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# 2010 MONITORING REPORT
# for
# MARION MITIGATION BANK
# MARION, OR

## (Phases I, II and III)

**Submitted to:**
Oregon Department of State Lands
U.S. Army Corps of Engineers

**Submitted by:**
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4853 NW Bruno Place
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**Prepared by:**
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**Corvallis, OR 97330**
**(541) 758-0057**

**January 31, 2011**

# 2010 MONITORING REPORT
# for
# MARION MITIGATION BANK
# MARION, OR
# (Phases I, II & III)

## Contents

Hydrology Monitoring..... .1
Vegetation Monitoring .....9
Summary.....10
Credit Sales .....12
References .....12

Figure 1. Sketch of the Marion Mitigation Bank site showing locations of observations wells, pond gages, and wildlife monitoring stations.....2
Figure 2. Wetland boundary in Phase I.....6
Figure 3. Wetland boundary in Phase II.....7
Figure 4. Map of Phase III showing final contours.....8

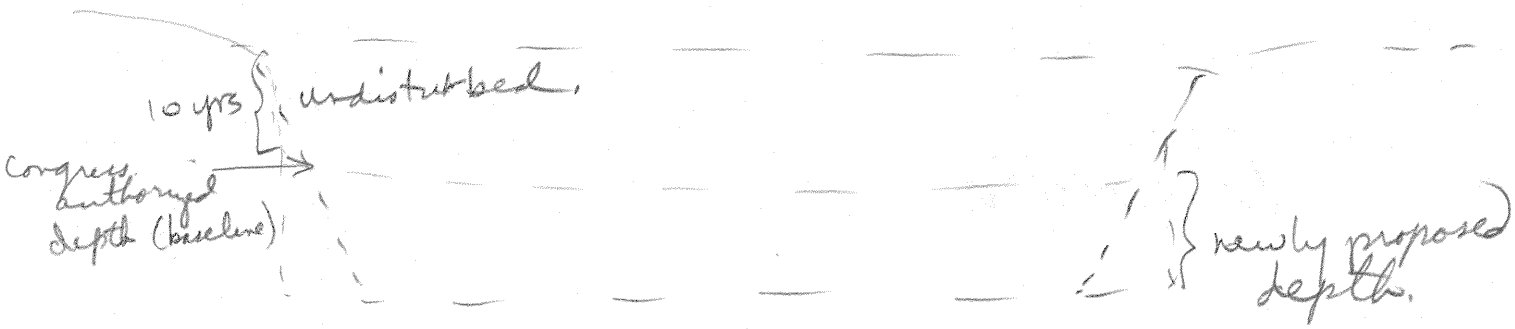
Table 1. Water levels in 2010 in observation wells at the Marion Mitigation Bank.....3
Table 2. Water levels in 2010 in shallow wells at the Marion Mitigation Bank.....4
Table 3. Water levels in 2010 in ponds at the Marion Mitigation Bank.....5
Table 4. Monthly precipitation at the National Weather Service Station at Salem,OR.....5
Table 5. Woody Species Density for the Marion Mitigation Site Phase I and II 2010.....11

Appendix 1. Vegetation sampling data 2010
Appendix 2. Journal of Credit Releases and Sales

maps
photos

Guard Plan

specified ? as-builts - see Green ? (ODOT)



# Tualatin Valley Environmental Bank

## Wetland Credit Receipt

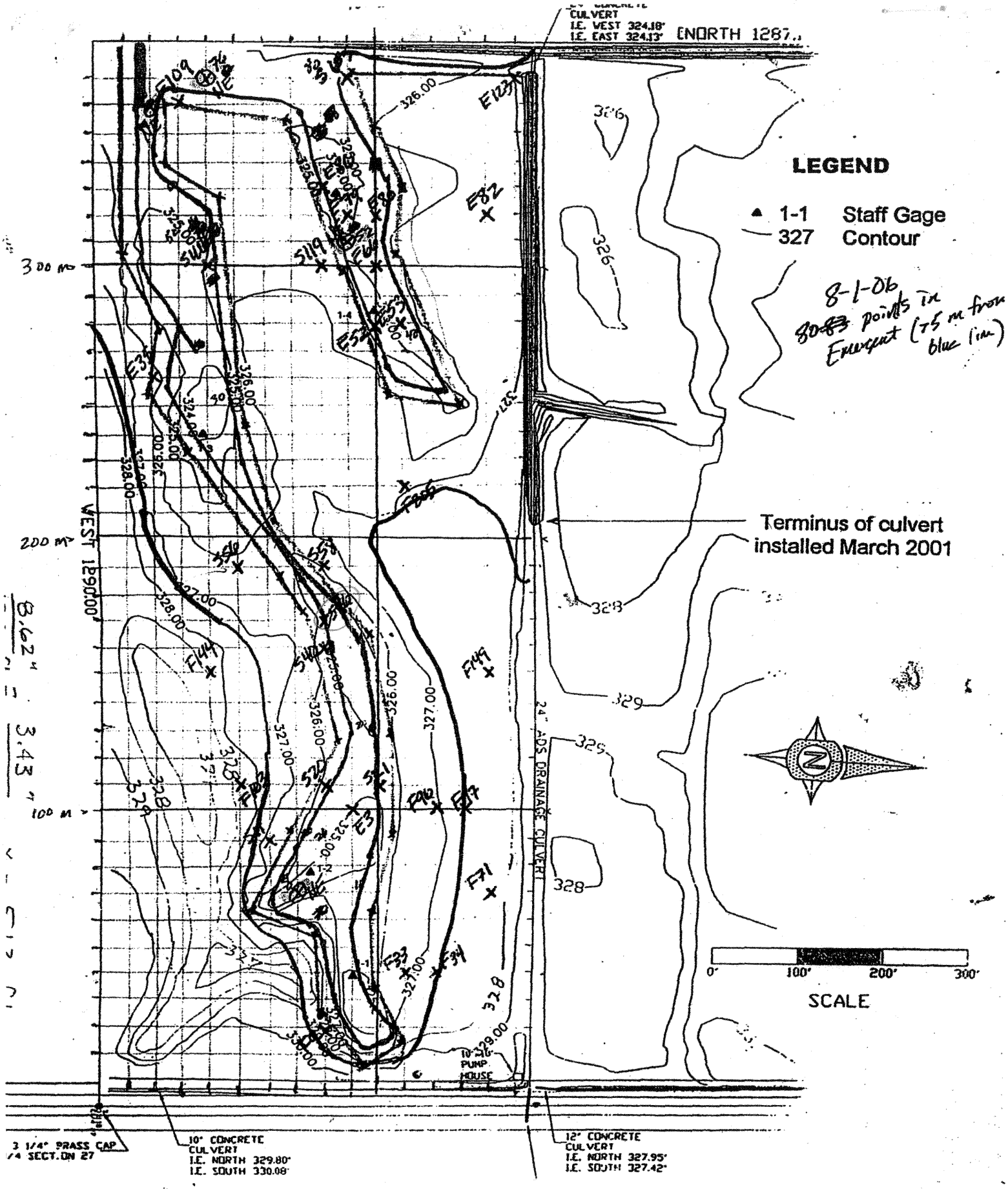
Date: **July 12, 2013**
Number of credits sold: **0.29**
Acres of wetland impacts, by HGM and Cowardin class: **PEM; Slope/Flats**;
HGM and Cowardin class of the credits being sold to compensate for those impacts: **PEM; Slope/Flats;**
Permittee Name: **Dennis E. Sackhoff, North Bethany Creek LLC**
Project Name: **North Bethany Creek and Street P15**
Corps Permit Number: **NWP-2013-28**
DSL Permit Number: **APP0053339**
Or other project identifier:
Impact HUC (10 digit HUC): 1709001004

By selling credits to the permittee, the Tualatin Valley Environmental Bank sponsor Dave Heikes Farms Incorporated hereby assumes responsibility for fulfilling the mitigation obligation of the Permit(s) listed above.

Sponsors signature:

Dave Heikes

greenbanks




Sketch 3 - Proposed regrading of Phase I.

