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: March, 2012 Monitoring Year 8
Date Removal-Fill Activity Completed:
Date mitigation was completed Grading: 2002 Planting: 2004
Report submitted by: Frazier Creek Wetland Mitigation Bank

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	Met in all but one community type	Did not meet all of the criteria in the ash forest
7.	Non-Native Species	Yes	
8.	Wildlife Habitat	Yes	

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

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LIST OF ATTACHMENTS

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 13.005 credits. Of these 13 credits, the first 45% of the credits (5.88) have been released.

2.0 WORK SUMMARY

Site preparation began in late summer of 2002. Grading was done, including the construction of two water distribution swales. Outlet structures were constructed at the north end of each distribution swale. Berms in the vicinity of the outlet structures were repaired following severe storms the first winter after their installation. The repair work included correcting bank erosion, breaches in the berms and additional armoring of the sides of the outlet structures with rip-rap.

In late spring and summer of 2003, soils were prepared for planting by re-application of herbicide and disking. Planting began in October 2003 with drilling the wet prairie grass seed mix. Trees and shrubs were planted according to the planting plan on October 6, 2003. Willow slips were installed in the designated 0.2 acre patch in February 2004.

Since its inception the Bank has undergone routine spot spraying and mowing, primarily for annual ryegrass (*Lolium multiflorum)*, reed canary grass (*Phalaris arundinacea)* and Himalayan blackberry *(Rubus discolor)* and over the past two years has expanded to include bird's foot trefoil (*Lotus corniculata),* rat-tail fescue *(Vulpia myuros),* parentucellia *(Parentucellia viscose),* velvet grass *(Holcus lanatus),* and pennyroyal *(Mentha pulegium).*

An additional 50 potted Pacific willows (*Salix lasiandra)* were planted in the 0.2 willow community in the southwest of the Bank in February 2010. Approximately 50 one-sided sedge (*Carex unilateralis*) and green sheathed sedge (*Carex feta*) transplants were planted in the ash forest in February as well.

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 July 13 and 25, 2011 by Pat Thompson and Carla Cudmore. Complete monitoring results are included as Attachment 1 and the Monitoring Point Location Map is included as Attachment 2. Eight-seven monitoring plots were examined. The monitoring was conducted according to approved Bank protocols, with only minor differences as have been noted previously.

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.

The hedge row tree and shrub layer accounted for approximately 87% of the cover. The hedgerow shrub/tree vegetation averaged 15.3 feet in width. The average high shrub/tree height was about 24.5 feet and average shrub height was 7.9 feet all increases from 2010. The hedge row continues to thrive and function as planned.

Seventy-eight percent of the herbaceous and grass spices within the hedge row are native. The non-natives that are present at greater than trace amounts include Himalayan blackberry, Canada thistle (*Cirsium arvense)* and pennyroyal.

4.2 Willow Planting Southwest Portion of Bank

The willow planting area in the southwest portion of the Bank has been monitored since its initial planting in 2004. It has shown varying degrees of success. Prior to 2010, all the willows planted were cuttings. The survival rate of these cuttings has been problematic. Due to this, 50 potted Pacific willows were planted in February 2010. During the 2011 monitoring, the willows were thriving and growing with an increase in the average height since 2010.

The herbaceous layer in the willow planting area is a mixture of both native and non-native species of which, between 50 and 60% is native. The primary native species includes dense sedge (*Carex densa*), Spanish clover (*Lotus purshianus*), spike bentgrass (*Agrostis exarata*), slough grass (*Beckmania syzigachne*), tufted hairgrass (*Deschampsia cespitosa*), and meadow barley (*Hordeum brachyantherum*), coast tarweed (*Madia sativa)* and denseflower willowherb (*Epilobium densiflorum).*

The primary non-native species include cat's ear dandelion (*Hypochaeris radicata*), pennyroyal, parentucellia, Himalayan blackberry, colonial bentgrass (*Agrostis tenuis*), velvet grass, red brome (*Ventenata dubia*), common centuary (*Centuarium umbellatum),* hawksbeard (*Crepis capillaries),* prickly lettuce *(Lactuca serriola),* spiny sow thistle (*Sonchus asper),* rough-stalk bluegrass (*Poa trivialis),* tansy ragwort *(Tanacetum vulgare)* and oxeye daisy *(Chrysanthemum leucanthemum).*

Willow area - continue spot spraying for annual ryegrass, velvet grass and pennyroyal.

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.

In 2011, there were 14.5 trees per plot. This is a significant drop from the 28.9 trees per plot in 2010. This decrease, however, is due to the reduction in the numerous ash saplings that were present in 2010. The ash saplings have been replaced in part by herbaceous and grass species. Additionally, it was very difficult to find saplings in the extensive herbaceous/grass growth. The average number of ash trees greater than 3 feet in height is 8.7 per plot. The average height of the non-saplings increased 10.2' to 11.3. The ash trees continue to grow and reproduce and are meeting performance standards. The herbaceous layer native vegetation has increased dramatically from 2010 to 2011 from 4.7% to 37%.

Additional herbicide applications will concentrate on cat's ear dandelion, water-purslane (*Peplis portula*), colonial bentgrass, red brome, velvet grass, annual ryegrass and rat-tail fescue.

4.4 Wet Prairie

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.

Grass cover versus forb cover in the wet prairie remains high at 93.4% grass cover. Meadow barley remains the most dominant species at 53.9%. The next most abundant species are tufted hairgrass at 22.1%, spike bentgrass at 7.9 % and slough grass at 7.1%.

