

Mitigation Monitoring Report Cover Sheet
Oregon Department of State Lands

Block 1: Report Information

DSL Permit Number: 26208 COE Permit Number: Nationwide Permit -#2001-1031
 Permittee: Ken Reynolds
 County: Benton Report Date: December 9, 2014 Monitoring Year 11
 Date Removal-Fill Activity Completed:
 Date mitigation was completed Grading: 2002 Planting: 2004
 Report submitted by: Oregon Wetlands LLC

Block 2: Monitoring Report Purpose

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

X Compensatory **freshwater** wetland mitigation for permanent wetland impacts.

NA Compensatory **estuarine** wetland mitigation for permanent wetland impacts.
Only non-wetland compensatory mitigation.

Only mitigation for temporary impacts that has a monitoring requirement.
 Voluntary wetland enhancement, creation or restoration (General authorization or individual permit) not funded with money from our wetland mitigation revolving fund.

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

X **Mitigation Bank** Report

Other: _____

Block 3: Results

| | Success Criteria | Met? (Y/N) | Comments/Reasons for Failure* |
|----|----------------------|------------|-------------------------------|
| 1. | Hydrology | Yes | |
| 2. | Community Types | Yes | |
| 3. | Structural Diversity | Yes | |
| 4. | Species Diversity | Yes | |
| 5. | Tree and Shrubs | Yes | |
| 6. | Ground Cover | Yes | |
| 7. | Non-Native Species | Yes | |
| 8. | Wildlife Habitat | Yes | |

| | | |
|--|-------|------|
| Remedial work recommended | Yes | No X |
| Deed Restriction or other protection instrument attached <small>(noted: if a filed deed restriction was a required as a permit condition, please attach a copy: _____ previously submitted)</small> | Yes X | No |
| Final Monitoring Report? | Yes | No X |
| Requesting release or partial release of bond/credits | Yes | No X |

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1.0 REGULATORY BACKGROUND

The purpose of this report is to summarize the progress of the Frazier Creek Wetland Mitigation Bank (Bank). The Frazier Creek Wetland Mitigation Bank, owned by Ken Reynolds, is located in Corvallis, Oregon. The site is located in Township 11 South, Range 4 West, northwest quarter of Section 18, Tax Lot 400, Benton County, Oregon. The Bank is contiguous with the Jackson-Frazier Wetland. The letter of approval for the Bank was signed in 2002 and is permitted as ACOE permit #2001-1031.

The Bank is 26.01 acres, all of which was deemed cropped wetlands that generated credits at a 2:1 ratio. The Bank has a potential of 12.63 credits. All of the 12.63 credits have been released.

2.0 WORK SUMMARY

The focus of 2014 work was to eliminate the few remaining non-native species, foster the increased diversity, and monitor the site for any unforeseen issues. The forbs dominated areas provided the main source of maintenance work. This area was then walked several times throughout the growing season to spot treat any non-native species. The forbs, sedges and rushes established well as evident on the site visit, monitoring photos, and in the monitoring data. The final walk through on 11/20/14 indicated excellent establishment of all perennial species, with extensive germination of annuals in-between. Forbs dominated areas were treated with a grass specific herbicide in early November to reduce competition with forbs, sedges, and rushes.

The remainder of the site was walked several times to spot treat mainly non-native grasses. Several areas were flagged and patch treated with a broadleaf specific herbicide where spot spraying was not practical or advantageous. The forbs dominated areas were mowed for the first time, in conjunction with maintenance trails and the perimeter of the site in a way to distribute as much seed as possible. Several small areas were mowed last, to aid in early detection of non-native grasses in a way to not distribute seed.

3.0 AS-BUILT PLANS

As-built monitoring was conducted March 29, 2004.

4.0 MONITORING METHODOLOGY AND GENERAL RESULTS

Vegetation monitoring was conducted on June 13, 2014 by Ray Fiori. Complete monitoring results are included as Attachment 1 and the Monitoring Point Location Map is included as Attachment 2, updated with the 2009 imagery. Eight-nine monitoring plots were examined. The monitoring was conducted according to approved Bank protocols, with only minor differences as have been noted previously. Based on comments received from the regulatory agencies following the 2012 site visit, additional monitoring was completed in 2013 & 2014 to address several provisions within the extensive list of performance measures that had gone previously unnoticed/monitored.

Under the structural diversity component, section b) states multi-layered canopies must be present in hedgerow and northern perimeter of wetland forest (also referred to as transitional shrub). This measure has been previously monitored in the hedgerows, but neglected in northern perimeter of wetland forest. Data was collected in 2013 & 2014 to document species composition as well as average height for tree species, average width for shrub species, and aerial coverage.

Under the survivorship of trees and shrubs, section a) survivorship of trees and shrubs should result in planting densities within 5% recommended in the planting plan. The planting plan for hedgerow planting recommended 985

plants so the survivorship target is 936-985 plants. Aerial coverage is utilized in the monitoring due to extensive growth. The planting plan for the forested wetland called for planting of 1,050 Ash and no shrubs for a survivorship target of 1,000-1,050 Ash trees, or 293 stems/ac. The planting plan for the transitional shrub area (also referred to as Northern edge of wetland forest) called for 350 plants for a survivorship target of 333-350 plants. This habitat is very mature and also has a diversity component, so species composition, average height of trees, average width of shrubs, and estimate of aerial coverage was utilized in monitoring. The planting plan for the willow area called for planting 275 willows, so the survivorship target is 260-275 plants. Since this area is small, and total plant counts were used in the past that protocol was followed in 2014, although with extensive growth, absolute cover will be used in 2015.

Under the survivorship of ground cover, section c) There should be 50% ground cover within 2 years in the shrub and forest habitat. At this point the hedgerow and transitional shrub areas are closed canopy systems, with organic leaf litter being the dominant ground cover. The ash forest has 20 monitoring points to document ground cover. Two plots were established in the willow area last year to quantify ground cover. From the center of the area, 2 pin flags were thrown, one in each direction to establish random plots. They are illustrated on the monitoring map, and data was collected. The herbaceous layer will slowly fade away over time as the canopies close in on these habitats.