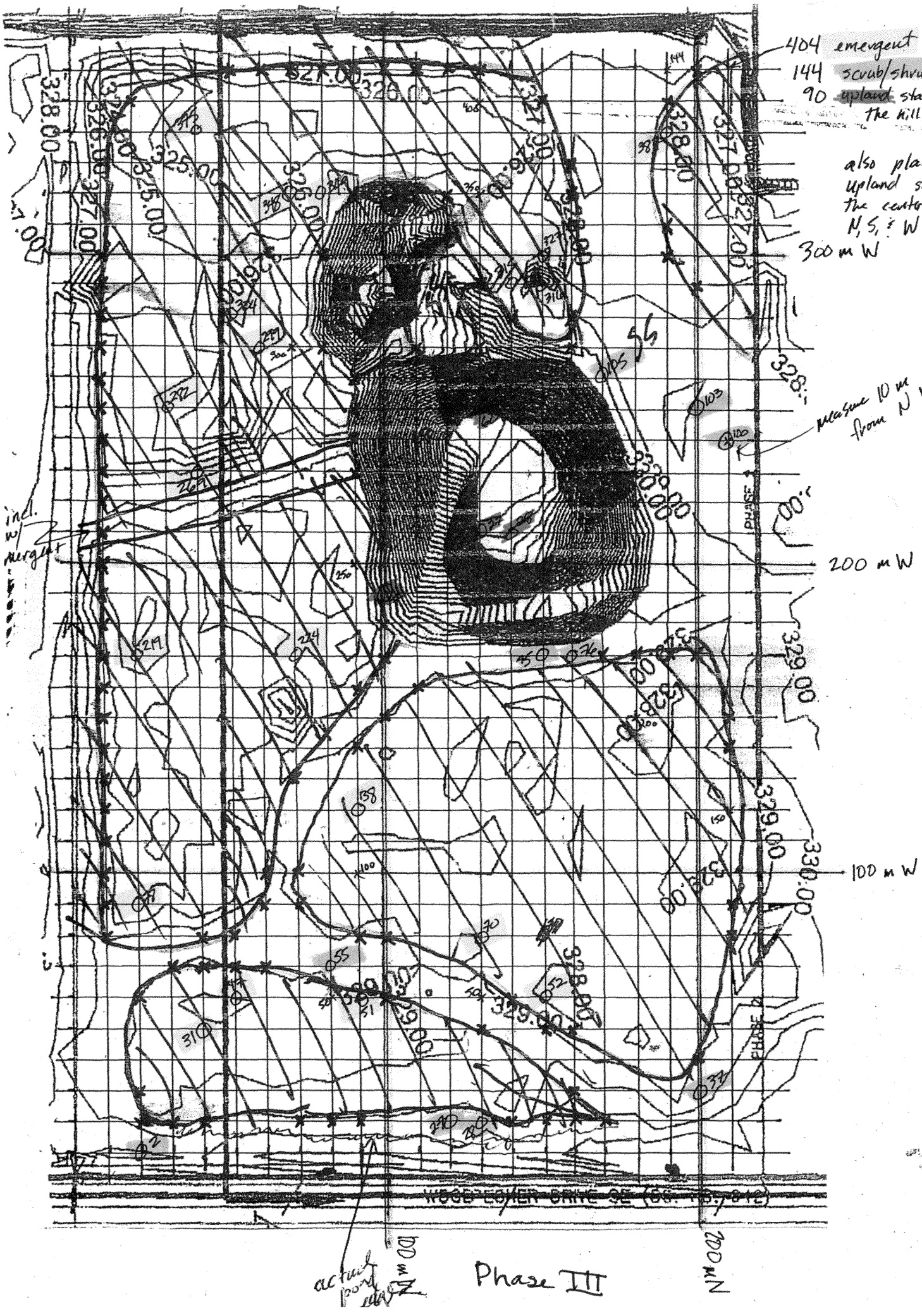
| Marion Mitigation Bank Plant Monitoring, 2011 Phase 1 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Emergent Habitat Type | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-003** | **E-053** | **E-066** | **E-079** | **E-080** | **EN-008** | **EN-052** | **EN-070** | **EN-076** | **S-116** | **Mean** |
| Agrostis stolonifera | creeping bentgrass | | FACW | 2 | y | | | | 2 | 40 | 50 | | 6 | 85 | | 18.3 |
| Carex obnupta | slough sedge | yes | OBL | 1 | y | | 67 | | 50 | 24 | | 18 | | | | 15.9 |
| Mentha pulegium | pennyroyal | | OBL | 1 | y | | 1 | 45 | 3 | 3 | 5 | 38 | 1 | 3 | 18 | 11.7 |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | 88 | | 3 | | | | | | | 9.1 |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | 55 | 1 | 6 | 8 | 1 | 2 | 5 | | | | 7.8 |
| Eleocharis palustris | common [creeping] spike-rush | yes | OBL | 1 | y | 7 | | 18 | 4 | 1 | 4 | 8 | 1 | 1 | 6 | 5.0 |
| Juncus articulatus | jointed rush | yes | OBL | 1 | y | | 1 | | 12 | 7 | 1 | 20 | | | | 4.1 |
| Polygonum persicaria | spotted ladysthumb | | FACW | 2 | y | 27 | | | | | 3 | | | | | 3.0 |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | | | | 5 | 25 | | | | | 3.0 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | | | | | 5 | 17 | 1 | | 2.3 |
| Populus balsamifera ssp. trichocarpa | black cottonwood | yes | FAC | 3 | y | | | | | 15 | 5 | | | | | 2.0 |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | | | | | | | | | 15 | | 1.5 |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | | | | | | 12 | | | 1.2 |
| Lythrum portula | spatulaleaf loosestrife | | OBL | 1 | y | | | | | | | | 12 | | | 1.2 |
| Callitriche sp. | water starwort | NA | OBL | 1 | y | | | | | | 8 | | | | | 0.8 |
| Juncus effusus | soft rush | yes | FACW | 2 | y | | | | | | 7 | | | | | 0.7 |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | | | | | 1 | | | 1 | 2 | 1 | 0.5 |
| Daucus carota | wild carrot/ Queen Anne's lace | | NOL | 5 | u | | | | | | | | 4 | | | 0.4 |
| Eleocharis acicularis | needle spike-rush | yes | OBL | 1 | y | 4 | | | | | | | | | | 0.4 |
| Plagiobothrys scouleri | Scouler's popcornflower | yes | FACW | 2 | y | | | | | | | | 4 | | | 0.4 |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | 3 | | | | | | | | | 0.3 |
| Brassica rapa | field [common] [birdsrape] mustard | | NOL | 5 | u | | | | | | | | 2 | | | 0.2 |
| Rumex crispus | curly dock | | FAC+ | 3 | y | | | | | | | | 2 | | | 0.2 |
| Carex unilateralis | one-sided sedge | yes | FACW | 2 | y | | | | | | | | | | 1 | 0.1 |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | | | | | | | | | 1 | | 0.1 |
| Potamogeton sp. | pondweed | yes | OBL | 1 | y | 1 | | | | | | | | | | 0.1 |
| Veronica peregrina ssp. xalapense | hairy purslane speedwell | yes | OBL | 1 | y | | | | | | | | | | 1 | 0.1 |
| Veronica scutellata | marsh speedwell | yes | OBL | 1 | y | | | | 1 | | | | | | | 0.1 |
| | | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | | 2 | 25 | | | | 10 | 20 | | 75 | 13.2 |
| moss, duff, dead vegetation, etc. | " | | | | | 5 | | 5 | 20 | 15 | 15 | 10 | 20 | 2 | | 9.2 |
| standing water (inches) | | | | | | 16 | 8 | 20 | 5 | 4 | 1 | 8 | | | | |

| Marion Mitigation Bank Plant Monitoring, 2011 Phase 1 | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scrub-Shrub Habitat Type | | | | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-035** | **E-052** | **E-086** | **E-109** | **E-123** | **F-009** | **S-011** | **S-020** | **S-021** | **S-040** | **S-046** | **S-058** | **S-155** | **Mean** |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | 12 | 16 | | | 98 | | | 55 | | 13 | | | 14.9 |
| Mentha pulegium | pennyroyal | | OBL | 1 | y | 27 | 15 | 28 | 27 | | | | 10 | 10 | 9 | 10 | 17 | 17 | 13.1 |
| Agrostis stolonifera | creeping bentgrass | | FACW | 2 | y | | 1 | 2 | 20 | 12 | | | 9 | 5 | 25 | | 20 | 25 | 9.2 |
| Carex obnupta | slough sedge | yes | OBL | 1 | y | 5 | 48 | 58 | | | | | | | | | | | 8.5 |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | 22 | | | | 10 | | 1 | 2 | | 1 | | 20 | 50 | 8.2 |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | 1 | | | | 33 | 38 | 25 | | | | | | | 7.5 |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | | 12 | | | | | 40 | 15 | 14 | | | | 6.2 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | | | | | | 1 | 75 | | | | | 5.8 |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | | | | | | 62 | 5 | | | | | | | 5.2 |
| Eleocharis acicularis | needle spike-rush | yes | OBL | 1 | y | 10 | | | | | | | 1 | | 14 | 37 | 1 | | 4.8 |
| Poa trivialis | rough [roughstalk] bluegrass | | FACW | 2 | y | | | | | | | 55 | | | | | | | 4.2 |
| Callitriche sp. | water starwort | NA | OBL | 1 | y | | | | | | | | 40 | 2 | | | | | 3.2 |
| Lythrum portula | spatulaleaf loosestrife | | OBL | 1 | y | 10 | | | 30 | 1 | | | | | | | | | 3.2 |
| Lotus corniculatus | birdsfoot trefoil | | FAC | 3 | y | 1 | | | | 40 | | | | | | | | | 3.2 |
| Populus balsamifera ssp. trichocarpa | black cottonwood | yes | FAC | 3 | y | | 25 | | | | | | | | | 13 | | | 2.9 |
| Eleocharis palustris | common [creeping] spike-rush | yes | OBL | 1 | y | 2 | 3 | 5 | 10 | | | | | | | 1 | | 4 | 1.9 |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | 3 | | | | | | 4 | | | 1 | | 15 | | 1.8 |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | | 20 | | 1 | | | | | | | | 1.6 |
| Beckmannia syzigachne | American slough grass | yes | OBL | 1 | y | | | | | | | | 16 | | | | 1 | 2 | 1.5 |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | 12 | | | 1 | 2 | | | | | | | | 2 | 1.3 |
| Cerastium glomeratum | sticky chickweed | | UPL | 5 | | | | | | | | 15 | | | | | | | 1.2 |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | 3 | | | | | | 5 | | | | | | | 0.6 |
| Lythrum hyssopifolia | hyssop loosestrife | | OBL | 1 | y | | | | | | | | | 1 | 2 | | 5 | | 0.6 |
| Plagiobothrys scouleri | Scouler's popcornflower | yes | FACW | 2 | y | 1 | | | 5 | 1 | | | | | | | | | 0.5 |
| Lolium arundinacea | tall fescue | | FAC- | 3 | | | | | | | 3 | 4 | | | | | | | 0.5 |
| Carex unilateralis | one-sided sedge | yes | FACW | 2 | y | | | | | | | | | 5 | | | | | 0.4 |
| Gratiola ebracteata | bractless hedgehyssop | yes | OBL | 1 | y | | | | | | | | | | 2 | 1 | 2 | | 0.4 |
| Juncus bufonius | toad rush | yes | FACW | 2 | y | 5 | | | | | | | | | | | | | 0.4 |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | | 1 | | | | | | | 1 | 2 | | | | 0.3 |
| Juncus articulatus | jointed rush | yes | OBL | 1 | y | 2 | 1 | | | | | | | | | | | | 0.2 |
| Polygonum persicaria | spotted ladysthumb | | FACW | 2 | y | | | | | | | | 1 | | 1 | | | | 0.2 |
| Veronica peregrina ssp. xalapense | hairy purslane speedwell | yes | OBL | 1 | y | | | | | | | | | | 1 | | 1 | | 0.2 |
| Bromus hordeaceus ssp. hordeaceus | soft brome | | FACU | 4 | | | | | | | | 2 | | | | | | | 0.2 |
| Eleocharis ovata | ovate spikerush | yes | OBL | 1 | y | 1 | | | | | | | | | 1 | | | | 0.2 |
| Juncus tenuis | slender rush | yes | FACW- | 2 | y | | | | | 2 | | | | | | | | | 0.2 |
| Myosotis discolor | yellow and blue forget-me-not | | FACW | 2 | y | | | | | | | 2 | | | | | | | 0.2 |

| Marion Mitigation Bank Plant Monitoring, 2011 Phase 1 | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scrub-Shrub Habitat Type | | | | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-035** | **E-052** | **E-086** | **E-109** | **E-123** | **F-009** | **S-011** | **S-020** | **S-021** | **S-040** | **S-046** | **S-058** | **S-155** | **Mean** |
| Vicia hirsuta | tiny vetch | | NOL | 5 | u | | | | | | | 2 | | | | | | | 0.2 |
| Daucus carota | wild carrot/ Queen Anne's lace | | NOL | 5 | u | | | | | | | 1 | | | | | | | 0.1 |
| Veronica scutellata | marsh speedwell | yes | OBL | 1 | y | | 1 | | | | | | | | | | | | 0.1 |
| Anthemis cotula | mayweed chamomile/ stinking mayweed | | FACU | 4 | | | | | | | 1 | | | | | | | | 0.1 |
| Epilobium brachycarpum | tall annual willow-herb | yes | UPL | 5 | | | | | | | | 1 | | | | | | | 0.1 |
| Geranium carolinianum | Carolina geranium | yes | NOL | 5 | u | | | | | | | 1 | | | | | | | 0.1 |
| Gnaphalium palustre | lowland cudweed | yes | FAC+ | 3 | y | | | | 1 | | | | | | | | | | 0.1 |
| Parentucellia viscosa | parentucellia | | FAC- | 3 | | | | | | | | 1 | | | | | | | 0.1 |
| Plantago major | broadleaf plantain | | FAC | 3 | y | | | | 1 | | | | | | | | | | 0.1 |
| Sonchus asper | prickly sow-thistle | | FAC- | 3 | | | | | | | | 1 | | | | | | | 0.1 |
| Trifolium repens | white clover | | FAC- | 3 | | | | | | | | 1 | | | | | | | 0.1 |
| Vicia pannonica | Hungarian vetch | | NOL | 5 | u | | | | | | | 1 | | | | | | | 0.1 |
| Vicia sativa | common vetch | | UPL | 5 | | | | | | | 1 | | | | | | | | 0.1 |
| | | | | | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 3 | 23 | | 15 | 12 | | 1 | | | 32 | 1 | 5 | 3 | 7.3 |
| moss, duff, dead vegetation, etc. | " | | | | | 7 | 1 | 5 | 3 | 3 | | 6 | 10 | 7 | 5 | 27 | 10 | 12 | 7.4 |
| standing water (inches) | | | | | | | 8 | 4 | | | | | | | | | | | |