4.5 Swale and Emergent

Five swale monitoring points and five monitoring points within the distribution swale were monitored. The swale and emergent community remains diverse with 20 native fac or wetter species. The two most common species are creeping spike rush (*Eleocharis palustris*) and pennyroyal, which has increased substantially from 8.5% to 14.0% of the cover. The increase in pennyroyal is likely due to an extended germination period in the fall of 10'coupled with an extremely cold/wet spring in 11', creating optimum growing conditions for pennyroyal while creating less favorable conditions for germination/growth of native species. Although pennyroyal is not native, it is not on the Bank's list of non-native invasive species.

4.6 Transitional Shrub

The transitional shrub zone on the north and an 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).

There is little herbaceous layer due to the full coverage by the shrub and trees. Species noted includes: spike bentgrass, meadow barley, Watson's willow herb *(Epilobium watsonii),* slough grass, dense sedge, pennyroyal, curly dock (*Rumex crispus*), and tufted hairgrass.

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. Six species of native trees were identified during the monitoring, including Oregon ash, Douglas hawthorn, cascara, cottonwood, red-osier dogwood and western crabapple.
b. Four shrubs, Nootka rose, cluster rose, Douglas spirea, and willow are present within the hedgerows and transitional shrub zone.
c. Within the emergent zone, three species of Carex, two species of Juncus, *Deschampsia cespitosa*, *Hordeum brachyantherum*, and nine native fac or wetter species of forbs are present. Overall, 20 native species were identified in the groundcover within the emergent wetland.

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, transitional shrub, and ash forest surpass the 100% survivorship standard. The willow area in the southwest portion of the Bank has struggled since its initial planting in 2004. In February 2010, the sponsor planted 50 potted Pacific willows. Earlier plantings were all done with cuttings that had poor survival. All stems were counted in 2010 with 76 willows found,

ranging in height from saplings to 12' in height. These were again counted in 2011 with 95% tree survival (72) with tree growth noted throughout.

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 for performance standards a and b in emergent/swale and wet prairie. Performance standard c was met in the hedge row, willow and transitional shrub, but not in the ash forest.***

a & b. Within the emergent/swale community, 78.5% of the cover is native fac or wetter vegetation and within the wet prairie zone, there is 95% native vegetation.

c. The hedge row has 78% native herbaceous cover. The native herbaceous cover in 0.2 acre shrub/willow wetland is approximately 50 to 55% and in the transitional shrub between 80 and 90%. The only area not currently meeting this criterion is the ash forest, with 37% cover which is an increase from the 4.7% native herbaceous cover in 2010.

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. Ryegrass was identified in the Bank, but only in trace amounts.

b. & c. The only two zero tolerance species noted in the Bank are trace amounts Himalayan blackberry and 1% coverage within the swale/emergent portion of the bank by reed canary grass.

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.

7.0 SUGGESTED REMEDIAL

Oregon Wetlands LLC (OW) has been asked by the bank sponsor to assist with maintenance, management, and reporting for the bank. Based on conversations with Dana Field and Jaimee Davis on 3/1/12, OW will be preparing a memo to outline maintenance/management activities and a more detailed credit release schedule which will be submitted by 3/12/12 for review. It is anticipated that with the resources (Knowledge, labor, and equipment) that the OW team brings to the project, the site will be back on track and exceeding performance standards by the end of the 2012' growing season.

Ash Forest Continue spot spaying for cat's ear dandelion, water-purslane, colonial bentgrass, red brome, velvet grass, annual ryegrass and rat-tail fescue. This will be accomplished very early in the 12' growing season, to allow for additional natural recruitment. Additional seeding will take place if natural recruitment is not significant enough to provide 80% native cover.

Willow Area Continue spot spaying for cat's ear dandelion, water-purslane, colonial bentgrass, red brome, velvet grass, annual ryegrass and rat-tail fescue. This will be accomplished very early in the 12' growing season, to allow for additional natural recruitment. Additional seeding will take place if natural recruitment is not significant enough to provide 80% native cover. If non-natives continue germinating after initial treatment, this are may be kept sprayed out through the growing season and re-seeded in fall 12' with a no-till drill.

8.0 CREDIT SALES SUMMARY

Two credit releases have occurred. The first release (30%) for 3.92 credits in April 2003 and a second (15%) release for 1.96 credits in August 2004, totally 5.88 credits. Of these 5.88 credits, 5.78 have been sold and were previously reported on. No credits have been sold in the past year. To date 0.04 credits remained unsold.

9.0 CREDIT RELEASE REQUEST

We are asking for a full credit release for all portions of the Bank except for the 3.5 acres of the ash forest. Although the trees are doing fine, the herbaceous area needs another year to reduce the non-native species.

Credits to be held:

3.5 ac ash forest at 2:1 credit = 1.75 credits
Hold the remaining 55% credit not already released= .963 credits

Total credits available:	13.005
Credits released to date:	5.880
Credits Remaining:	7.125
Credits to be held:	.963
Requested Credit Release	**6.162**

Frazier Creek Wetland Mitigation Bank

Plant Species List - 2005-2011

2009/2011 - Includes all species identified in monitoring plots and seen as walking between plots