4.1 Northern Boundary Hedgerow

As noted in the 2008 monitoring report, the protocol for monitoring the hedgerow planting was modified in 2008 due to the density of the vegetation and has been followed since. The protocol is as follows: the species of shrubs and trees, approximate size, row width and estimate of aerial cover are noted within a 10' length of hedgerow starting at the plot marker and extending 10' to the west within the hedgerow. (Previous Report)

The hedge row tree and shrub layer accounted for approximately 95.9% of the cover. The hedgerow shrub/tree vegetation averaged 15.7 feet in width. The average high shrub/tree height was about 25.5 feet and average shrub height was 8.5 feet. The hedge row continues to thrive and function as planned.

99.29% of the herbaceous and grass species within the hedge row are native. A small amount of Rough stalk bluegrass was present in plot 6, where the canopy is not completely closed. This is now a closed canopy system, so herbaceous species are only present on the borders where there is some light penetration, but mostly devoid of herbaceous cover within the original monitoring points.

4.2 Willow Planting Southwest Portion of Bank

Additional willow cuttings were installed in early spring 2012, with good survival as evident on the annual site visit. Non-native vegetation has also been eliminated from the understory, providing space for additional native woody plants to thrive. During the time of monitoring, 141 native woody plants were present, dominated by willows with a few native recruits. As indicated in the instrument, the primary objectives of this area was to provide structural diversity and wildlife cover, both of which are being accomplished.

*The herbaceous layer is dominated by leaf litter among the originally planted willows, as these plants are quite large and this should be expected as succession moves forward. After extensive non-native control this year, the more open areas are mostly bare with remnant populations of dense sedge (*Carex densa*), tufted hairgrass (*Deschampsia cespitosa*), and meadow barley (*Hordeum brachyantherum*), which were avoided during spot spraying. Although it shouldn't be expected to prosper in the future as the woody species expand, the understory was planted with a native prairie mix to occupy space while the overstory is establishing. Additional willow cuttings will be installed in late winter to expedite canopy closure. (Previous Report, 2012)*

To quantify the herbaceous layer in the willow area this year, 2 monitoring plots were established, with the same monitoring protocol as the herbaceous layer in the ash forest. The herbaceous layer is dominated by native species which represent 65% cover. Native herbaceous cover dropped slightly this year, with limited growth resulting from spot herbicide treatment of selective herbicide for non-natives. The limited growth actually provided additional soil moisture for trees and shrubs which expanded dramatically this year. The total plant count for this area was 290 live plants, which provided 50% aerial coverage with 4 species present.

4.3 Ash Forest and Shrub Edge

Approximately 3.5 acres of ash forest with a shrub edge were planted in 2004. Sampling protocols have changed over the years with varying sample sizes, plot locations and reporting of results. The sampling protocols developed and implemented in 2009 continue to be followed. Twenty plots are monitored using a 20' diameter for the overstory layer and a 3' by 3' plot for the herbaceous layer, the center of each plot being the stake. (Previous Report)

In 2014, there were 14.25 trees per plot, which represents 360.7 trees/acre. There is abundant native Ash seedlings, and with survivorship standards already met, the woody component is not of concern. The herbaceous layer is 85% native vegetation cover, with only 6.25% non-native cover, and no non-native invasives. Extensive work has gone into eliminating non-native species the last 3 years which has led to increased native cover, increased tree growth, and decreased bare ground. As the trees continue to grow and the canopy begins to close, herbaceous cover will ultimately decrease in the long-term

4.4 Wet Prairie

Grass cover versus forb cover in the wet prairie remains high at 88.4% grass, but this was reduced from 93.4% grass cover in 2011. Meadow barley remains the most dominant species at 46.63%. The next most abundant species are tufted hairgrass at 22.22%, spike bentgrass at 13.91% and slough grass at 3.58%. Pennyroyal, the most abundant non-native in 2011 was reduced from 1.63% cover to 0.33%. In order to increase diversity, a portion of the prairie was burned, and planted to a diversity of native forbs. (Previous Report, 2012)

Forty-six plots were monitored located along east-to-west transects that were about 200 feet apart. There were approximately 3.3 sample plots per acre in the wet prairie.

Total native cover is 87.44%, with no non-native invasives. This year grass cover versus forbs cover in the wet prairie was 59.33% grass and 33.11% forbs/sedge/rush. Meadow barley remains the most dominant grass species at 34%, while Common selfheal is the most dominant forbs species at 11.89%. The next most abundant species are tufted hairgrass at 15.44% and Slender rush at 3.33%.

4.5 Swale and Emergent

The swale and emergent community remain diverse with 19 native fac or wetter species. The biggest changes from 2011 are a slight shift in species dominance, coupled with a significant reduction in pennyroyal. Creeping spike rush and pointed rush were the most dominant species in 2012, while pennyroyal was reduced to 5.5% cover. Pennyroyal was subsequently eliminated from these habitats by the end of the growing season, but conditions were not advantageous for effective control until after the monitoring period. (Previous Report)

The swale and emergent community remain diverse with 20 native fac or wetter species. Native cover is 93.5%, with only 4% non-native species, and 1% non-native invasives. The small amount of Reed canary

grass was treated in the fall to allow for translocation of the herbicide into the root system, resulting in long term control.

4.6 Transitional Shrub

*The transitional shrub zone on the north and east side of the ash forest continues to do remarkable. It has excellent coverage and variety of shrub and trees species. The shrub coverage averages 7-10 feet in height and the tree height averages 12-25 feet in a row 22 feet wide. The species noted includes Douglas hawthorn (*Crataegus douglasii*), Oregon ash (*Fraxinus latifolia*), Pacific crabapple (*Pyrus fusca*), cottonwood (*Populus balsamifera*), cascara (*Rhamnus purshiana*), red-osier dogwood (*Cornus stolonifera*) Douglas spirea (*Spiraea douglasii*), Nootka rose (*Rosa nutkana*), clustered rose (*Rosa pisocarpa*), and willow (*Salix ssp*). One Himalayan blackberry was encountered, which was removed. There is little herbaceous layer due to the full coverage by the shrub and trees. Species noted includes: Slough sedge, Dense sedge, curly dock, Fringe cup, and tufted hairgrass. (Previous Report)*

This area was formally monitored this year to quantify habitat conditions, and species diversity. There is four species of native trees and four species of native shrubs present providing multilayered canopies, excellent diversity, and 95% aerial coverage.