| Marion Mitigation Bank Plant Monitoring, 2011 Phase 1 | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forested Habitat Type | | | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-082** | **F-033** | **F-034** | **F-071** | **F-096** | **F-097** | **F-103** | **F-144** | **F-149** | **F-205** | **S-056** | **S-119** | **Mean** |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | 55 | 10 | | | 65 | 35 | | | | | 55 | | 18.3 |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | 10 | | | 5 | | | 38 | 58 | | 25 | 3 | 12 | 12.6 |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | 95 | 5 | | | | | | | | | | 8.3 |
| Equisetum arvense | common [field] horsetail | yes | FAC | 3 | y | | | | 1 | | | | | 95 | | | | 8.0 |
| Vulpia bromoides | barren fescue | | UPL | 5 | | | | | | | | 28 | 60 | | | | | 7.3 |
| Agrostis stolonifera | creeping bentgrass | | FACW | 2 | y | 3 | | | | | | | | | | | 50 | 4.4 |
| Bromus hordeaceus ssp. hordeaceus | soft brome | | FACU | 4 | | | | | | | | 25 | 12 | 5 | | | | 3.5 |
| Juncus patens | spreading rush | yes | FACW | 2 | y | | | 35 | | | | | | | 6 | | | 3.4 |
| Lolium arundinacea | tall fescue | | FAC- | 3 | | | | | 10 | 5 | | | | | 10 | | 8 | 2.8 |
| Juncus effusus | soft rush | yes | FACW | 2 | y | 15 | 5 | 12 | | | | | | | | | | 2.7 |
| Mentha pulegium | pennyroyal | | OBL | 1 | y | | | | | 1 | 3 | | | | | 25 | | 2.4 |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | | | | | | | | 13 | | 15 | 2.3 |
| Daucus carota | wild carrot/ Queen Anne's lace | | NOL | 5 | u | | | | 3 | | | 2 | 6 | 7 | 2 | | 1 | 1.8 |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | | 1 | | 2 | 1 | 1 | 2 | | 8 | 5 | | | 1.7 |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | | 20 | | | | | | | | | | 1.7 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | 1 | | | | 2 | 9 | | | | | | 6 | 1.5 |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | | | | | 2 | 2 | 1 | 1 | | 3 | 4 | 5 | 1.5 |
| Carex obnupta | slough sedge | yes | OBL | 1 | y | | | | | | 17 | | | | | | | 1.4 |
| Juncus articulatus | jointed rush | yes | OBL | 1 | y | | 1 | 2 | | 1 | 10 | | | | | | | 1.2 |
| Vicia pannonica | Hungarian vetch | | NOL | 5 | u | | | | | | | 5 | 1 | | 8 | | | 1.2 |
| Festuca rubra | red fescue | | FAC+ | 3 | y | | | | 12 | | | | 1 | | | | | 1.1 |
| Parentucellia viscosa | parentucellia | | FAC- | 3 | | | | | | | | 2 | 1 | 6 | | | | 0.8 |
| Poa trivialis | rough [roughstalk] bluegrass | | FACW | 2 | y | | | | | | | 7 | | | 1 | | | 0.7 |
| Holcus mollis | creeping velvetgrass | | FACU | 4 | | | | | | | | 8 | | | | | | 0.7 |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | 7 | | | | | | | | | | | 0.6 |
| Carex leptopoda | Dewey's sedge | yes | FAC | 3 | y | | 5 | 2 | | | | | | | | | | 0.6 |
| Juncus tenuis | slender rush | yes | FACW- | 2 | y | 1 | | 2 | | | | | | | 3 | | | 0.5 |
| Vicia hirsuta | tiny vetch | | NOL | 5 | u | | | | | | | | 5 | | 1 | | | 0.5 |
| Myosotis discolor | yellow and blue forget-me-not | | FACW | 2 | y | | | | | | | 1 | 1 | 2 | 1 | | | 0.4 |
| Bromus catharticus | rescuegrass | | NOL | 5 | u | | | | | | | | | 5 | | | | 0.4 |
| Bromus sterilis | barren brome | | NOL | 5 | u | | | | | | | 5 | | | | | | 0.4 |
| Leucanthemum vulgare | oxeye daisy | | UPL | 5 | | | | | | | | 5 | | | | | | 0.4 |
| Lythrum hyssopifolia | hyssop loosestrife | | OBL | 1 | y | | | | | | | | | | | 4 | | 0.3 |
| Aira caryophyllea | silver hairgrass | | FACU | 4 | | | | | | | | 2 | 2 | | | | | 0.3 |
| Trifolium hybridum | alsike [hybrid] clover | | FAC | 3 | y | | | | | | | 4 | | | | | | 0.3 |
| Typha latifolia | cattail | yes | OBL | 1 | y | | 2 | 2 | | | | | | | | | | 0.3 |
| Lotus corniculatus | birdsfoot trefoil | | FAC | 3 | y | | | | | | 3 | | | | | | | 0.3 |
| Vicia sativa | common vetch | | UPL | 5 | | 1 | | | 1 | | | | | | | | 1 | 0.3 |
| Centaurium erythraea | European centaury | | FAC | 3 | y | | | | | | | | 1 | | 2 | | | 0.3 |
| Cerastium glomeratum | sticky chickweed | | UPL | 5 | | | | | | | | 1 | 1 | | | | | 0.2 |

| Marion Mitigation Bank Plant Monitoring, 2011 Phase 1 | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forested Habitat Type | | | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-082** | **F-033** | **F-034** | **F-071** | **F-096** | **F-097** | **F-103** | **F-144** | **F-149** | **F-205** | **S-056** | **S-119** | **Mean** |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | 1 | | | | 1 | | | | | | | | 0.2 |
| Galium aparine | catchweed bedstraw/ cleavers | yes | FACU | 4 | | | | | | | | | | 2 | | | | 0.2 |
| Lotus unifoliolatus var. unifoliolatus | Spanish clover | yes | UPL | 5 | | | | | | | | 1 | | | | 1 | | 0.2 |
| Rumex acetosella | sheep [red] sorrel | | FACU+ | 4 | | | | | | | | 2 | | | | | | 0.2 |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | 1 | | | | | | | | | | | | 0.1 |
| Juncus bufonius | toad rush | yes | FACW | 2 | y | | | | | | | | | | | 1 | | 0.1 |
| Aphanes arvensis | field parsley piert/western lady's-mantle | | NOL | 5 | u | | | | | | | 1 | | | | | | 0.1 |
| Bidens frondosa | leafy beggar's-tick | yes | FACW+ | 2 | y | | | | | | | | | | | | 1 | 0.1 |
| Convolvulus arvensis | field bindweed | | NOL | 5 | u | | | | | | | | 1 | | | | | 0.1 |
| Cornus sericea | redosier dogwood | yes | FACW | 2 | y | | | 1 | | | | | | | | | | 0.1 |
| Crataegus douglasii | black hawthorn | yes | FAC | 3 | y | | 1 | | | | | | | | | | | 0.1 |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | | | 1 | | | | | | | | | | 0.1 |
| Galium parisiense | creeping [wall] bedstraw | | UPL | 5 | | | | | | | | | 1 | | | | | 0.1 |
| Juncus ensifolius | dagger-leaf rush | yes | FACW | 2 | y | 1 | | | | | | | | | | | | 0.1 |
| Lolium perenne ssp. multiflorum | Italian ryegrass | | FAC | 3 | y | | | | | | | 1 | | | | | | 0.1 |
| Poa pratensis | Kentucky bluegrass | | FAC | 3 | y | | | | | | | | | | | | 1 | 0.1 |
| Rumex obtusifolius | bitterdock/ butterdock/ broad-leaved dock | | FAC | 3 | y | | | | | | | | | 1 | | | | 0.1 |
| Senecio jacobaea | tansy ragwort | invasive | FACU | 4 | | | | | | | | | | | 1 | | | 0.1 |
| | | | | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 12 | | 5 | | 22 | 3 | 5 | 1 | | 1 | 8 | 1 | 4.8 |
| moss, duff, dead vegetation, etc. | " | | | | | 8 | 70 | 58 | 60 | 5 | 18 | 7 | 10 | | 15 | 7 | 12 | 22.5 |
| standing water (inches) | | | | | | 1 | | | | | | | | | | | | |


404 emergent stations
144 scrub/shrub stations
90 upland stations on the hill
also place 1 each upland stations in the centers of the N, S, & W berms
300 m W
measure 10 m from N boundary pk 3
200 m W
100 m W
ind. w/ emergent
PHASE
WOOD LOWER DRIVE SE
100 m Z
200 m N
actual point

Phase III

MMB PHASE 3

EMERGENT 6-12-11

| | 31 | 52 | 70 | 224 | 352 | 299 | 304 | 348 | 349 | 375 |
|---|---|---|---|---|---|---|---|---|---|---|
| Eleocharis palustris | 10 | ~~80~~ | 0 | 1 | | | | | | |
| Lemna minor | 3 | 1 | 1 | 4 | | | | | | |
| Juncus effusus | 0 | 3 | 0 | 5 | | | | | | |
| Azolla sp. | | 99 | 96 | 2 | | | | | | |
| Ludwigia palustris | | 0 | 0 | 2 | | | | | | |
| Salix lasiandra | | 20 | 0 | 0 | | | | | | |
| Phalaris arundinacea | | 15 | 8 | | | | | | | |
| Salix hookeri? | | 4 | 0 | | | | | | | |
| Typha latifolia | | 0 | 6 | | | | | | | |
| | | | 0 | | | | | | | |
| | 0 | 0 | 0 | 0 | | | | | | |
| bare | 78 | 0 | ~~0~~ 32 | 32 | | | | | | |
| decad veg, algae, moss, etc. | 10 | 0 | ~~54~~ 11 | 34 | | | | | | |
| standing water | 18" | 8" | ~~18"~~ 12" | 12" | | | | | | |

deep water

deep water

MMB PHASE 3

| EMERGENT | 47 | 51 | 78 | 138 (6-11-11) | 219 | 269 (placed @ heavy edge emergent veg) | 315 | 316 (6/11/11) | 317 (6/11/11) | 381 |
|---|---|---|---|---|---|---|---|---|---|---|
| Agrostis stolonifera | 0 | 0 | 0 | 0 | 0 | 0 | | 1 | 0 | |
| Phalaris arundinacea | 17 | 12 | 25 | 8 | ↑ | 0 | | 4 | 5 | |
| Juncus effusus | 0 | 0 | 22 | 0 | | 0 | | 88 | 88 | |
| Carex leptopoda? small heads | 0 | 0 | 0 | 0 | ↓ | 0 | | 1 | 0 | |
| Carex stipata? broad lvs, no heads | 0 | 0 | 0 | 0 | 0 | 0 | | 2 | 0 | |
| Lemna minor | 45 | 15 | 10 | 1 | 1 | 10 | | 10 | 50 | |
| Epilobium ciliatum | 0 | 0 | 0 | 0 | 0 | 0 | | 1 | 0 | |
| Salix lasiandra | 0 | 2 | 0 | 15 | ↑ | 3 | | 0 | 2 | |
| Salix gooderi? hookeri? | 0 | 0 | 0 | 2 | | 0 | | ↑ | 6 | |
| Ludwigia palustris | 0 | 0 | 1 | 1 | ↓ | 0 | | | 1 | |
| Populus balsamifera | 0 | 1 | 0 | 9 | 0 | 0 | | | 0 | |
| Azolla sp. | 2 | 80 | 0 | 95 | 1 | 0 | | | ↑ | |
| Eleocharis palustris | 0 | 55 | 5 | 5 | 1 | 18 | | | | |
| Bidens frondosa | ↑ | 0 | 1 | 0 | 0 | 0 | | | | |
| Elodea canadensis | | 0 | 2 | ↑ | ↑ | ↑ | | | | |
| Alisma sp. | | 1 | 0 | | | | | | | |
| Alopecurus geniculatus | | 1 | ↑ | | | | | | | |
| | | 0 | | | | | | | | |
| | | ↑ | | | | | | | | |
| | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | | ↓ | ↓ | |
| | 0 | 0 | ↓ | ↓ | 0 | 0 | | 0 | ↓ | |
| bare | 50 | 2 | 0 | 0 | 97 | 30 | | 5 | 0 | |
| dead veg, moss, algae | 5 | 2 | 38 | 4 | 0 | 40 | | 3 | 8 | |
| standing water | 24" | 8" | 4" | 8" | 28" | 12" | | 1/3" | 8" | |