Scientific Name	Common Name	Status	Origin	On Plan	2005	2007	2008	2009	2010	2011
Overstory Species										
Cornus stolonifera	Red-osier dogwood	FACW	native					X	X	X
Crataegus douglasii	Douglas Hawthorn	FAC	native	X	X	X	X	X	X	X
Fraxinus latifolia	Oregon ash	FACW	native	X	X	X	X	X	X	X
Pyrus fusca	Pacific Crabapple	FAC	native	X	X	X	X	X	X	X
Populus balsamifera	Cotton wood	FAC	native					X	X	X
Rhamnus purshiana	Cascara	FAC	native	X	X	X	X	X	X	X
Scrub/Shrub Species										
Spiraea douglasii	Douglas spirea	FAC	native	X	X	X	X	X	X	X
Rosa nutkana	Nootka rose	FAC	native	X				X	X	X
Rosa pisocarpa	Clustered rose	FAC	native	X	X	X	X	X	X	X
Sali lasiandra	Pacific Willow	FACW	native						X	X
Salix sitchensis	Sitka willow	FACW	native	X	X	X	X	X	X	X
Sedges and Rushes										
Carex densa	Dense sedge	OBL	native	X	X	X	X	X	X	X
Carex feta	Green-sheath sedge	FACW	native					X	X	X
Carex unilateralis	One-sided sedge	FACW	native	X	X	X	X	X	X	X
Eleocharis ovata	Ovoid spike rush	OBL	native	X	X	X	X	X	X	
Eleocharis palustris	Creeping spike rush	OBL	native	X	X	X	X	X	X	X
Juncus acuminatus	Tapered rush	OBL	native	X	X			X		
Juncus bolanderi	Bolander's rush	OBL	native					X	X	
Juncus bufonius	Toad rush	FACW	native		X				X	
Juncus effusus	Soft rush	FACW	native		X	X	X		X	X
Juncus ensifolius	Swordleaf rush	FACW	native	X	X	X		X		
Juncus oxymeris	Pointed rush	FACW	native				X	X	X	X
Juncus tenuis	Slender rush	FACW	native	X	X	X	X	X	X	X
Herbaceous Species										
Alisma gramineum	Narrow leaf water plantain	OBL	native					X	X	X
Alisma plantago aquatica	Water plantain	OBL	native	X	X	X	X			X
Antemis cotula	Mayweed chamomile	FACU	non			X	X	X		
Bidens frondosa	Leafy beggars-tick	FACW	native		X	X	X	X	X	X
Centuarium umbellatum	Common centuray	FAC	non			X	X	X	X	X
Centuarium erythrea	Centuray	NOL					X			
Cerastium arvense	Chickweed	FACU	non		X			X	X	
Cirsium arvense	Canada thistle	FACU	non		X		X	X	X	X
Cirsium vulgare	Bull thistle	FACU	non		X			X	X	
Crepis capillaris	Hawksbeard	FACU	non						X	
Daucus carota	Queen Anne's lace	NOL	non				X	X	X	
Downingia elegans	Showy downingia	OBL	native		X	X	X			
Epilobium densiflorum	Denseflower willowherb	FACW	native			X	X	X	X	X
Epilobium watsonii	Watson's willow herb	FACW	native		X	X	X	X	X	X
Eryngium petiolatum	Coyote thistle	OBL	native		X	X	X			
Galium aparine	Catchweed	FACU	non					X	X	
Galium trifidum	Small bedstraw	FACW	native						X	
Geum macrophyllum	Oregon Avens	FACW	native					X	X	X
Geranium molle	Dovefoot geranium	NOL	non		X					
Geranium visosissimum	Crane's bill geranium	FACU	non					X	X	X
Gnaphalium palustre	Cudweed	FAC	native		X	X	X			
Hypericum formosum	Scouler's St.John's-wort	FAC	native					X		
Hypochaeris radicata	Catsear dandelion	FACU	non		X	X	X	X	X	X
Kickxia elatine	Sharp-point fluellin	UPL	non							X
Lactuca serriola	Prickly lettuce	FACU	non		X	X	X	X	X	
Lemna minor	Common duckweed	OBL	native					X	X	
Lotus corniculata	Bird'sfoot trefoil	FAC	non		X		X	X	X	X
Lotus purshianus	Spanish clover	NOL	native						X	X
Lythrum hyssopifolium	Hyssop loosestrife	OBL	non		X		X	X	X	

Frazier Creek Wetland Mitigation Bank

Plant Species List - 2005-2011

2009/2011 - Includes all species identified in monitoring plots and seen as walking between plots

Scientific Name	Common Name	Status	Origin	On Plan	2005	2007	2008	2009	2010	2011
Lythrum portula	Spatulaleaf loosestrife	NOL	non		X			X	X	
Madia sativa	Coast tarweed	NOL	native				X	X	X	X
Melilotus alba	White sweetclover	FACU	non				X		X	
Mentha arvensis	Field mint	FACW	native		X					
Mentha pulegium	Pennyroyal	OBL	non		X	X	X	X	X	X
Mimulus guttatus	Yellow Money-flower	OBL	native						X	X
Myosotis laxa	Small-flowered forget me not	OBL	native					X	X	X
Myosotis discolor	bicolor forget me not				X	X	X		X	
Navarettia squarosa	Skunkweed	NOL	native				X	X	X	
Oenanthe sarmentosa	Pacific water parsley	OBL	native	X	X			X	X	X
Parentucellia viscosa	Yellow parentucellia	FAC	non		X	X	X	X	X	X
Peplis portula	Water- purslane	NOL	non						X	X
Plagiobothrys figuratus	Fragrant popcorn flower	FACW	native	X	X					
Plagiobothrys scouleri	Scouler's popcorn flower	FACW	native					X	X	
Polygnum lapathifolium	Smartweed				X	X	X	X		
Rorippa curvisiliqua	Western yellowcress	OBL	native			X		X	X	X
Rubus discolor	Himalayan blackberry	FACU	non		X	X	X	X	X	X
Rumex acetosella	Sheep sorrel	FACU	non				X			
Rumex conglomeratus	Clustered dock	FACW	non				X	X	X	X
Rumex crispus	Curly Dock	FAC	non		X	X	X	X	X	X
Senecio vulgaris	Common grounsel	FACU	non				X	X		
Sonchus asper	Spiny sow thistle	FAC	non					X	X	X
Tanacetum vulgare	Tansy ragwort	NOL	non							X
Taraxacum officinale	Dandelion	FACU	non		X		X	X	X	
Trifolium pratense	Red clover	FACU	non		X					
Trifolium repens	White clover	FAC	non				X	X	X	
Typha latifolia	Cat tail	OBL	native		X	X		X	X	X
Veronica americana	American speedwell	OBL	native					X	X	
Veronica peregrina	Purslane speedwell	OBL	native		X	X		X		
Veronica persicaria		NOL				X	X			
Veronica scutella	Skullcap speedwell	OBL	native						X	X
Vicia americana	American vetch	NOL	non				X	X	X	
Grass Species										
Agrostis exarata	Spike bentgrass	FACW	native	X	X	X	X	X	X	X
Agrostis tenuis	Colonial bentgrass	FAC	non						X	X
Alopecurus geniculatus	Water foxtail	OBL	native		X	X		X	X	X
Alopecurus pratensis	Meadow foxtail	FACW	non					X	X	X
Avena sativa	Wild oat	NOL	non		X	X	X	X	X	X
Beckmania syzigachne	Slough grass	OBL	native	X	X	X	X	X	X	X
Bromus californica	California brome	NOL			X	X		X	X	
Bromus carinatus	California brome	NOL	native						X	X
Deschampsia cespitosa	Tufted hairgrass	FACW	native	X	X	X	X	X	X	X
Echinochloa crusgalli	Large barnyard-grass	FACW	non		X	X		X		
Glyceria elata	Tall manna grass	FACW	native					X	X	X
Glyceria occidentalis	Western manna grass				X					
Holcus lanatus	Velvet grass	FAC	non		X	X		X	X	X
Hordeum brachyantherm	Meadow barley	FACW	native	X	X	X	X	X	X	X
Lolium multiflorum	Annual ryegrass	NOL	non					X	X	X
Lolium sp.	Ryegrass	NOL	non		X	X	X	X	X	
Phalaris arundinacea	Reed canary grass	FACW	non		X	X	X	X	X	X
Poa sp.					X			X		X
Poa trivialis	Rough-stalk bluegrass	FACW	non					X	X	X
Ventenata dubia	Red brome	NOL	non						X	X
Vulpia myuros	Rat-tail fescue	NOL	non						X	X