5.0 PERFORMANCE STANDARDS AND MONITORING RESULTS

5.1 Hydrology

Performance Standards

- a) Surface water should be visible in the distribution channel
- b) Wetland hydrology as defined in the 1987 COE Manual must be present
- c) The standard will be satisfied when the objective has been satisfied in two years with normal or below precipitation beginning in 2003

Results – *Criteria Satisfied*

Hydrology monitoring performance standards were previously met, following two years of monitoring during years of normal or below normal precipitation. As such, no additional hydrology monitoring was completed.

5.2 Community Types

Performance Standards

Six community types should be present in the approximate locations identified on the planting plan. The area of each community type should be within five percent of the proposed area.

Results - *Criteria Satisfied*

Six community types (hedgerow scrub/shrub, forest, wet prairie, flooded emergent, transitional shrub edge, and shrub willow) are present. They are located in the approximate location designated on the planting plan.

5.3 Structural Diversity

Performance Standards

- a. Grass, shrub, and forest habitats must be present
- b. Multilayered canopies must be present in the hedgerows and northern perimeter of wetland forest.

Results - *Criteria Satisfied*

- a. Each of the three specified habitats is present.
- b. The hedgerow and the northern perimeter of the wetland forest have a mixed canopy of both low and high growing shrubs and trees.

5.4 Species Diversity

Performance Standards

- a. Three native species of trees maturing at >20 feet must be present
- b. Minimum of four species of shrubs in hedgerows and transitional shrub zone
- c. Twelve native species of groundcover in emergent zone including three species of *Carex*, two species of *Juncus*, *Deschampsia cespitosa*, *Hordeum brachyantherum*, and four species of forbs.

Results - *Criteria Satisfied*

- a. Five species of native trees were identified during the monitoring, including Oregon ash, Douglas hawthorn, cascara, cottonwood, and western crabapple.
- b. Five native shrubs, Nootka rose, cluster rose, Douglas spirea, red-osier dogwood and willow are present within the hedgerows and transitional shrub zone.
- c. Within the emergent zone, four species of *Carex*, three species of *Juncus*, *Deschampsia cespitosa*, *Hordeum brachyantherum*, and eight native forbs are present. Overall, 20 native species were identified in the groundcover within the emergent wetland. In addition there is one more native rush of a different genus.

5.5 Tree and Shrubs

Performance Standards

- a. Planting density within five percent of planting plan—typically 80 to 100% survivorship
- b. Increase aerial cover in successive years; 15% aerial cover of trees 3 years after planting; 40 to 60% aerial cover of shrubs after three years.

Results – *Criteria satisfied*

- a. Tree and shrub survivorship along with natural propagation within the hedgerows, willow area, transitional shrub, and ash forest surpass the 100% survivorship standard.
- b. The aerial extent of the trees and shrubs has met the 15% coverage by trees and 40-60% by shrubs in all community types.

5.6 Ground Cover

Performance Standards

- a. 30 to 50% native ground cover in emergent and wet prairie zones after one year
- b. 60 to 80% ground cover of native Willamette Valley species two years after installation in emergent and wet prairie zones
- c. 50% native ground cover within two years in shrub and forest habitat

Results - *Criteria satisfied*

- a & b. Within the emergent/swale community, 93% of the cover is native vegetation and within the wet prairie zone, there is 87.44% native vegetation.
- c. The hedge row has 95.9% native aerial cover, with 99.2% of the limited herbaceous layer native species. The 0.2 acre shrub/willow wetland is approximately 50% native aerial cover, and 65% of the herbaceous cover is native. The transitional shrub area is 95% native aerial cover, with no herbaceous layer due to canopy closure. The Ash forest has 85% native herbaceous cover.

5.7 Non-Native Species

Performance Standards

- a. Ryegrass should be plowed under and removed prior to active installation of native plants. Not to exceed 10% of ground cover.
- b. Zero tolerance for reed canary grass, Himalayan blackberry, Evergreen blackberry (*Rubus ursinus*), purple loosestrife (*Lythrum salicaria*), kudzu (*Pueraria* ssp.), Japanese knotweed (*Polygonum cuspidatum*), and poison hemlock (*Conlon maculatum*), the first two years after installation.
- c. Aerial cover of species listed in b. should be no more than five percent two years after plant installation and <15% thereafter.

Results - *Criteria satisfied.*

- a. No Ryegrass present
- b. & c. The only two zero tolerance species noted at all within the Bank are trace amounts of Himalayan blackberry and reed canary grass, both of which were treated in early fall when control is most effective.

5.8 Wildlife Habitat

Performance Standards

- a. Emergent, prairie, shrub, and forest habitat types must be present.
- b. There should be sightings or signs of songbirds, waterfowl, shorebirds, amphibians, and mammals each year. The number of sightings should increase annually as habitats mature.

Results - *Criteria satisfied.*

- a. All of the habitat types are present.
- b. Sightings of songbirds, waterfowl, shorebirds, amphibians, and mammals were recorded.

6.0 PHOTO POINT MONITORING

Photos from the photo points are included as Attachment 3. Photos were taken on June 13, 2014 and the location and photo direction is listed on each photo.

7.0 SUGGESTED REMEDIAL

At this point native species are well established and thriving in all habitats. Spot spraying will be utilized to eliminate any non-natives that are indentified. Grass specific herbicide will be utilized in the forbs area to decrease native grass competition as needed.

8.0 CREDIT SALES SUMMARY

As of May 2014 all 12.63 credits have been released. Of these 12.63 credits, 8.22 have been sold. To date 4.413 credits remained unsold and documented in table 1.

Table 1: Credit Sales Summary:

| <i>DATE</i> | <i>NAME</i> | <i>DSL</i> | <i>CORP</i> | <i>ADDED</i> | <i>SOLD</i> | <i>BALANCE</i> |
|-------------|-------------------------------|---------------|--------------|--------------|-------------|----------------|
| 04/02/2003 | CORPS/DSL INITIAL RELEASE | Permit Number | | 3.92 | | 3.92 |
| 04/22/2003 | Cascade View Developments LLC | 26456 | | | 0.03 | 3.89 |
| 07/08/2003 | City of Corvallis | 30408 | | | 0.42 | 3.47 |
| 07/24/2003 | Norway Development | 5418 | | | 0.1 | 3.37 |
| 01/16/2004 | Timberhill Corp | 24132-RF | | | 0.26 | 3.11 |
| 05/26/2004 | DSL Revolving Fund | | | | 0.17 | 2.94 |
| 06/02/2004 | Timberhill Corp | 30514-FP | 2000-0320 | | 1.28 | 1.66 |
| 08/12/2004 | CREDIT RELEASE 2 | | | 1.96 | | 3.62 |
| 08/27/2004 | Jim Shaver | 32347-GA | 2004-0326 | | 0.06 | 3.56 |
| 07/13/2004 | Rodger Nyquist | | 2003-0053 | | 0.03 | 3.53 |
| 09/06/2004 | Ronald Neilson | | | | 0.02 | 3.51 |
| 09/20/2004 | Clearwater II LLC | 32861-FP | | | 0.19 | 3.32 |
| 11/18/2004 | Thomas Fox Properties | 32863-FP | | | 0.77 | 2.55 |
| 11/30/2004 | Sammi Molvi | 32811-FP | | | 0.28 | 2.27 |
| 12/17/2004 | Development by Design | 33260-FP | | | 0.14 | 2.13 |
| 04/11/2005 | Bill Boyd | 33384 | | | 1.14 | 0.99 |
| 06/29/2005 | J. Conser & Sons | 33868-RF | | | 0.43 | 0.56 |
| 08/26/2005 | Tuscany Estates | 34542-RF | | | 0.47 | 0.09 |
| 03/24/2006 | ODOT Philomath Couplet | 34148-GA | | | 0.06 | 0.03 |
| 05/17/2012 | CREDIT RELEASE 3 | | | 2.00 | | 2.03 |
| 04/16/2013 | CREDIT RELEASE 4 | | | 2.00 | | 4.03 |
| 05/20/2013 | Conser Design | FP-15070 | | | 0.91 | 3.12 |
| 11/08/2013 | Corvallis Memory Facility | 54649 | NWP 2013-237 | | 0.01 | 3.11 |
| 5/16/14 | CREDIT RELEASE 5 | | | 2.75 | | 5.86 |
| 5/20/2014 | City of Albany | 55393-RF | NWP 2014-31 | | 0.167 | 5.693 |
| 7/28/ 2014 | Casco Communications | 55978 | 2014-127 | | 1.28 | 4.413 |

9.0 CONCLUSION

The Frazier Creek Wetland Mitigation Bank is performing well and on track to be a highly successful mitigation bank. Non-native species have been virtually eliminated, allowing native species to flourish. Additional diversity was added to the prairie in 2012 and far exceeds performance standards. The greatest deficiencies in the past have been low stem counts coupled with a weedy understory in the willow area, an understory dominated by non-native species in the designated ash forest, and increasing amounts of pennyroyal throughout the site, all of which have been rectified. As was evident during the annual site visit and documented in the monitoring results, the site has evolved quickly, back on a highly successful trajectory. Based on late fall observations, 2015 is shaping up to be even more impressive, far exceeding the performance standards with excellent diversity, few non-natives, and no invasives.

Attachment 1: Sample Plot Monitoring Data

| | Transect 3 | | | | | | | | | | | | Transect 4 | | | | | | | | | | Transect 5 | | |
|-----|------------|-----|----|-----|-----|-----|-----|----|-----|----|----|----|------------|----|----|-----|----|-----|-----|-----|----|----|------------|--|--|
| 13 | 1 | 3 | 4 | 5 | 7 | 8 | 10 | 11 | 12 | 13 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10e | 10w | 11 | 1 | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 10 | | | | | | 15 | | | | | | | | | | | | | | | | | | |
| | 10 | | | | | | | | | | 10 | | | | | | 20 | | | | | | | | |
| | 10 | | | | | | | | | | | | | | | | 5 | | 10 | | | | | | |
| | | | | | | | | 5 | 5 | | | | 10 | 5 | | | | | 5 | 15 | | | | | |
| | | | 5 | | | | 5 | | | | | 5 | 10 | 5 | | | | | 5 | | | | | | |
| | | | | | | | | | | | | | | | | | | 5 | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 10 | 25 | 30 | 20 | 15 | | | | | | | 30 | | | | | | | 10 | 20 | | | |
| | | | | | 5 | | 5 | | | | | | | | | 70 | 25 | 25 | 5 | | 5 | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90 | 30 | 30 | | 20 | | 5 | 10 | | | | | 25 | 10 | 20 | 25 | 10 | | 25 | 20 | 30 | 30 | 20 | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | 10 | | | | | | | | | | | | | | | |
| | 15 | 60 | 45 | 50 | 75 | 80 | 65 | 70 | 75 | 70 | | 60 | 75 | 80 | 45 | 35 | | 50 | 35 | 40 | 40 | 30 | 40 | | |
| | | | 5 | | | | | | | 5 | | | | | | | | | | | | | 5 | | |
| | | | | | | | | | 15 | 5 | | 10 | | | | | | | | 5 | | | | | |
| | 25 | | 20 | | | | | 25 | | 15 | | 5 | 10 | 10 | 15 | | 20 | | 10 | 25 | 15 | 10 | 15 | | |
| 100 | 75 | 100 | 80 | 100 | 100 | 100 | 100 | 75 | 100 | 85 | | 95 | 90 | 90 | 85 | 100 | 80 | 100 | 90 | 75 | 85 | 90 | 85 | | |
| 100 | 75 | 100 | 75 | 100 | 100 | 100 | 100 | 70 | 75 | 70 | | 95 | 80 | 90 | 75 | 95 | 80 | 100 | 85 | 75 | 75 | 75 | 80 | | |