MMB PHASE 3

SCRUB/SHRUB 6/11/11

| | 2 | 27 | 28 | 37 | 55 | 75 | 76 | 100 | 103 | 105 |
|---|---|---|---|---|---|---|---|---|---|---|
| Agrostis capillaris/castellana | 0 | 0 | 0 | 0 | 60 | 0 | ~~40~~ 100 | 0 | ~~0~~ 2 | 1 |
| Hypochaeris/leontodon | | | | | 0 | | 1 | 0 | 0 | 0 |
| also incl. some T. hybridum → Trifolium repens | | | | | 3 | | 11 | 0 | 0 | 1 |
| Juncus bufonius | | | | | 0 | | ~~10~~ 5 | 2 | 5 | 0 |
| Geranium carolinianum | | | | | | | 1 | 0 | 1 | |
| Equisetum arvense | 0 | | | | | | 0 | 2 | 0 | |
| Galium aparine | 1 | | | | | | | 1 | 1 | |
| Epilobium brachycarpum | 0 | | 0 | | | | | 1 | ~~10~~ | 0 |
| Phalaris arundinacea | 0 | | 2 | | | | | 0 | 10 | 5 |
| Daucus carota | 4 | | 0 | | | | | | 2 | 0 |
| Lactuca serriola | 0 | | | | | | | | 1 | 0 |
| Taraxacum officinale | 0 | | | | | | | | 5 | 0 |
| Brassica rapa | 0 | | | | 0 | | | | 0 | 1 |
| Festuca rubra | 0 | | | | 1 | | | | | 0 |
| Raphanus sativus | 28 | | | | 0 | | | | | 1 |
| Montia perfoliata | 87 | | | | | | | | | |
| Bromus catharticus (inermis?) | 1 | | | | | | | | | |
| Lamium purpureum | 1 | | | | | | | | | |
| Geranium lucidum | 1 | 0 | 0 | | | | | | | |
| Azolla sp. | 0 | 68 | 6 | | | | | | | |
| Lemna minor | | 7 | 48 | | | | | | | |
| Typha latifolia | | 3 | 1 | | | | | | | |
| Potamogeton sp. | | 85 | 85 | | | | | | | |
| Eleocharis palustris | | 0 | 3 | | | | | | | |
| | | | 0 | | | | | | | |

MMB PHASE 3

SCRUB/SHRUB 6-11-11

| | 2 | 27 | 28 | 37 | 55 | 75 | 76 | 100 | 103 | 105 |
|---|---|---|---|---|---|---|---|---|---|---|
| Holcus lanatus | 4 | 0 | 0 | 6 | 30 | 0 | 37 | 15 | 18 | 25 |
| Poa trivialis | 0 | | | 15 | 7 | | 1 | 62 | 37 | 60 |
| Lolium multiflorum | | | | 6 | 0 | | 2 | 0 | 0 | 0 |
| Vicia sativa | | | | 18 | 2 | | 0 | | 1 | 0 |
| Vicia hirsuta | | | | 8 | 0 | | 0 | | 0 | 1 |
| Vicia pannonica | | | | 6 | 0 | | 1 | | 0 | 0 |
| Anthemis cotula | | | | 2 | 0 | | 0 | | 0 | 0 |
| Parentucellia viscosa | | | | 4 | 8 | | 2 | | 1 | 0 |
| Trifolium dubium | 0 | | | 10 | 1 | | 0 | | 0 | 0 |
| Geranium molle | 12 | | | 2 | 0 | 0 | 0 | | 0 | 1 |
| also incl. some T. hybridum → Trifolium pratense | 0 | | | 7 | | 2 | | | 0 | 0 |
| Veronica peregrina | 0 | | | 7 | | 0 | | | 1? | 1 |
| Coronopus glomeratum | 1 | | | 3 | | | | 0 | 1 | 1 |
| Epilobium ciliatum | 10 | | | 3 | | | | 20 | 8 | 2 |
| Bromus hordeaceous | 0 | | | 1 | | | | 0 | 0 | 0 |
| Bromus lectorum | 0 | | | 1 | 0 | | | | 0 | |
| Myosotis bicolor | 1 | | | 1 | 1 | | | | 1 | |
| Aphanes arvensis | 0 | | | 1 | 0 | | | | 0 | |
| pods only? Cardamine oligospanma | | | | 1 | 0 | | | | | |
| Festuca bromoides | | | | 1 | 1 | 0 | 0 | | | |
| Alopecurus geniculatus | | | | 0 | 0 | 45 | 12 | | | |
| Eleocharis ovata | | | | | 0 | 18 | 0 | | | |
| Juncus articulatus | | | | | 0 | 2 | | | | |
| Hordeum brachyantherum | | | | | 12 | 1 | | | | |
| Rorippa curvisiliqua | | | | | 0 | 3 | | | | |
| Alisma plantago-aquatica | | | | | | 3 | | | | |
| Lythrum portula | | | | | | 1 | | | | |
| Eleocharis acicularis | | | | | | 10 | | | | |
| Bidens frondosa | | | | | | 1 | 0 | | | |
| Mentha pulegium | | | 0 | 0 | | 1 | 2 | 0 | | 0 |
| bare | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 2 |
| dead veg, moss algae | 2 | 0 | 2 | 3 | 2 | 15 | 3 | 4 | 15 | 15 |
| standing water | 1 0 | 24" | 18" | 0 | 0 | trace | 0 | 0 | 0 | 0 |

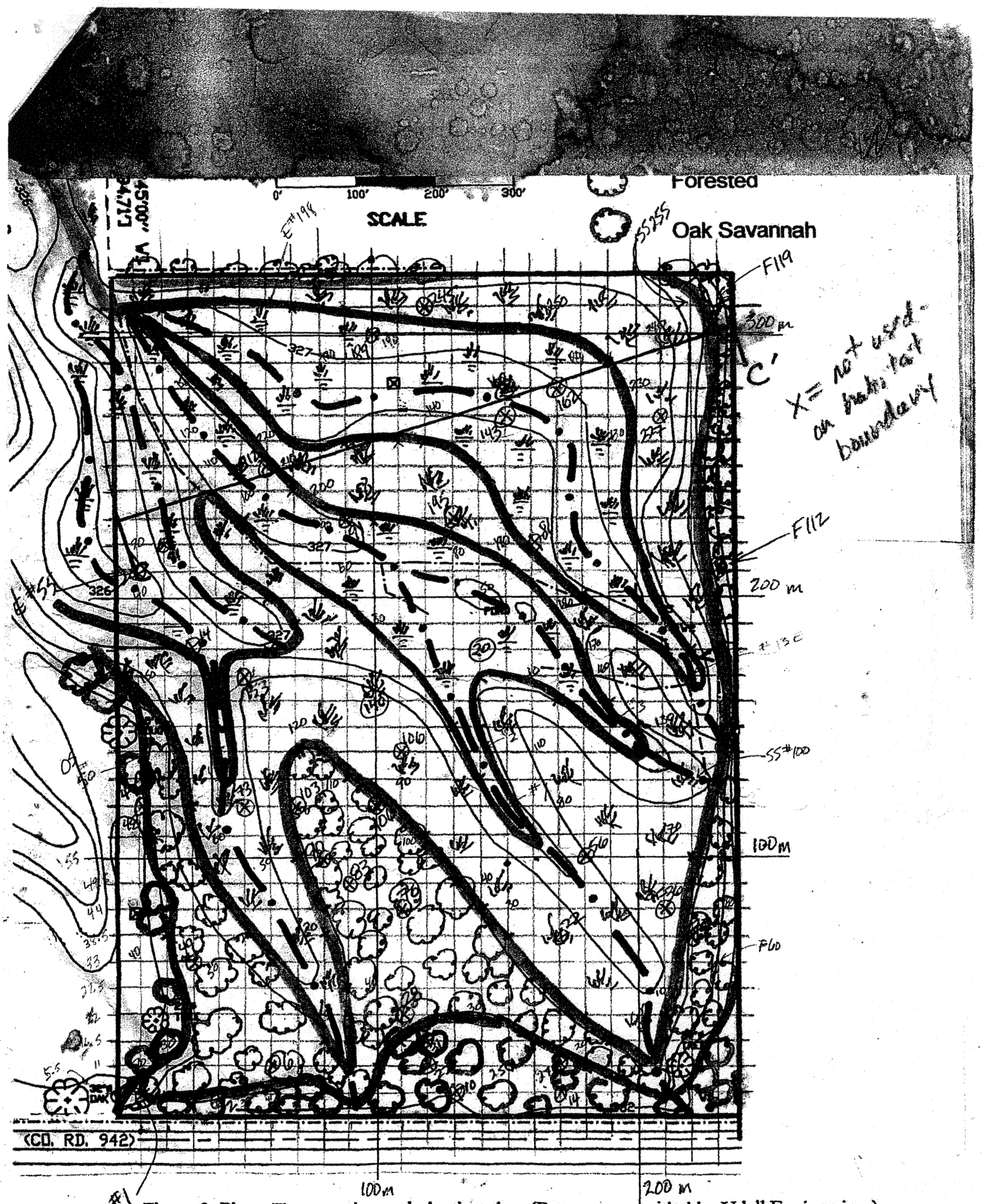



Figure 8. Phase II restoration and planting plan. (Base map provided by Udell Engineering.)

| Marion Mitigation Bank Plant Monitoring, 2011 Phase 2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Emergent Habitat Type | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-020** | **E-143** | **E-160** | **E-162** | **F-083** | **F-090** | **F-103** | **S-073** | **S-140** | **S-195** | **Mean** |
| Juncus effusus | soft rush | yes | FACW | 2 | y | | | | | | 85 | 25 | 8 | | 62 | |
| Polygonum persicaria | spotted ladysthumb | | FACW | 2 | y | 50 | | | | | | 1 | 5 | 80 | 1 | |
| Azolla mexicana | mexican mosquito-fern [water-fern] | yes | OBL | 1 | y | 1 | | | | | 10 | 88 | | | | |
| Lemna minor | duckweed | yes | OBL | 1 | y | 50 | | | | | | 5 | 20 | 5 | 15 | |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | 1 | | | | | | 1 | | | 55 | |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | | | | | 5 | 20 | 30 | | | |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | 10 | | | | | | 1 | 10 | 20 | | |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | | | 1 | 20 | | | | 18 | |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | | | | 1 | | | 20 | | 2 | |
| Salix hookeriana | Hooker willow | yes | FACW | 2 | y | | | | | | 20 | | | | | |
| Alnus rhombifolia (canopy) | white alder | yes | FACW | 2 | y | | | | | | | | | | 10 | |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | 5 | | | | | | | | 5 | | |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | | | | | 8 | 1 | | | | | |
| Juncus bufonius | toad rush | yes | FACW | 2 | y | | | | | 5 | | | | | | |
| Sparganium angustifolium | simplestem bur-reed | yes | OBL | 1 | y | 2 | | | | | | | | 1 | | |
| Alisma plantago-aquatica | American water-plantain | yes | OBL | 1 | y | | | | | | | 1 | | | | |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | | | | | 1 | | | | | | |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | | | | | 1 | | | | | | |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | | | | | 1 | | | | | | |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | | | | | 1 | | | | | | |
| Trifolium repens | white clover | | FAC- | 3 | | | | | | 1 | | | | | | |
| | | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | | | | | 55 | 3 | | 20 | | 1 | |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | 5 | | | | 25 | 12 | 1 | 40 | 1 | 5 | |
| standing water (inches) | | | | | | 20 | | | | 1 | 5 | 20 | 24 | 14 | 4 | |