Frazier Creek Wetland Mitigatigation Bank					Transect 1													Transect 2			
Wet Prairie					NOTE: T1-10, T2-5, T2-6, T3-9, T4-9 have been moved to the swale/emergent plot data results.																
July 25, 2011					T3-6 and T5-1 were removed.																
				Ave.																	
				Cover	1	2	3	4	5	6	7	8	9	11	12	13		1	2	3	4
Botanical Name	**Common Name**	**Status**	**Origin**	**ea. Species**																	
erbaceous Species - percent cover																					
lisma plantago aquatica	Water plantain	OBL	native	0.00														T			
idens frondosa	Leafy beggars-tick	FACW	native	0.00												T					
arex densa	Dense sedge	OBL	native	1.09				T			T	T	T								
arex unilaterils	One-sided sedge	FACW	native	0.11							T		T								
entuarium umbellatum	Common centuray	FAC	non	0.00																	
leocharis palustris	Creeping spike rush	OBL	native	0.00														T			
ilobium densiflorum	Denseflower willow herb	NOL	native	0.54	5								T								
ickxia elatine	Sharp-point fluellin	UPL	non	0.43															10	10	
otus purshianus	spanish clover	NOL	native	0.43																	
uncus tenuis	Slender rush	FACW	native	2.07					15	10	T	5									
lentha pulegium	Pennyroyal	OBL	non	1.63									5					15			
lyosotis laxa	small flowered forget me no	OBL	native	0.11														T			
onchus asper	Spiny sow thistle	FAC	non	0.00																	
umex conglomeratus	Clustered dock	FACW	non	0.00																	
umex crispus	Curly Dock	FAC	non	0.00							T					T					
rass Species - percent cover																					
grostis exarata	Spike bentgrass	FACW	native	7.28	T	15	15	10	10	5	15	10	10	10	15			T	T		25
eckmania syzigachne	Slough grass	OBL	native	7.07			10	20	T	5	25	10	T	20	15	25			T	10	T
romus carinatus	California brome	NOL	native	0.43																	
eschampsia cespitosa	Tufted hairgrass	FACW	native	22.07	95	80	45		15	70		T	45	T	30	25				T	5
lyceria elata	Tall manna grass	FACW	native	1.85														85			
olcus lanatus	Velvet grass	FAC	non	0.22																	
ordeum brachyantherm	Meadow barley	FACW	native	53.91	T	5	30	70	60	10	60	75	40	70	40	30			90	80	70
oa trivialis	Rough-stalk bluegrass	FACW	non	0.54												20			T		
otal % vegetative cover				100	100	100	100	100	100	100	100	100	100	100	100	100		100	100	100	100
elative % native canopy cover		Mean=	95		100	100	100	100	100	100	100	100	95	100	100	80		0	90	90	100
elative % listed species invasive canopy cover :		Mean=	**0.00**																		
Listed species includes reed canary grass, Himalayan Blackberry, evergreen blackberry, purple loosestrife, kudzu, Japanese knotweed and poison hemlock.																					
otal Sample points = 46																					

								Transect 3												Transect 4									
7	8	9	10	11	12	13		1	2	3	4	5	7	8	10	11	12	13		1	2	3	4	5	6	7	8	10e	10w	11
			T					50																						
		5										T								T										
T	T											T						T								5			15	
	T											T				T		T				T								
											20																				
			5	T							10	20	5			T								T					5	
T															5					10					T	15	5	20		
																				5										
																	T													
				T																										
	5	5		T	30				10	10	5			T	T	10		10		20	10	10	20	5	10	5	20	10		T
5	5	20				5							T	5	15					5		T	T	5	45	35	20	20		T
																20						T								
		5				90		50	55	30	10		30	10	5	T	10			60	45	60	20	40			30	5	10	40
																	10													
95	90	65	95	100	70	5			35	60	55	80	65	85	75	70	70	90			40	30	60	50	45	40	25	45	70	60
																					5	T								
100	100	100	100	100	100	100		100	100	100	100	100	100	100	100	100	90	100		100	100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100		100	100	100	100	100	100	100	95	100	80	100		90	95	100	100	100	100	85	95	80	100	100