Attachment 1: Sample Plot Monitoring Data

| Frazier Creek Wetland Mitigation Bank | | | | | | | | | | | | | | |
|---|------------------------------|--------|--------|---------------------------|------|-------|------|-------|------|-------|-------|------|------|-------|
| Swale/Emergent Plot Data | | | | | | | | | | | | | | |
| June 13, 2014 | | | | | | | | | | | | | | |
| Common Name | Botanical Name | Status | Origin | Ave. Cover ea. Species | 1 | 2 | 3 | 4 | 5 | T1-10 | T2-5 | T2-6 | T3-9 | T4-9 |
| Overstory Species | | | | | | | | | | | | | | |
| <i>Fraxinus latifolia</i> | Oregon ash | FACW | native | | | | | | | | | | | |
| Herbaceous Species - percent cover | | | | | | | | | | | | | | |
| <i>Alisma gramineum</i> | Narrow leaf water plantain | OBL | native | 3.0 | 5 | | 25 | | | | | | | |
| <i>Bidens frondosa</i> | Leafy beggars-tick | FACW | native | 0.0 | | | | | | | | | | |
| <i>Carex densa</i> | Dense sedge | OBL | native | 1.0 | | | | | | 10 | | | | |
| <i>Carex feta</i> | Green-sheath sedge | FACW | native | 5.0 | | | | | | | | | | 50 |
| <i>Carex obnupta</i> | Slough sedge | OBL | native | 2.0 | | | | 20 | | | | | | |
| <i>Carex unilateris</i> | One-sided sedge | FACW | native | 4.5 | | 10 | | | | 5 | 10 | | | 20 |
| <i>Centaurium umbellatum</i> | Common centuray | FAC | non | 0.5 | | | | | | | | 5 | | |
| <i>Eleocharis palustris</i> | Creeping spike rush | OBL | native | 13.0 | 65 | 20 | 15 | 10 | 5 | | | | 15 | |
| <i>Epilobium densiflorum</i> | Denseflower willowherb | FACW | native | 0.0 | | | | | | | | | | |
| <i>Epilobium watsonii</i> | Watson's willow herb | FACW | native | 0.0 | | | | | | | | | | |
| <i>Eriophyllum lanatum</i> | Oregon sunshine | NOL | native | 2.0 | | | | | | | | 20 | | |
| <i>Juncus acuminatus</i> | Tapered rush | OBL | native | 20.0 | | 35 | 15 | 40 | | 60 | | | 50 | |
| <i>Juncus effusus</i> | Soft rush | FACW | native | 0.0 | | | | | | | | | | |
| <i>Juncus oxymeris</i> | Pointed rush | FACW | native | 1.0 | | | | | | 10 | | | | |
| <i>Lemna minor</i> | Common duckweed | OBL | native | 4.0 | | | 15 | | 25 | | | | | |
| <i>Mentha pulegium</i> | Pennyroyal | OBL | non | 0.0 | | | | | | | | | | |
| <i>Mimulus guttatus</i> | Yellow Money-flower | OBL | native | 1.0 | | | | | | | | 10 | | |
| <i>Myosotis laxa</i> | small flowered forget me not | OBL | native | 4.0 | | 10 | 5 | 20 | 5 | | | | | |
| <i>Oenanthe sarmentosa</i> | Pacific water parsley | OBL | native | 4.0 | | | | | 40 | | | | | |
| <i>Parentucellia viscosa</i> | Yellow parentucellia | FAC | non | 0.0 | | | | | | | | | | |
| <i>Plagiobothrys figuratus</i> | Fragrant popcorn flower | FACW | native | 0.0 | | | | | | | | | | |
| <i>Prunella vulgaris</i> | Common selfheal | FACU | native | 5.5 | | | | | | | | 55 | | |
| <i>Rumex conglomeratus</i> | Clustered dock | FACW | non | 0.0 | | | | | | | | | | |
| <i>Rumex crispus</i> | Curly Dock | FAC | non | 0.0 | | | | | | | | | | |
| <i>Sidalcea nelsoniana</i> | Nelson's checkermallow | FACW | native | 0.0 | | | | | | | | | | |
| <i>Typha latifolia</i> | Cat tail | OBL | native | 1.5 | | 15 | | | | | | | | |
| <i>Veronica scutella</i> | Skullcap speedwell | OBL | native | 0.0 | | | | | | | | | | |
| Grass Species - percent cover | | | | | | | | | | | | | | |
| <i>Agrostis exarata</i> | Spike bentgrass | FACW | native | 0.5 | | | | | | 5 | | | | |
| <i>Alopecurus geniculatus</i> | Water foxtail | OBL | native | 0.5 | | | | | 5 | | | | | |
| <i>Beckmania syzigachne</i> | Slough grass | OBL | native | 3.5 | | 10 | | 10 | 5 | 10 | | | | |
| <i>Deschampsia cespitosa</i> | Tufted hairgrass | FACW | native | 5.0 | | | | | | | 50 | | | |
| <i>Glyceria elata</i> | Tall manna grass | FACW | native | 5.0 | 15 | | 15 | | 5 | | | | 15 | |
| <i>Hordeum brachyantherm</i> | Meadow barley | FACW | native | 7.0 | | | | | | 5 | 30 | 5 | | 30 |
| <i>Poa trivialis</i> | Rough-stalk bluegrass | FACW | non | 0.0 | | | | | | | | | | |
| <i>Phalaris arundinacea</i> | Reed canary grass | FACW | non | 1.0 | | | | | 10 | | | | | |
| <i>Vulpia myuros</i> | Rat-tail fescue | NOL | non | 0.5 | | | | | | | | 5 | | |
| Bareground: | | Mean= | 0.5 | | | | | | | 5 | | | | |
| Open Water: | | Mean= | 2.5 | | 15 | | 10 | | | | | | | |
| Relative % listed species invasive canopy cover : | | Mean= | 1.0 | | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 |
| Listed species includes reed canary grass, Himalayan Blackberry, evergreen blackberry, purple loosestrife, kudzu, Japanese knotweed and poison hemlock. | | | | | | | | | | | | | | |
| Number of native species = 21 | | | | | | | | | | | | | | |
| Species of Sedge = 4 | | | | | | | | | | | | | | |
| Species of Rush = 3 | | | | | | | | | | | | | | |
| Species of Native Forbs = 8 | | | | | | | | | | | | | | |
| % native canopy cover (Excludes bare substrate): | | | | | | | | | | | | | | |
| | | Mean= | 93.00 | | 85.0 | 100.0 | 90.0 | 100.0 | 90.0 | 95.0 | 100.0 | 90.0 | 80.0 | 100.0 |