| Marion Mitigation Bank Plant Monitoring, 2011 Phase 2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scrub/Shrub Habitat Type | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **F-070** | **F-076** | **F-106** | **F-112** | **S-022** | **S-036** | **S-056** | **S-106** | **S-153** | **S-227** | **Mean** |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | 75 | 1 | | 98 | | 95 | | | | |
| Juncus effusus | soft rush | yes | FACW | 2 | y | 2 | 20 | 68 | | | 65 | | | | 25 | |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | | | 98 | | | | | | | |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | | | | | | 2 | | | 80 | | |
| Salix hookeriana | Hooker willow | yes | FACW | 2 | y | | | | | | | | 80 | | | |
| Alnus rhombifolia (canopy) | white alder | yes | FACW | 2 | y | | | | | | | | | | 80 | |
| Equisetum arvense | common [field] horsetail | yes | FAC | 3 | y | 52 | | | | 3 | | | | | 25 | |
| Rubus discolor | Himalayan blackberry | invasive | FACU | 4 | | | 12 | | 65 | | | | 2 | | | |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | 15 | | | | | | 15 | 28 | | | |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | | 1 | 15 | 8 | | | | 7 | |
| Poa trivialis | rough [roughstalk] bluegrass | | FACW | 2 | y | | | | | | | | | | 20 | |
| Lotus corniculatus | birdsfoot trefoil | | FAC | 3 | y | | | | | | | 18 | | | 1 | |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | 12 | | | | | | 1 | | | | |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | 10 | | | | | | | | | | |
| Azolla mexicana | mexican mosquito-fern [water-fern] | yes | OBL | 1 | y | | | 9 | | | | | | | | |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | 4 | 1 | | | | 2 | | | | 2 | |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | 3 | | | | 1 | | | | |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | | | | | | | 1 | 3 | | | |
| Veronica americana | American speedwell | yes | OBL | 1 | y | | | 2 | | | | | | | 2 | |
| Lemna minor | duckweed | yes | OBL | 1 | y | | | 1 | | | 1 | | | 1 | | |
| Alisma plantago-aquatica | American water-plantain | yes | OBL | 1 | y | | | 2 | | | | | | | | |
| Lolium arundinacea | tall fescue | | FAC- | 3 | | | | | | | | | 2 | | | |
| Vicia sativa | common vetch | | UPL | 5 | | | | | | | | | 2 | | | |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | | | 1 | | | | | | | | |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | | | | | | | | 1 | | | |
| Bidens frondosa | leafy beggar's-tick | yes | FACW+ | 2 | y | | | 1 | | | | | | | | |
| Convolvulus arvensis | field bindweed | | NOL | 5 | u | | | | | | | 1 | | | | |
| Juncus ensifolius | dagger-leaf rush | yes | FACW | 2 | y | | 1 | | | | | | | | | |
| Myosotis laxa | small-flowered forget-me-not | yes | OBL | 1 | y | | | 1 | | | | | | | | |
| Plantago lanceolata | buckhorn plantain | | FACU+ | 4 | | | | | | | | | 1 | | | |
| Rumex acetosella | sheep [red] sorrel | | FACU+ | 4 | | | | | | | | | 1 | | | |
| Senecio jacobaea | tansy ragwort | invasive | FACU | 4 | | | | | | | | | 1 | | | |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | | 1 | | | | | | | | |
| Trifolium pratense | red clover | | FACU | 4 | | | | | | | | | 1 | | | |
| Vicia pannonica | Hungarian vetch | | NOL | 5 | u | | | | | | | | 1 | | | |
| | | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | | 1 | | 5 | | | 5 | | 20 | | |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | 6 | 65 | 20 | 94 | 82 | 25 | 65 | 55 | | 20 | |
| standing water (inches) | | | | | | | trace | 6 | | 2 | 2 | | | 36 | 1 | |

| Marion Mitigation Bank Plant Monitoring, 2011 Phase 2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forested Habitat Type | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-014** | **E-055** | **E-081** | **E-091** | **E-112** | **E-189** | **F-006** | **F-028** | **F-049** | **S-245** | **Mean** |
| Alnus rhombifolia (canopy) | white alder | yes | FACW | 2 | y | | | 99 | | | | | | | 45 | |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | 6 | 66 | | 30 | | | | | | | |
| Holcus mollis | creeping velvetgrass | | FACU | 4 | | | | | | | | | | 85 | | |
| Poa trivialis | rough [roughstalk] bluegrass | | FACW | 2 | y | | | 1 | | | | | | | 75 | |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | | | 75 | | | | | 1 | | |
| Azolla mexicana | mexican mosquito-fern [water-fern] | yes | OBL | 1 | y | | 70 | | | | | | | | | |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | | | | | | | 35 | 25 | | 4 | |
| Trifolium pratense | red clover | | FACU | 4 | | | | | | | | 47 | | | | |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | | | 20 | 18 | | | | 3 | | |
| Trifolium repens | white clover | | FAC- | 3 | | | | | | | | 5 | 30 | | | |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | | | | | | | | 1 | | 30 | |
| Rubus discolor | Himalayan blackberry | invasive | FACU | 4 | | | | 18 | 5 | | | | | | | |
| Typha latifolia | cattail | yes | OBL | 1 | y | | 23 | | | | | | | | | |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | 4 | 15 | | | | | | | |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | 1 | | 15 | | | | | | | |
| Vulpia bromoides | barren fescue | | UPL | 5 | | | | | | | | 15 | | | | |
| Carex stipata | awl-fruited sedge | yes | OBL | 1 | y | | | 10 | | | | | | | | |
| Lemna minor | duckweed | yes | OBL | 1 | y | | 4 | 2 | 2 | 1 | | | | | | |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | | 8 | | | | | | | | | |
| Equisetum arvense | common [field] horsetail | yes | FAC | 3 | y | | | 7 | | | | | | | | |
| Bromus hordeaceus ssp. hordeaceus | soft brome | | FACU | 4 | | | | | | | | 7 | | | | |
| Sparganium angustifolium | simplestem bur-reed | yes | OBL | 1 | y | 6 | | | | | | | | | | |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | | 6 | | | | | | | | | |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | | | | | | | 2 | 3 | | | |
| Alisma plantago-aquatica | American water-plantain | yes | OBL | 1 | y | | 4 | | | | | | | | | |
| Plantago lanceolata | buckhorn plantain | | FACU+ | 4 | | | | | | | | 1 | 1 | 2 | | |
| | | | | | | | | | | | | | | | | |
| Daucus carota | wild carrot/ Queen Anne's lace | | NOL | 5 | u | | | | | | | 3 | 1 | | | |
| Vicia sativa | common vetch | | UPL | 5 | | | | | | | | | | 3 | | |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | | | | | | | 1 | 2 | | | |
| Rumex acetosella | sheep [red] sorrel | | FACU+ | 4 | | | | | | | | 2 | 1 | | | |
| Vicia hirsuta | tiny vetch | | NOL | 5 | u | | | | | | | | | 3 | | |
| Deschampsia elongata | slender hairgrass | | FACW- | 2 | y | | | | | | | 2 | | | | |
| Galium aparine | catchweed bedstraw/ cleavers | yes | FACU | 4 | | | | | | | | | | 2 | | |
| Leucanthemum vulgare | oxeye daisy | | UPL | 5 | | | | | | | | 1 | 1 | | | |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | | | | | | | | 1 | | | |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | | | | | | | | | | 1 | |
| Senecio jacobaea | tansy ragwort | invasive | FACU | 4 | | | | | | | | | 1 | | | |
| Polygonum persicaria | spotted ladysthumb | | FACW | 2 | y | | | | 1 | | | | | | | |
| Cerastium glomeratum | sticky chickweed | | UPL | 5 | | | | | | | | 1 | | | | |
| Crepis capillaris | smooth hawksbeard | | FACU | 4 | | | | | | | | 1 | | | | |
| Mentha pulegium | pennyroyal | | OBL | 1 | y | | 1 | | | | | | | | | |
| Myosotis discolor | yellow and blue forget-me-not | | FACW | 2 | y | | | | | | | 1 | | | | |
| Parentucellia viscosa | parentucellia | | FAC- | 3 | | | | | | | | 1 | | | | |
| Ranunculus repens | creeping buttercup | | FACW | 2 | y | | | 1 | | | | | | | | |
| Solanum dulcamara | bittersweet nightshade | | FAC+ | 3 | y | | | | | 1 | | | | | | |
| Verbascum blattaria | moth mullein | | UPL | 5 | | | | | | | | 1 | | | | |
| | | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 88 | | | | | | 2 | 25 | | | |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | | 13 | 60 | 5 | 98 | | 5 | 12 | 15 | 3 | |
| standing water (inches) | | | | | | 36 | 6 | 1 | 8 | 10 | | | | | | |

Marion Mitigation Bank Cover Sheet 2010

| Performance Standard | | Met: Yes/No | |
|---|---|---|---|
| | Phase I | Phase II | Phase III |
| Areas of herbaceous vegetation dominated by more than 50% cover of FAC or wetter vegetation | Yes (Emergent habitat) | Yes (Emergent habitat) | Yes (Emergent habitat) |
| Scrub-shrub and forested areas will have no fewer than 3 woody species and will have a stem density of at least 100 stems per acre | 554 plants per acre (2008) | 1363 plants per acre (2008) | |
| No more than 15% cover of invasive, undesireable species | Yes | Yes | Yes |

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**2010 MONITORING REPORT**
**for**
**MARION MITIGATION BANK**
**MARION, OR**
**(Phases I, II & III)**

This is the tenth monitoring report for the Marion Mitigation Bank Site near Marion, OR. Construction of Phase I of the site restoration was completed in 2001, Phase II was completed in 2003, and Phase III was completed in October of 2008. Maureen Stellrecht and Novitzki and Associates, Inc. prepared this report and designed and participated in monitoring activities. Maureen Stellrecht conducted or supervised weed management and other site maintenance and the routine monitoring of pond, and ground water levels. Ground water levels were measured at least once per month and the depth of water in selected ponds was measured when ponding occurred. Michael Bollman conducted the vegetation monitoring in May. Maureen Stellrecht planted trees and native seed, cut and sprayed blackberry, reed canary grass, velvet grass, queen ann's lace, teasel, and scott's Broom at different times during the year.

Phase I and Phase II achieved and exceeded hydrology and vegetation performance standards in each habitat type. An aggressive weed management program, initiated in 2005 was continued in 2006, 2007, 2008, 2009, and 2010. Reed canary grass was a primary focus of weed management efforts this year. Velvet grass, blackberry, scott's broom, spatula leafed loosestrife, canada thistle, and other non-natives were sprayed, pulled, or mowed, as appropriate.

## Hydrology Monitoring

Ground water levels were measured in 17 observation wells (Figure 1) and data are presented in Table 1. Wells 1 through 9 have been measured since December 1999. Wells 10 through 13 have been measured since January 2003, and Wells 14 through 17 have been measured since January 2004. Shallow wells S1 through S7 were installed to define the edge of the restored wetland in Phase I and they have been measured since April 2003. Shallow wells S8 through S11 were installed to define the edge of the restored wetland in Phase II and they have been measured since March 2005. Data from the shallow well measurements taken throughout 2009 are presented in Table 2.

well 5? 14-17?

Wells 7-13 are located in Phase I and of these, wells 5, 11, 12, 13, 14, 15, 16 and 17 have a water level within 12 inches of the surface for more than 15 days during the growing season, thus meeting wetland hydrology criteria (they are highlighted in Table 1). Shallow wells S1-S7 are also within Phase I and wells S1, S2, S3, S8, S9, S10 and S11 also meet hydrology criteria (they are highlighted in Table 2). The areas represented by these wells are meeting wetland hydrology criteria. The boundary of the area meeting wetland hydrological criteria (10.06 acres) as well as the remedial area of phase I are shown on Figure 2.

what about wells 7-10?