Frazier Creek Wetland Mitigation Bank
Hedge Row Plot Data - July 13, 2011

Common Name	Botanical Name	Status	Origin	Cover	1	2	3	4	6	7	8	9	10	12	13
Tree Species - % aerial coverage within 10' length of hedgerow unless noted															
Fraxinus latifolia	Oregon ash	FACW	native	0.45					T	5					
Rhamnus purshiana	Cascara	FAC	native	0.45											5
Salix ssp.	Willow ssp.	FACW	native	25.00	5	50	40	10		20	10	5	20	50	65
Scrub/Shrub Species -% aerial coverage within 10' length of hedgerow															
Rosa nutkana	Nootka rose	FAC	native	30.91	50	20	30	35	20	30	35	45	40	25	10
Rosa pisocarpa	Clustered rose	FAC	native	30.45	45	20	25	40	20	35	40	35	40	25	10
Total Cover by Trees and Shurbs					100	90	95	85	40	90	85	85	100	100	90
Average % Cover Trees and sl	mear	87.3													
Average row width (feet)	mear	15.3			12	20	15	12	10	15	10	14	20	20	20
Average shrub height (feet)	mear	7.9			7	8	8	7	7	10	8	7	9	8	8
Average tree height (feet)	mear	24.5			16	20	15	20	6	20	14	15	15	30	25
* 2 plots were removed from monitoring. They are on the rock berms and are sprayed yearly.															
Herbaceous Species - percent cover															
Alisma gramineum	Narrow leaf water plantair	OBL	native					T							
Bidens frondosa	Leafy beggars-tick	FACW	native						T						
Carex densa	Dense sedge	OBL	native	4.09				5	20	5	10	5			
Carex unilateralis	One-sided sedge	FACW	native	0.45				T		5					
Cirsium arvense	Canada thistle	FACU	non												5
Eleocharis palustris	Creeping spike rush	OBL	native	0.45	T	5									
Juncus effusus	Soft rush	FACW	native							T					
Mentha pulegium	Pennyroyal	OBL	non			T	T	T	5	T	5				
Myosotis laxa	Small-flowered forget me	OBL	native	1.36			5	5	5						
Rubis discolor	Himalayan blackberry	FACU	non	0.45											5
Rumex crispus	Cury dock	FAC	non	0.00					T	T					
Sonchus asper	Spiny sow thistle	FAC	non												T
Grass Species - percent cover															
Agrostis exarata	Spike bentgrass	FACW	native							T					
Alopecurus pratensis	Meadow foxtail	FACW	non		T										
Beckmania syzigachne	Slough grass	OBL	native	0.45	T	T	T	5		T					
Deschampsia cespitosa	Tufted hairgrass	FACW	native	0.91	T	5	T	T			T	5	T		
Hordeum brachyantherm	Meadow barley	FACW	native	3.18					30	T	T	5	T	T	T
Lolium multiflorum	Annual reygrass	NOL	non	0.00			T								T
Poa ssp.	Bluegrass	FAC	non	0.00	T										
Total Cover by herbaceous and grass species:	Mean=	12.7			0	10	5	15	60	10	15	15	0	0	10
Percentage of the herbaceous and grass species that is native		Mean =	78%			100%	100%	67%	92%	100%	67%	100%			0%
Relative % listed species invasive canopy cover :	Mean=	**0.45**			0	0	0	0	0	0	0	0	0	0	5
Listed species includes reed canary grass, Himalayan Blackberry, evergreen blackberry, purple loosestrife, kudzu, Japanese knotweed and poison hemlock.															

Frazier Creek Wetland Mitigation Bank

Ash Plot Data and Willow Area Count - July 13, 2011

					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
umber of Ash Trees - stem count within 20' radius.					24	10	9	8	20	15	22	18	14	7	59	9	9	9	7	8	10	12	8	12
umber of non-saplings				8.65	7	8	9	8	10	8	10	8	8	6	12	8	8	8	7	8	10	12	8	10
verage height in feet (not including new saplings)					10	10	7	11	11	12	12	8	9	8	14	13	13	14	15	15	13	12	10	9
Average of all trees per plot =		14.5																						
Average non-saplings* per plot =		8.65																						
Average height of non-saplings per plot =		11.3		Average																				
*trees greater than 3' in height				**Cover**																				
rataegus douglasii	Douglas Hawthorn	FAC	native						1															
erbaceous Species - percent cover in 3' x 3' plot (center of 20' radius plots)																								
arex densa	Dense sedge	OBL	native	11.5			30	75			T		50	55		15		5					T	
arex feta	Green-sheath sedge	FACW	native	2.25											30			15						
arex unilaterils	One-sided sedge	FACW	native	14.25	15	10	5	5		45	20	50			30	15	75	15						
eum macrophyllum	Oregon Avens	FACW	native	0.5										10										
eranium visosissimum	Crane's bill geranium	FACU	non	5.5		10						T							T	20	25	T	50	5
ypochaeris radicata	catsear dandelion	FACU	non	0		T																	T	
uncus tenuis	Slender rush	FACW	native	1.75			5	10									20							
lentha pulegium	Pennyroyal	OBL	non	2.5														50						
eplis portula	Water- purslane	NOL	non	0.75														15						
orippa curvisiliqua	Western yellowcress	OBL	native	2.5							50													
ubus discolor	Himalayan blackberry	FACU	non	0																	T			
rass Species - percent cover in a 3' x 3' plot																								
grostis exarata	Spike bentgrass	FACW	native	0			T	T					T											
lopecurus geniculatus	Water foxtail	OBL	native	0																				
lopecurus pratensis	Meadow foxtail	FACW	non	4					35	35	10													
vena sp.	Wild oat	NOL	non	0.25		T																	5	
eckmania syzigachne	Slough grass	OBL	native	0.25	5														T					
romus carinatus	California brome	NOL	native	2			20														20			
eschampsia cespitosa	Tufted hairgrass	FACW	native	0.25			5											T						
olcus lanatus	Velvet grass	FAC	non	15.75		80			65			30		15		70	T	T			T	50		5
olium multiflorum	Annual reygrass	NOL	non	0		T					T											T		
oa trivialis	Rough-stalk bluegrass	FACW	non	11.25	10					T	20	20	25	10	40		T		25		25		45	5
entenata dubia	Red brome	NOL	non	8.25	70									T			5		50	40				
ulpia myuros	Rat-tail fescue	NOL	non	13.25									25	10					25	40	30	50		85
areground recent spraying/mowing				3.25			35	10		20														
ercent native groundcover		mean=	37.0		35.3	20	10	65	90	0	45	70	50	50	65	60	30	95	35	0	0	20	0	0
ercent total vegetation cover:		Mean=	96.75		100	100	65	90	100	80	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Shrub Willow Wetland (0.2 acres)