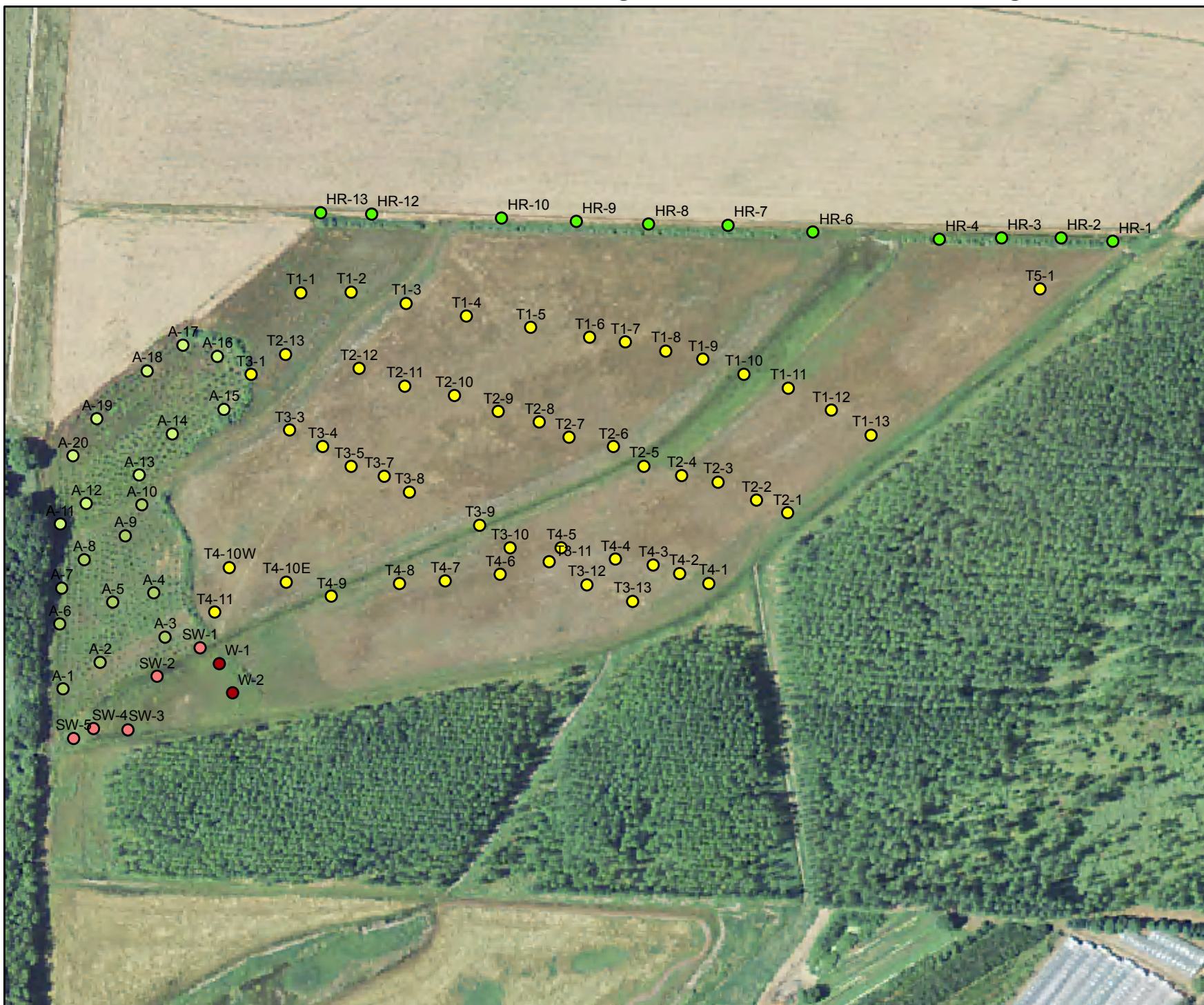
Attachment 1: Sample Plot Monitoring Data

| Frazier Creek Wetland Mitigation Bank Hedge Row Plot Data - June 13, 2014 | | | | | | | | | | | | | | | |
|---|------------------------------|--------|--------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Common Name | Botanical Name | Status | Origin | Cover | 1 | 2 | 3 | 4 | 6 | 7 | 8 | 9 | 10 | 13 | |
| Tree Species - % aerial coverage within 10' length of hedgerow unless noted | | | | | | | | | | | | | | | |
| <i>Fraxinus latifolia</i> | Oregon ash | FACW | native | 1.36 | | | | | 5 | 10 | | | | | |
| <i>Rhamnus purshiana</i> | Cascara | FAC | native | 0.45 | | | | | | | | | | 5 | |
| <i>Salix ssp.</i> | Willow ssp. | FACW | native | 28.18 | 5 | 55 | 40 | 30 | | 30 | 10 | 5 | 20 | 65 | |
| Scrub/Shrub Species -% aerial coverage within 10' length of hedgerow | | | | | | | | | | | | | | | |
| <i>Rosa nutkana</i> | Nootka rose | FAC | native | 33.64 | 50 | 20 | 35 | 30 | 30 | 30 | 40 | 50 | 40 | 25 | 20 |
| <i>Rosa pisocarpa</i> | Clustered rose | FAC | native | 32.27 | 45 | 20 | 25 | 40 | 30 | 30 | 45 | 45 | 40 | 25 | 10 |
| Total Cover by Trees and Shurbs | | | | | 100 | 95 | 100 | 100 | 65 | 100 | 95 | 100 | 100 | 100 | 100 |
| Average % Cover Trees and shrub | | mean= | 95.9 | | | | | | | | | | | | |
| Average row width (feet) | | mean | 15.5 | | 14 | 20 | 16 | 16 | 10 | 15 | 14 | 16 | 22 | 22 | 22 |
| Average shrub height (feet) | | mean= | 8.5 | | 7 | 8 | 8 | 8 | 8 | 10 | 8 | 7 | 9 | 10 | 10 |
| Average tree height (feet) | | mean= | 25.1 | | 16 | 20 | 15 | 20 | 8 | 20 | 14 | 15 | 18 | 30 | 25 |
| * 2 plots were removed from monitoring. They are on the rock berms and are sprayed yearly. | | | | | | | | | | | | | | | |
| Herbaceous Species - percent cover | | | | | | | | | | | | | | | |
| <i>Alisma gramineum</i> | Narrow leaf water plantain | OBL | native | 4.55 | | | | 50 | | | | | | | |
| <i>Bidens frondosa</i> | Leafy beggars-tick | FACW | native | 0.00 | | | | | | | | | | | |
| <i>Carex densa</i> | Dense sedge | OBL | native | 4.09 | | | | 5 | 5 | 5 | 10 | 10 | 10 | | |
| <i>Carex obtusa</i> | Slough sedge | OBL | native | 0.45 | | | | | | 5 | | | | | |
| <i>Carex unilateralis</i> | One-sided sedge | FACW | native | 1.36 | | | | | | 5 | 5 | | 5 | | |
| <i>Cirsium arvense</i> | Canada thistle | FACU | non | 0.00 | | | | | | | | | | | |