Wells 1-3 and 14-17 are located in Phase II and of these, wells 2, 14, 15, 16, and 17 have a water level within 12 inches of the surface for more than 15 days during the growing season, thus meeting wetland hydrology criteria (they are highlighted in Table 1). Shallow wells S8-S11 are also within Phase II and all four of these meet hydrology criteria (they are highlighted in Table 2). The boundary of the area meeting wetland hydrology criteria (16.80 acres) is shown on Figure 3.

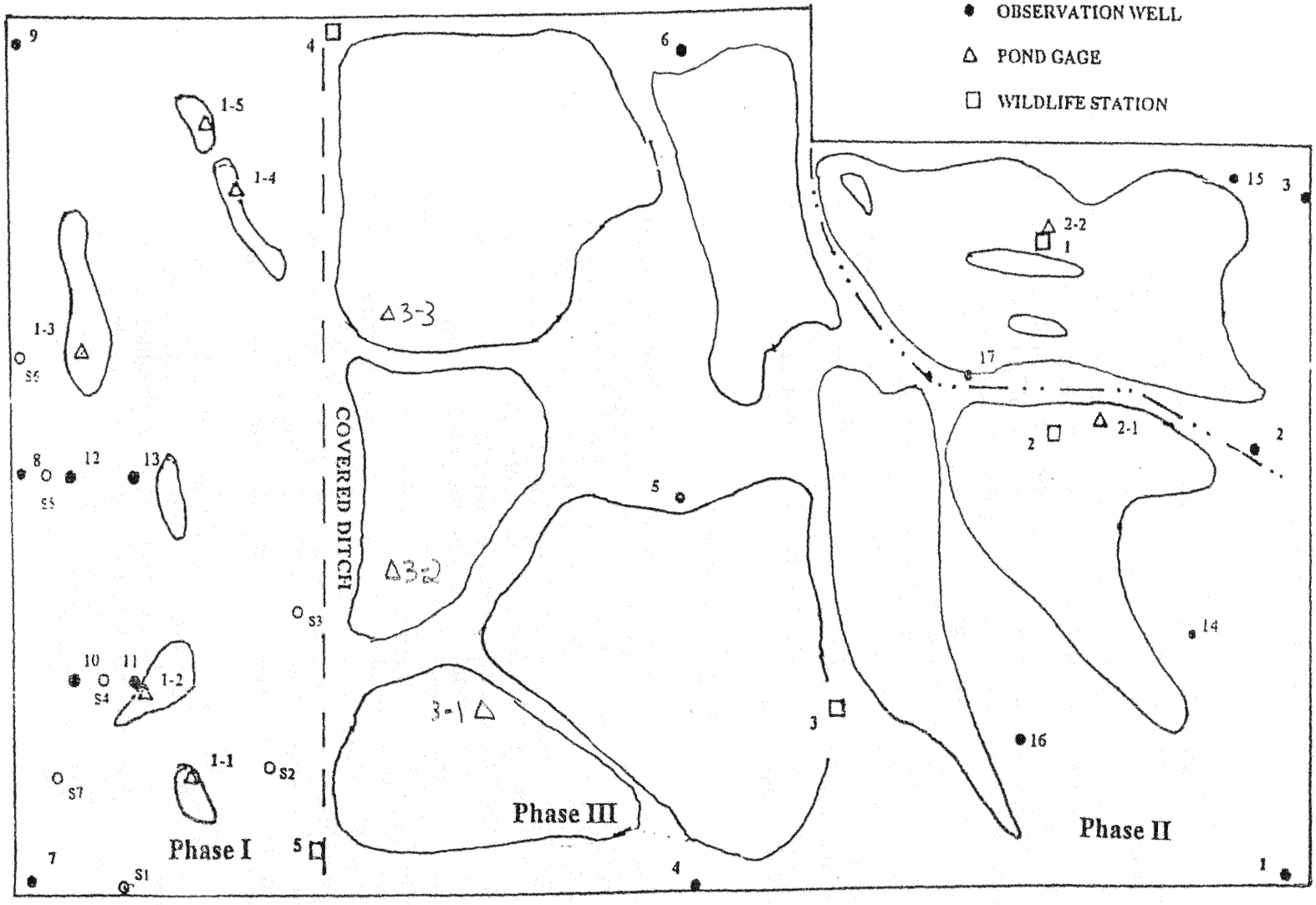


Figure 1. Sketch of the Marion Mitigation Bank site showing locations of observation wells, pond gages, and wildlife monitoring stations.

| | Observation Well Number | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** |
| **1/14/10** | 31 | 0 | 12 | 14 | 10 | +2 | 35 | 41 | 30 | 41 | 22 | 25 | 17 | 0 | 1 | 4 | +5 |
| **2/15/10** | 14 | 4 | 10 | 12 | 11 | 0 | 8 | 26 | 7 | 28 | 6 | 4 | 0 | +2 | 2 | 2 | +7 |
| **3/13/10** | 40 | 6 | 15 | 22 | 7 | 2 | 5 | 32 | 14 | 32 | 7 | 10 | 9 | 0 | 5 | 6 | 8 |
| **4/1/10** | 35 | 6 | 13 | 20 | 3 | 7 | 3 | 22 | 11 | 22 | 4 | 2 | 4 | +2 | 4 | 5 | +8 |
| **4/15/10** | 22 | 17 | 12 | 7 | 6 | 13 | 15 | 28 | 14 | 33 | 12 | 9 | 8 | 4 | 3 | 7 | +2 |
| **5/1/10** | 31 | 15 | 18 | 13 | 14 | 7 | 27 | 34 | 29 | 41 | 31 | 15 | 17 | 2 | 9 | 15 | 0 |
| **5/18/10** | 47 | 11 | 20 | 26 | 13 | 0 | 51 | 54 | 25 | 52 | 23 | 29 | 19 | 2 | 12 | 11 | 0 |
| **6/15/10** | 51 | 14 | 27 | 32 | 20 | 9 | 61 | 66 | 32 | 57 | 36 | 41 | 37 | 6 | 15 | 15 | 2 |
| **7/15/10** | 55 | 15 | 25 | 27 | 25 | 38 | 72 | 75 | 45 | 61 | 46 | 47 | 38 | 12 | 18 | 18 | 4 |
| **8/16/10** | 54 | 18 | 26 | 28 | 26 | 42 | 89 | 74 | 62 | 71 | 47 | 56 | 52 | 10 | 19 | 20 | 3 |
| **9/15/10** | 56 | 19 | 25 | 30 | 27 | 43 | 61 | 52 | 63 | 68 | 42 | 48 | 51 | 11 | 18 | 25 | 5 |
| **10/1/10** | 52 | 13 | 24 | 32 | 29 | 45 | 13 | 25 | 41 | 65 | 38 | 41 | 42 | 14 | 19 | 26 | 4 |
| **10/15/10** | 42 | 25 | 16 | 26 | 14 | 19 | 7 | 18 | 54 | 67 | 31 | 42 | 37 | 12 | 10 | 19 | +3 |
| **11/15/10** | 41 | 31 | 15 | 20 | 11 | +7 | 3 | 15 | 13 | 41 | 18 | 17 | 20 | 6 | 7 | 4 | +9 |
| **12/14/10** | 22 | 0 | 8 | 13 | 8 | 18 | 0 | 11 | 8 | 6 | 0 | +2 | +3 | +5 | 0 | 3 | +11 |

Table 1. Depth to water (in inches) below land surface in observation wells (figure 1).

| | Shallow Well Number | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 |
| 1/14/10 | +3 | 1 | 4 | 6 | 4 | 5 | 6 | 8 | 5 | 0 | 2 |
| 2/15/10 | 2 | 5 | 9 | 20 | 11 | 13 | 15 | 11 | 7 | 4 | 1 |
| 3/13/10 | 10 | 4 | 4 | __ | 15 | 18 | 13 | +1 | 2 | 0 | 5 |
| 4/1/10 | 0 | 6 | 1 | 17 | 5 | 13 | 17 | +1 | 2 | +1 | 5 |
| 4/15/10 | 2 | 4 | 3 | 15 | 17 | 15 | 13 | 3 | 4 | 1 | 5 |
| 5/1/10 | 8 | 12 | 12 | __ | 17 | 17 | 12 | 3 | 2 | 0 | 8 |
| 5/18/10 | __ | 10 | 13 | __ | 21 | __ | __ | 5 | 5 | 2 | 7 |
| 6/15/10 | __ | __ | __ | __ | __ | __ | __ | 14 | 10 | 13 | 11 |
| 7/15/10 | __ | __ | __ | __ | __ | __ | __ | 12 | 15 | 13 | __ |
| 8/16/10 | 19 | __ | __ | __ | __ | __ | __ | 12 | 14 | 12 | __ |
| 9/15/10 | 18 | __ | 22 | 18 | 20 | 21 | __ | 13 | 19 | 12 | __ |
| 10/1/10 | 16 | __ | 21 | 17 | 19 | 18 | __ | 13 | 16 | 11 | __ |
| 10/15/10 | 11 | 7 | __ | __ | 24 | 12 | 11 | 10 | 13 | 8 | 9 |
| 11/15/10 | 7 | 12 | 6 | 3 | 2 | 13 | 6 | 4 | 0 | 6 | 7 |
| 12/14/10 | +3 | 0 | 0 | 0 | 1 | 5 | 8 | +3 | +2 | +1 | 1 |

**Table 2. Depth to water (in inches) below land surface in shallow observation wells (figure 1).**

Water levels have been measured in the reference pond (renumbered "2-1") since May 2000. The Phase I regrading created seven small depressions and water levels in the 5 resulting ponds have been recorded since July, 2001. The Phase II regrading created three major ponds. One pond includes the former reference pond and the staff gage at that location has been renumbered "2-1". A new staff gage was installed in the larger pond to the west (2-2 on Figure 1) in December 2003. The completion of construction of phase III in 2008 created three new ponds (3-1, 3-2, 3-3). Water levels for these ponds has been collected since November 2008. The water level data are presented in Table 3.

**Table 3**. Depth of Water (in feet) in selected ponds in 2010 at the Marion Bank. Ponds (Figure 1) are identified by two digits: the first (1) refers to phase 1, 2, or 3; the second is the relative position west of Woodpecker Drive (1 is closest and 5 is furthest to the west).

| | **Pond Number** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **1-1** | **1-2** | **1-3** | **1-4** | **1-5** | **2-1** | **2-2** | **3-1** | **3-2** | **3-3** |
| **Date** | | | | | | | | | | |
| 1-14-10 | .98 | 2.68 | 1.10 | 3.16 | 2.66 | 2.20 | 2.00 | 1.74 | 2.10 | 1.32 |
| 2-15-10 | 1.28 | 2.84 | .96 | 3.00 | 3.12 | 2.62 | 2.48 | 1.60 | 2.06 | 2.10 |
| 3-13-10 | 1.58 | 2.76 | 2.48 | 2.36 | 2.40 | 2.98 | 2.58 | 1.64 | 1.86 | 2.14 |
| 4-1-10 | 2.10 | 2.62 | 2.78 | 2.80 | 2.82 | 2.32 | 2.42 | 1.66 | 2.00 | 2.14 |
| 4-15-10 | 1.30 | 1.82 | 2.04 | 2.34 | 2.08 | 1.90 | 1.82 | 1.42 | 1.98 | 2.00 |
| 5-1-10 | 1.12 | 1.64 | 1.64 | 2.22 | 2.06 | 1.85 | 1.92 | 1.34 | 1.62 | 1.84 |
| 5-18-10 | .85 | 1.73 | 1.26 | 1.67 | 1.74 | 2.05 | 2.08 | 1.28 | 1.20 | 1.72 |
| 6-15-10 | .68 | 1.04 | .92 | 1.06 | .90 | 1.24 | 1.36 | 1.12 | 1.26 | 1.14 |
| 7-15-10 | .24 | -- | -- | .44 | -- | .96 | .82 | .50 | 1.12 | .68 |
| 8-16-10 | .06 | -- | -- | -- | -- | 1.00 | .70 | -- | 1.10 | .45 |
| 9-15-10 | -- | -- | -- | -- | -- | -- | 1.00 | -- | 1.02 | .32 |
| 10-1-10 | -- | -- | -- | -- | -- | -- | 1.30 | -- | .84 | .26 |
| 10-15-10 | -- | .56 | -- | .68 | .04 | .26 | 1.34 | -- | 1.10 | .46 |
| 11-15-10 | .32 | 2.00 | .86 | 1.10 | .88 | 1.30 | 1.16 | .90 | 1.24 | .90 |
| 12-14-10 | .56 | 3.30 | 1.10 | 2.86 | 1.44 | 2.05 | 1.92 | 1.10 | 1.64 | 1.16 |

Precipitation was above average for much of the year (Table 4). Thus ponds contained water until mid-June. Ponds 2-2, 3-2, and 3-3 contained water through out the year. The rest of the ponds began to refill in October due to heavy September rains. These data confirm the success of the hydrologic restoration. Hydrologic performance criteria (Novitzki 2001 a, page 16) require that "...in most years (i.e., 3 out of 5) ...emergent habitats shall be saturated or shallowly ponded for more than 60 days (i.e., end of April) into the growing season" (that begins March 1--Morlan, 1999). The ponded conditions observed in 2010 comfortably exceed performance standards.