-3" height	5
-5'	43
-12'	19
3'+	5
otal Number of Willows	72

Frazier Creek Wetland Mitigatigation Bank

Swale/Emergent Plot Data

July 14, 2011

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														
Fraxinus latifolia	Oregon ash	FACW	native									1		
Herbaceous Species - percent cover														
Alisma gramineum	Narrow leaf water plaintain	OBL	native	0.0			T							
Bidens frondosa	Leafy beggars-tick	FACW	native	0.5						5			T	
Carex densa	Dense sedge	OBL	native	8.5		5		35		10				35
Carex feta	Green-sheath sedge	FACW	native	0.0				T						
Carex unilaterils	One-sided sedge	FACW	native	7.5				30						45
Centuarium umbellatum	Common centuray	FAC	non	0.0							T	T		
Eleocharis palustris	Creeping spike rush	OBL	native	16.5	40	5	40		40				40	
Epilobium densiflorum	Denseflower willowherb	FACW	native	0.5								5		
Epilobium watsonii	Watson's willow herb	FACW	native	0.5				5						
Juncus effusus	Soft rush	FACW	native	0.5				5						
Juncus oxymeris	Pointed rush	FACW	native	9.5		40	T			25			30	
Mentha pulegium	Pennyroyal	OBL	non	14.0	15	30	15	T		25	25		30	
Mimulus guttatus	Yellow Money-flower	OBL	native	0.0					T					
Myosotis laxa	small flowered forget me no	OBL	native	8.5	35	5	15	20	10				T	
Oenanthe sarmentosa	Pacific water parsley	OBL	native	5.5					50	5			T	
Parentucellia viscosa	Yellow parentucellia	FAC	non	0.0							T			
Rumex conglomeratus	Clustered dock	FACW	non	4.5		15	5			25				
Rumex crispus	Curly Dock	FAC	non	0.5						5				
Veronica scutella	Skullcap speedwell	OBL	native	0.0									T	
Grass Species - percent cover														
Agrostis exarata	Spike bentgrass	FACW	native	1.5							5	5		5
Beckmania syzigachne	Slough grass	OBL	native	0.5	T		T	T	T				T	5
Deschampsia cespitosa	Tufted hairgrass	FACW	native	13.5							35	90		10
Glyceria elata	Tall manna grass	FACW	native	5.0	10		5				35			
Hordeum brachyantherm	Meadow barley	FACW	native	0.0										T
Phalaris arundinacea	Reed canary grass	FACW	non	1.0			5	5						
water				1.5			15							
Relative % listed species invasive canopy cover : 0														
Listed species includes reed canary grass, Himalayan Blackberry, evergreen blackberry, purple loosestrife, kudzu, Japanese knotweed and poison hemlock.														
Number of native species = 20														
Species of Carex = 3														
Species of Juncus = 2														
Species of Native Fobes = 9														
% native canopy cover (includes bareland):		Mean=	**78.50**		85.0	55.0	60.0	95.0	100.0	45.0	75.0	100.0	70.0	100.0

TABLE 1
Latitude and Longitude for Each Sample Plot

Transect # 1

Sample Plot #	LAT	LONG
1	44.61457	-123.22915
2	44.614533	-123.228444
3	44.614502	-123.228229
4	44.614475	-123.228015
5	44.614431	-123.227602
6	44.614396	-123.227188
7	44.614384	-123.226942
8	44.614349	-123.226673
9	44.614308	-123.226422
10	44.614254	-123.226131
11	44.614176	-123.225832
12	44.614066	-123.225534
13	44.613952	-123.225247

Transect # 2

1	44.613549	-123.225819
2	44.613633	-123.226045
3	44.613693	-123.226284
4	44.613745	-123.226579
5	44.61378	-123.22681
6	44.613841	-123.226988
7	44.613875	-123.227288
8	44.613958	-123.227531
9	44.613977	-123.227792
10	44.614084	-123.228083
11	44.614118	-123.228437
12	44.614177	-123.228755
13	44.614263	-123.229232

Transect # 3

1	44.614155	-123.229509
2	44.61398	-123.229437
3	44.613927	-123.229209
4	44.613845	-123.229005
5	44.613737	-123.228823
6	44.613685	-123.228604
7	44.613625	-123.228407
8	44.613549	-123.228126
9	44.613164	-123.226852
10	44.613373	-123.227679
11	44.613325	-123.227436
12	44.613218	-123.227146
13	44.61309	-123.226875