| <i>Eleocharis palustris</i> | Creeping spike rush | OBL | native | 1.36 | | 10 | | | | | 5 | | | | |
| <i>Epilobium ciliatum</i> | Fringed willoweed | FACW- | native | 0.00 | | | | | | | | | | | |
| <i>Epilobium watsonii</i> | Watson's willow herb | FACW | native | 0.00 | | | | | | | | | | | |
| <i>Juncus effusus</i> | Soft rush | FACW | native | 2.27 | | | | 10 | | 5 | 5 | | 5 | | |
| <i>Lactuca serriola</i> | Prickly lettuce | FACU | non | 0.00 | | | | | | | | | | | |
| <i>Mentha pulegium</i> | Pennyroyal | OBL | non | 0.00 | | | | | | | | | | | |
| <i>Myosotis laxa</i> | Small-flowered forget me not | OBL | native | 0.00 | | | | | | | | | | | |
| <i>Parentucellia viscosa</i> | Yellow parentucellia | FAC | non | 0.00 | | | | | | | | | | | |
| <i>Rubis discolor</i> | Himalayan blackberry | FACU | non | 0.00 | | | | | | | | | | | |
| <i>Rumex crispus</i> | Cury dock | FAC | non | 0.00 | | | | | | | | | | | |
| <i>Sonchus asper</i> | Spiny sow thistle | FAC | non | 0.00 | | | | | | | | | | | |
| Grass Species - percent cover | | | | | | | | | | | | | | | |
| <i>Agrostis exarata</i> | Spike bentgrass | FACW | native | 0.00 | | | | | | | | | | | |
| <i>Alopecurus pratensis</i> | Meadow foxtail | FACW | non | 0.00 | | | | | | | | | | | |
| <i>Beckmania syzigachne</i> | Slough grass | OBL | native | 1.82 | | | | | | 20 | | | | | |
| <i>Deschampsia cespitosa</i> | Tufted hairgrass | FACW | native | 0.00 | | | | | | | | | | | |
| <i>Hordeum brachyantherm</i> | Meadow barley | FACW | native | 6.36 | | | | | | 70 | | | | | |
| <i>Lolium multiflorum</i> | Annual regrass | NOL | non | 0.00 | | | | | | | | | | | |
| <i>Poa ssp.</i> | Bluegrass | FAC | non | 0.45 | | | | | | 5 | | | | | |
| Bareground due to Canopy Closure | | Mean= | 77.3 | | 100 | 90 | 100 | 35 | | 80 | 75 | 90 | 80 | 100 | 100 |
| Total Cover by herbaceous and grass species: | | Mean= | 22.7 | | 0 | 10 | 0 | 65 | 100 | 20 | 25 | 10 | 20 | 0 | 0 |
| Percentage of the herbaceous and grass species that is native | | Mean = | 99.29 | | 0 | 100 | 0 | 100 | 95 | 100 | 100 | 100 | 100 | 0 | 0 |
| Relative % listed species invasive canopy cover : | | Mean= | 0.00 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Listed species includes reed canary grass, Himalayan Blackberry, evergreen blackberry, purple loosestrife, kudzu, Japanese knotweed and poison hemlock. | | | | | | | | | | | | | | | |