**Table 4**. Monthly Precipitation in inches in 2010 at the National Weather Service Station in Salem, OR.

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Observed | 5.85 | 4.07 | 5.14 | 4.35 | 3.47 | 2.64 | 0.04 | 0.20 | 2.07 | 5.22 | 6.44 | 9.95 |
| Normal (30 year) | 5.84 | 5.09 | 4.17 | 2.76 | 2.13 | 1.45 | 0.57 | 0.68 | 1.43 | 3.03 | 6.39 | 6.46 |

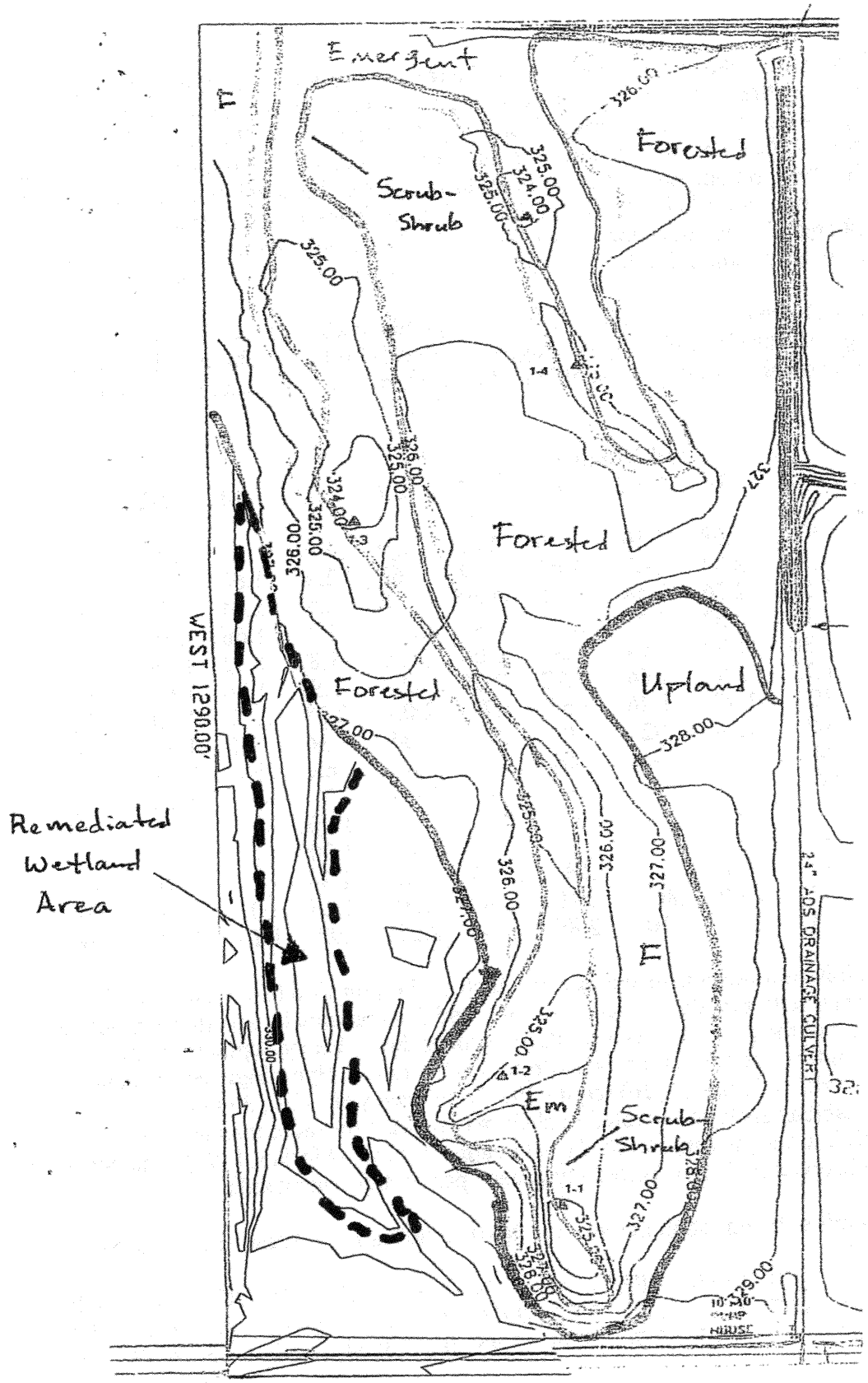


Figure 2. Phase I habitat boundaries resulting after construction and planting.

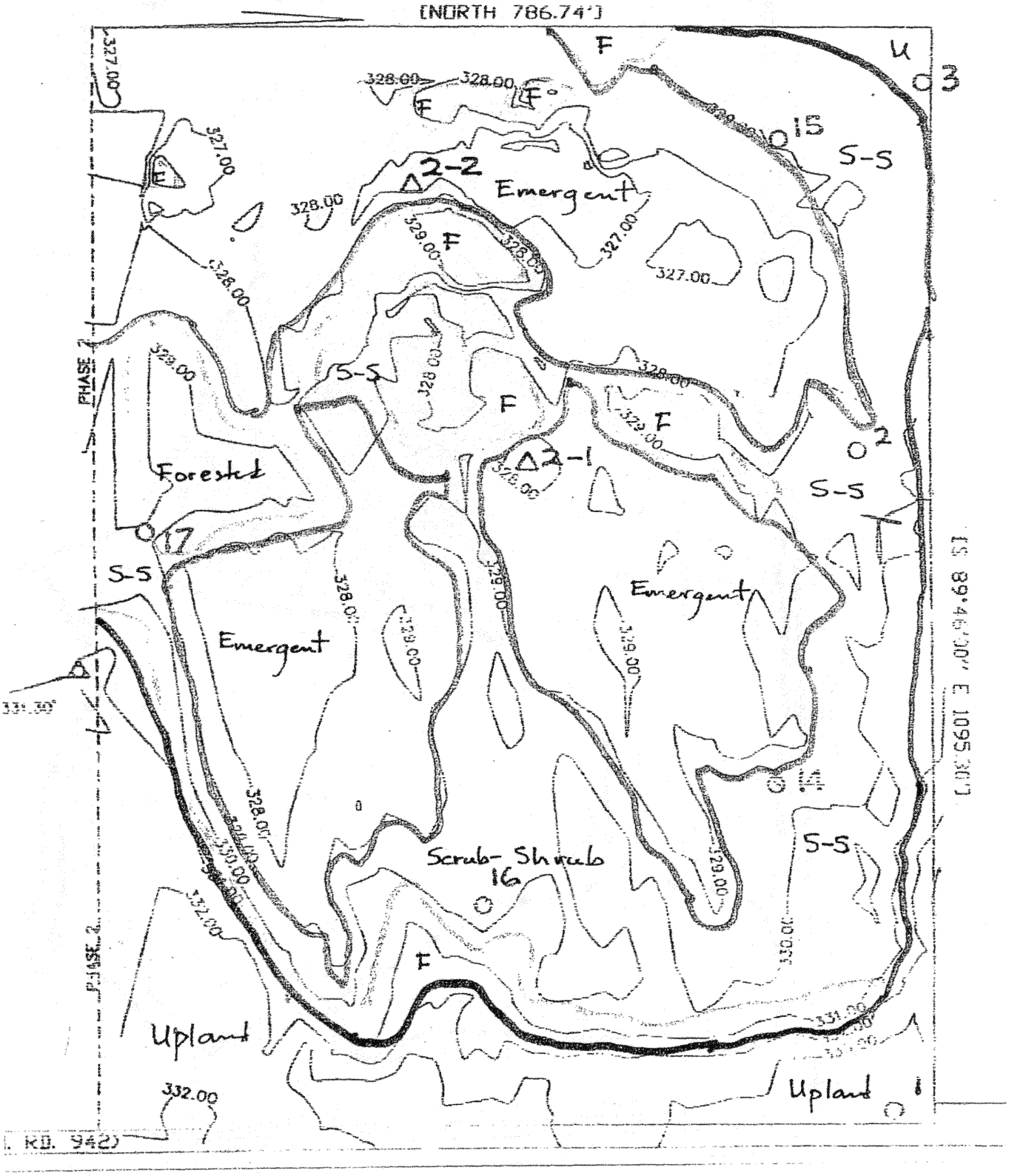


Figure 3. Phase II habitat boundaries resulting after construction and planting.