Transect # 4

1	44.613159	-123.226425
2	44.613239	-123.226554
3	44.613299	-123.226733
4	44.613325	-123.226988
5	44.613359	-123.227371
6	44.613252	-123.227734
7	44.613229	-123.227969
8	44.61318	-123.228455
9	44.613103	-123.228899
10e	44.613218	-123.229561
10w	44.613213	-123.229598
11	44.613003	-123.229618

Transect #5

1	44.614711	-123.224073

Hedge Row

1	44.614951	-123.223627
2	44.61496	-123.22402
3	44.61494	-123.224414
4	44.614932	-123.224875
5	44.614936	-123.225268
6	44.614934	-123.225684
7	44.614925	-123.226261
8	44.614929	-123.226806
9	44.614928	-123.227298
10	44.614952	-123.227791
11	44.614927	-123.228263
12	44.614916	-123.228678
13	44.614921	-123.229035

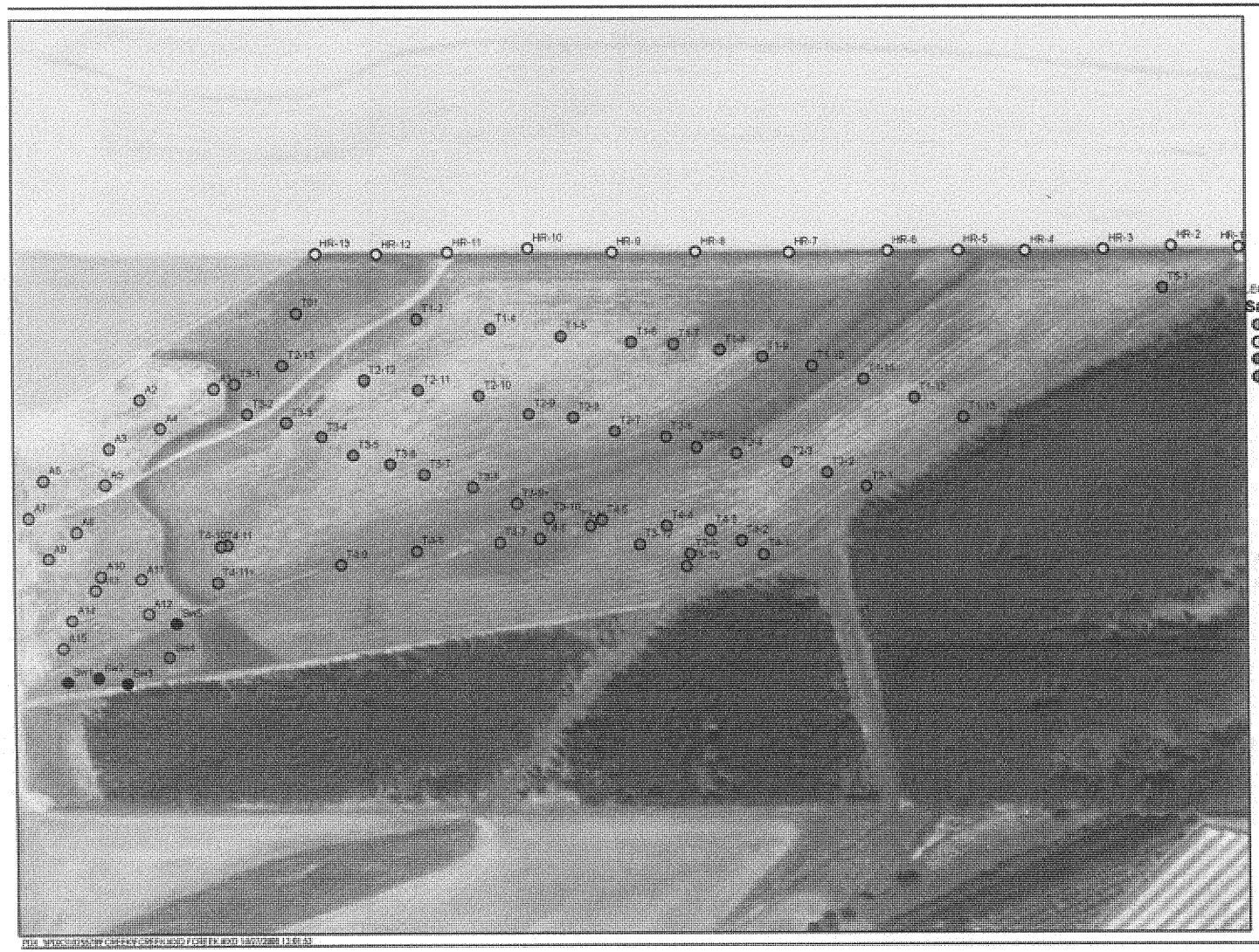

Figure 1
Frazier Creek Wetland Monitoring

Fazier Creek Monitoring Points

Ash Monitoring

Swale Monitoring

0 50 100 200 Feet