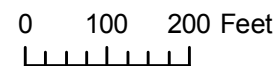
Attachment 1: Sample Plot Monitoring Data

| Frazier Creek Wetland Mitigation Bank | | | | | | | | | | | | | | | | | | | | | | | | |
|--|----------------------------|-------|--------|-------|-------|----|----|-----|----|-----|----|----|-----|-----|-----|----|-----|----|-----|-----|----|-----|-----|-----|
| Ash Plot Data and Willow Area - June 13, 2014 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| Number of Ash Trees - stem count within 20' radius. | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of non-saplings | | | | 10.4 | | | | | | | | | | | | | | | | | | | | |
| Average height in feet (not including new saplings) | | | | | | | | | | | | | | | | | | | | | | | | |
| Average of all trees per plot = | | | | 14.25 | | | | | | | | | | | | | | | | | | | | |
| Average non-saplings* per plot = | | | | 10.4 | | | | | | | | | | | | | | | | | | | | |
| Average height of non-saplings per plot = | | | | 12.0 | | | | | | | | | | | | | | | | | | | | |
| *trees greater than 3' in height | | | | | | | | | | | | | | | | | | | | | | | | |
| <i>Crataegus douglasii</i> | Douglas Hawthorn | FAC | native | | | | | 1 | | | | | | | | | | | | | | | | |
| Number of non-sapling trees/ac | | | | 360.7 | | | | | | | | | | | | | | | | | | | | |
| Herbaceous Species - percent cover in 3' x 3' plot (center of 20' radius plots) | | | | | | | | | | | | | | | | | | | | | | | | |
| <i>Carex densa</i> | Dense sedge | OBL | native | 5.50 | | | 30 | | 45 | 15 | 10 | | 10 | | | | | | | | | | | |
| <i>Carex feta</i> | Green-sheath sedge | FACW | native | 3.25 | | | | | | | | | | 15 | | 10 | 10 | 30 | | | | | | |
| <i>Carex obnupta</i> | Slough sedge | OBL | native | 0.00 | | | | | | | | | | | | | | | | | | | | |
| <i>Carex unilateris</i> | One-sided sedge | FACW | native | 17.00 | | | 15 | 40 | | 35 | 65 | 15 | | 15 | | 65 | 80 | 10 | | | | | | |
| <i>Centaurium umbellatum</i> | Common centuray | FAC | non | 0.25 | | | | | | | | | 5 | | | | | | | | | | | |
| <i>Epilobium watsonii</i> | Watson's willow herb | FACW | native | 0.00 | | | | | | | | | | | | | | | | | | | | |
| <i>Geum macrophyllum</i> | Oregon Avens | FACW | native | 4.00 | | | | | | 20 | | | 60 | | | | | | | | | | | |
| <i>Geranium viscosissimum</i> | Crane's bill geranium | FACU | non | 0.75 | | | | | | | | | | | | | | 10 | | 5 | | | | |
| <i>Hypochaeris radicata</i> | catsear dandelion | FACU | non | 0.50 | | | | 10 | | | | | | | | | | | | | | | | |
| <i>Juncus bufonius</i> | Toad rush | FACW | native | 4.25 | 5 | 5 | | 15 | | | | | | | 60 | | | | | | | | | |
| <i>Juncus tenuis</i> | Slender rush | FACW | native | 0.75 | | | | | 15 | | | | | | | | | | | | | | | |
| <i>Kickxia elatine</i> | Sharp-point fluellin | UPL | non | 0.25 | | | | | | | | | | | | | | | | | 5 | | | |
| <i>Lythrum portula</i> | Spatulate leaf loosestrife | NOL | non | 1.50 | 10 | 5 | | 10 | | 5 | | | | | | | | | | | | | | |
| <i>Mentha pulegium</i> | Pennyroyal | OBL | non | 0.00 | | | | | | | | | | | | | | | | | | | | |
| <i>Navaretia squarosa</i> | Skunkweed | FACU | native | 1.50 | 5 | 10 | | 15 | | | | | | | | | | | | | | | | |
| <i>Peplis portula</i> | Water-purslane | NOL | non | 0.00 | | | | | | | | | | | | | | | | | | | | |
| <i>Plagiobothrys liguratus</i> | Fragrant popcorn flower | FACW | native | 0.00 | | | | | | | | | | | | | | | | | | | | |
| <i>Polygonum amphibium</i> | Smartweed | OBL | native | 0.25 | | 5 | | | | | | | | | | | | | | | | | | |
| <i>Rorippa curvisiliqua</i> | Western yellowcress | OBL | native | 1.00 | 5 | | | 5 | | 5 | | 5 | | | | | | | | | | | | |
| <i>Rubus discolor</i> | Himalayan blackberry | FACU | non | 0.00 | | | | | | | | | | | | | | | | | | | | |
| <i>Sidalcea nelsoniana</i> | Nelson's checkermallow | FACW | native | 3.75 | 5 | 10 | 10 | | 10 | | | 15 | 5 | 5 | | 5 | 10 | | | | | | | |
| Grass Species - percent cover in a 3' x 3' plot | | | | | | | | | | | | | | | | | | | | | | | | |
| <i>Agrostis exarata</i> | Spike bentgrass | FACW | native | 1.00 | | | | 20 | | | | | | | | | | | | | | | | |
| <i>Alopecurus geniculatus</i> | Water foxtail | OBL | native | 9.00 | 5 | 30 | | 10 | 10 | | 10 | | 10 | | | | | | | 35 | 40 | | 20 | |
| <i>Alopecurus pratensis</i> | Meadow foxtail | FACW | non | 0.00 | | | | | | | | | | | | | | | | | | | | |
| <i>Avena sp.</i> | Wild oat | NOL | non | 0.25 | | | | | | | | | | | | | | 5 | | | | | | |
| <i>Beckmania syzigachne</i> | Slough grass | OBL | native | 0.50 | 10 | | | | | | | | | | | | | | | | | | | |
| <i>Bromus carinatus</i> | California brome | NOL | native | 0.00 | | | | | | | | | | | | | | | | | | | | |
| <i>Deschampsia cespitosa</i> | Tufted hairgrass | FACW | native | 3.25 | | | 15 | | | | | 25 | | | | | | | | 25 | | | | |
| <i>Deschampsia danthonioides</i> | Annual hairgrass | FACW: | native | 0.25 | | | | 5 | | | | | | | | | | | | | | | | |
| <i>Deschampsia elongata</i> | Slender hairgrass | FACW | native | 0.75 | | | | | | | | | | | | | | | | | | | 15 | |
| <i>Glyceria occidentalis</i> | Western mangrass | OBL | native | 0.50 | | | | | | | | | | | | | | | | | 10 | | | |
| <i>Holcus lanatus</i> | Velvet grass | FAC | non | 0.75 | | | | | | | | | | | 10 | 5 | | | | | | | | |
| <i>Hordeum brachyantherm</i> | Meadow barley | FACW | native | 28.00 | 35 | 35 | 10 | 15 | 10 | 15 | | 20 | 20 | | 40 | 20 | 10 | 5 | 5 | 65 | 50 | 50 | 80 | 75 |
| <i>Lolium multiflorum</i> | Annual regrass | NOL | non | 0.00 | | | | | | | | | | | | | | | | | | | | |
| <i>Panicum capillare</i> | Common witchgrass | FACU | native | 0.25 | 5 | | | | | | | | | | | | | | | | | | | |
| <i>Poa trivialis</i> | Rough-stalk bluegrass | FACW | non | 4.00 | | | | 10 | | 5 | 10 | 5 | 5 | | 15 | 5 | 5 | 5 | | | 5 | | 5 | 5 |
| <i>Ventenata dubia</i> | Red brome | NOL | non | 0.00 | | | | | | | | | | | | | | | | | | | | |
| <i>Vulpia myuros</i> | Rat-tail fescue | NOL | non | 0.75 | | | 10 | | | | | | 5 | | | | | | | | | | | |
| Bareground due to: recent spraying: 6.10 / Organic Litter | | | | mean= | 6.25 | | 15 | | 10 | 15 | 20 | | 20 | | 5 | | 40 | | | | | | | |
| Percent native groundcover | | | | mean= | 85.0 | | 75 | 95 | 80 | 90 | 65 | 75 | 85 | 95 | 90 | 80 | 85 | 80 | 90 | 95 | 55 | 90 | 95 | 90 |
| Percent total vegetation cover: | | | | Mean= | 93.75 | | 85 | 100 | 90 | 100 | 85 | 80 | 100 | 100 | 100 | 80 | 100 | 95 | 100 | 100 | 60 | 100 | 100 | 100 |

Frazier Creek Mitigation Bank Monitoring Points



- Transects
- Ash
- Swale
- Hedgerow
- Willow Area



Frazier Creek Mitigation Bank 2014 Photo Monitoring

Photo 1 T-1 West



Photo 2 T2-7 Northwest



Photo 3 T2-1 West



Photo 4 T2-1 Southeast



Photo 5 T4-9 North



Photo 6 T2-10 Northeast



Photo 7 SW across swale



Photo 8 Willow area West



Photo 9 Willow area Southwest



Photo 10 A-2 Northwest



Photo 11 Ash area SW corner



Photo 12 A-5 Northwest



Attachment 3: Monitoring Photos

Photo 13 T2-12 Northwest



Photo 14 T3-8 East



Photo 15 T4-9 Northeast



Photo 16 T2-9 East



Photo 17 T0-1 East



Photo 18 T2-12 East



Photo 19 T2-7