Photo 1 looking west from T5-1

Photo 2 looking northwest from T2-7

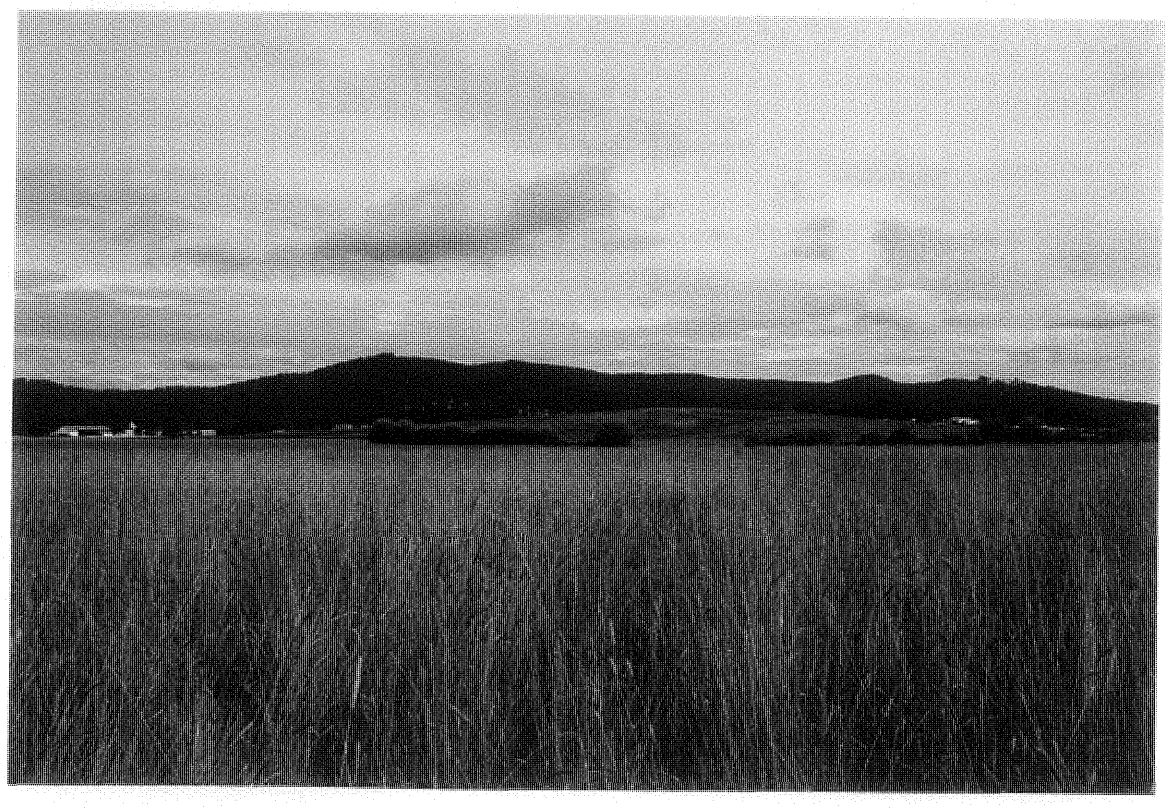

Photo 3 looking west from T2-1

Photo 4 looking southwest from T2-1

Photo 5 looking north from T4-9

Photo 6 looking northeast from T2-10

Photo 7 willow area looking southwest across swale area

Photo 8 willow area looking west across swale towards ash area

Photo 9 willow area in southwest corner

Photo 10 ash area looking northwest across from Ash 2

Photo 11 ash area in southwest corner

Photo 12 ash area looking northwest across from Ash 5

Photo 13 looking northwest from T2-12

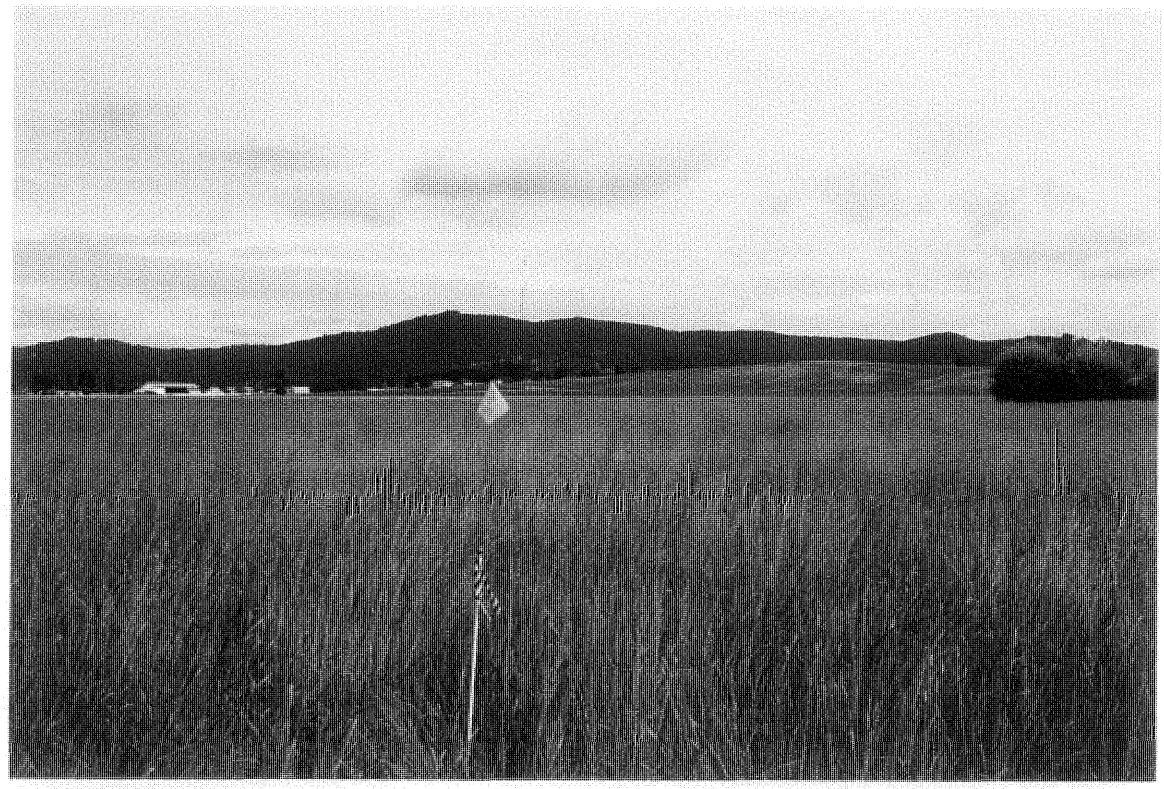

Photo 14 looking east from T3 8

Photo 15 looking northwest from T4-9

Photo 16 looking east from T2 9

Photo 17 looking east from T0-1

Photo 18 looking east from T2-12

Photo 19 looking southwest from T2-7