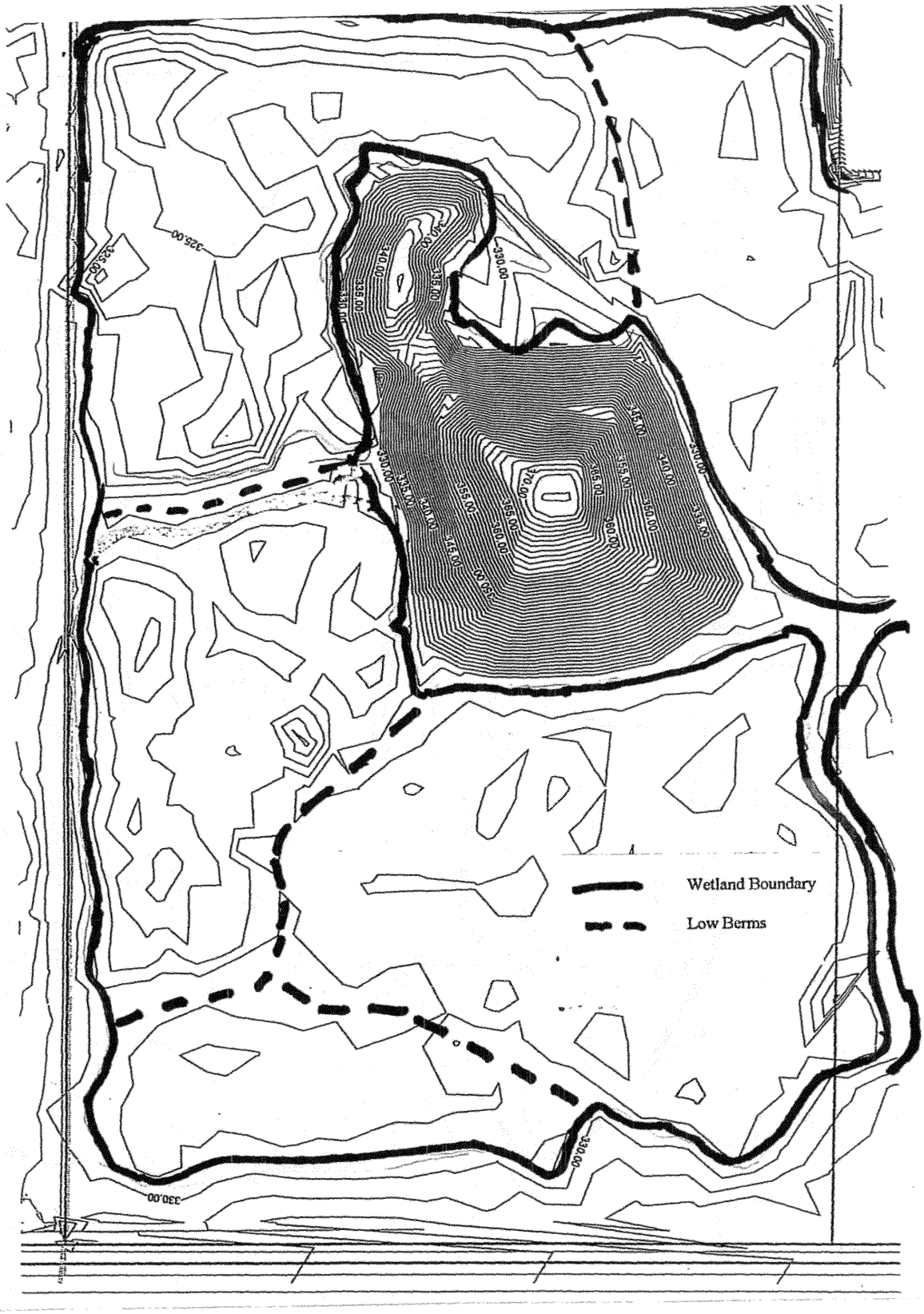


**Figure 4. Approximate wetland boundary after construction. Boundary between emergent and scrub-shrub habitats will be defined as distinct plant communities develop.**

## Vegetation Monitoring - Phase I

The plant community observed in 2010 is indicative of the continued transition from grass seed production to restored wetland. The boundaries of the habitat types were revised in October 2005 as suggested by the MBRT to better reflect the as-built conditions achieved in Phase I (Figure 2). Sample plot locations will be marked and have a tag or permanent identification attached in spring of 2010. This will allow the IRT to locate and identify each sample plot during the annual field inspection. The plant species in each habitat type are presented in Appendix 1. The percentage of FAC or wetter cover in each habitat type was: Emergent - 100%; Scrub-shrub - 90%; and Forested - 63%. This is apparently a response to return to more normal precipitation since 2006 (Table 3). The dominant plant species in Phase I were jointed rush (*Juncus articulates*), marsh seedbox (*Ludwiga palustris*), common spike rush (*Eliocharis palustris*), Sitka willow (*Salix sitchensis*), and pennyroyal (*Mentha pulegium*).

The plant community in the emergent habitat remained excellent. The plant community in both the scrub-shrub and forested habitats improved significantly since 2005, apparently responding to wetness that persisted throughout much of the year. The herbaceous community in the scrub shrub habitat has improved significantly due to the increase in woody vegetation. A stem density count was initiated in 2008 and will continue to be done every 5 years in order to better document this change in density (Table 5). We would like to initiate vegetation structure evaluation surveys in future years to document the horizontal and vertical vegetative growth diversity as suggested by John Marshall USFW.

**Percentage of Plant Community FAC or wetter in Phase I**

| Habitat | New 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|
| Emergent | 54 | 93 | 91 | 88 | 98 | 91 | 100 |
| Scrub/shrub | 48 | 68 | 80 | 84 | 90 | 85 | 90 |
| Forested | 27 | 49 | 57 | 58 | 72 | 75 | 63 |

We discussed with the IRT the failure of the extreme southeast corner of Phase I to achieve performance standards. Through the course of several meetings, including two on-site inspections, we have developed a remedial design that was completed in summer/ fall of 2009.

After excavation was completed in August 2009, we distributed a layer of wood compost. In October 2009, the area was seeded with a mix of slough grass, toad rush, and meadow barley. Already we have seen growth from many of the desirable grasses which were planted. We plan to spray the area with a broad leaf spray in the spring to combat any undesirable upland broad leaf species which previously existed there. We also planted a mix of alders and spirea in 2010 and plan to plant more trees and shrubs in February 2011.

## Vegetation Monitoring - Phase II

The plant communities observed in each habitat in 2010 represents a dramatic change from grass seed production to wetland. The boundaries of the habitat types were revised in October 2005 as suggested by the MBRT to better reflect the as-built conditions achieved in Phase II (Figure 3). In 2010 the percentage of FAC or better cover in each habitat type was: Emergent - 99%; Scrub-shrub - 94%; and Forested - 75%. Several desirable species are well established including soft rush (*Juncus effuses*), mexican mosquito-fern (*Azolla Mexicana*), common spike rush ( *Eleocharis palustris*), marsh seed box (*Ludwigia palustris*), and spotted lady's thumb (*Polygonum persicaria*).

**Percentage of Plant Community FAC or wetter in Phase II**

| Habitat | New 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|
| Emergent | 83 | 70 | 88 | 90 | 96 | 98 | 99 |
| Scrub/shrub | 66 | 70 | 66 | 67 | 79 | 87 | 94 |
| Forested | 61 | 53 | 83 | 80 | 78 | 99 | 75 |

Vegetation Monitoring- Phase III

Vegetation sampling in Phase III began in 2010. The majority of this phase (other than the hill) is emergent with open water, with scrub/ shrub surrounding the ponds. Twenty emergent sampling stations were picked at random, and 10 scrub/ shrub plots. No forested plots were delineated at this time. The FAC and wetter species in each habitat type were: Emergent- 100%, Scrub-shrub- 74%. The emergent habitat type was dominated by *Juncus effuses* (Soft rush), *Azolla Mexicana* (mexico mosquito-fern), *Phalaris arundinaceous* (reed canary grass), *Myriophyllum spicatum* ( water mil foil), and *Eliocharis palustrus* (Common spike-rush). The scrub-shrub habitat was dominated by *Vicia Pannonia* (Hungarian vetch), *Holcus lanatus* (velvet grass), Trifolium repens (white clover), and Poa pratensis (Kentucky bluegrass).

## Summary

Emergent habitats (ponds) at the Marion Mitigation Bank site contained water through most of the year. This meets (and exceeds) hydrologic performance criteria (Novitzki 2001 a, page 16) that "...in most years (i.e. 3 out of 5) ... emergent habitats shall be saturated or shallowly ponded for more than 60 days (i.e. end of April) into the growing season". Scrub-shrub and forested habitats also meet hydrologic criteria, exhibited by ground water levels within 12 inches of the surface for more than 15 days during the growing season. Ground water levels at the site fluctuated much like previous years.

In the Phase I restoration the emergent habitat plant community is 100% FAC or wetter, the scrub-shrub habitat is 90%, and forested habitat is 63%. We regraded an area in the southeast corner of Phase I to assure wetland hydrology as specified in the Banking Instrument as discussed with the IRT.

In the Phase II restoration the emergent habitat is 99% FAC or wetter, the scrub-shrub habitat is 94%, and the forested habitat is 75%. The Phase III vegetation monitoring began in 2010. The plant community observed is 100% FAC or wetter in the emergent habitat and 74% FAC or wetter in the scrub/shrub habitat.

We initiated an aggressive weed management plan in 2005 to focus on reed canary grass, velvet grass, and other non-natives. We will continue to spray, cut, or pull non-natives until the native plant community is well established and less vulnerable to invasion by exotics. We have completed Phase III and regraded a small part of Phase I and Phase II to assure that we achieve wetland hydrology. We have introduced a stem density survey, which we will continue to conduct every five years, to more accurately document the maturation of the site.

The completion of construction of phase III along with the regarding of some portions of phases I and II will give us the opportunity to continue with successful remediation of this site.

Woody Species Density for the Marion Mitigation Banking Site

2008

Phase 1

| Sample Location | Alder | Ash | Cottonwood | Dogwood | Hawthorn | Spirea | Twinberry | Willow_1 | Willow_2 | Willow_3 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F-009 | 9 | 16 | 0 | 1 | 13 | 16 | 0 | 10 | 2 | 2 | 58 |
| F-033 | 3 | 0 | 2 | 0 | 3 | 9 | 0 | 11 | 8 | 2 | 33 |
| F-097 | 0 | 0 | 1 | 0 | 0 | 5 | 0 | 3 | 4 | 4 | 13 |
| F-109 | 0 | 33 | 0 | 0 | 0 | 10 | 0 | 0 | 1 | 0 | 44 |
| F-205 | 0 | 34 | 0 | 0 | 0 | 9 | 0 | 0 | 2 | 1 | 45 |
| S-020 | 0 | 5 | 21 | 0 | 0 | 12 | 0 | 8 | 3 | 0 | 49 |
| S-040 | 0 | 0 | 14 | 0 | 0 | 10 | 0 | 8 | 2 | 0 | 34 |
| S-056 | 0 | 0 | 2 | 0 | 0 | 23 | 0 | 0 | 1 | 1 | 26 |
| S-116 | 0 | 18 | 5 | 0 | 0 | 8 | 0 | 40 | 5 | 0 | 76 |
| S-119 | 0 | 38 | 0 | 0 | 0 | 12 | 0 | 1 | 1 | 0 | 52 |
| total: | 12 | 144 | 45 | 1 | 16 | 114 | 0 | 81 | 29 | 10 | 430 |
| plants per hectare: | 38 | 458 | 143 | 3 | 51 | 363 | 0 | 258 | 92 | 32 | 1369 |
| plants per acre: | 15 | 185 | 58 | 1 | 21 | 147 | 0 | 104 | 37 | 13 | 554 |

Phase 2

| Sample Location | Alder | Ash | Cottonwood | Dogwood | Elderberry | Spirea | Twinberry | Willow_1 | Willow_2 | Willow_3 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F-083 | 0 | 47 | 6 | 0 | 0 | 4 | 1 | 12 | 8 | 0 | 78 |
| F-076 | 0 | 22 | 7 | 0 | 0 | 7 | 0 | 7 | 6 | 0 | 49 |
| F-090 | 4 | 39 | 4 | 3 | 0 | 6 | 0 | 14 | 50 | 0 | 116 |
| S-022 | 0 | 10 | 5 | 1 | 0 | 4 | 0 | 5 | 8 | 0 | 33 |
| S-036 | 0 | 0 | 1 | 0 | 0 | 5 | 0 | 5 | 4 | 3 | 15 |
| S-227 | 162 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 6 |
| S-195 | 217 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 8 |
| F-103 | 3 | 4 | 28 | 0 | 0 | 13 | 0 | 36 | 258 | 1 | 339 |
| S-[illegible]73 | 0 | 0 | 15 | 0 | 0 | 4 | 0 | 10 | 362 | 12 | 391 |
| [illegible]-112 | 16 | 1 | 0 | 0 | 3 | 0 | 0 | 19 | 0 | 0 | 23 |
| total: | 402 | 127 | 68 | 4 | 3 | 43 | 1 | 108 | 704 | 17 | 1058 |
| plants per hectare: | 1280 | 404 | 216 | 13 | 10 | 137 | 3 | 344 | 2241 | 54 | 3368 |
| plants per acre: | 518 | 164 | 88 | 5 | 4 | 55 | 1 | 139 | 907 | 22 | 1363 |

| | |
|---|---|
| area of 10 m circle | 314.2 |
| area per hectare | 31.83 |
| habitat per hectare | 3.183 |
| samp. per hectare | 0.796 |
| acres per hectare | 2.471 |

Table 5. Woody Species Density for the Marion Mitigation Site Phase I and II

## CREDIT SALES---2010

6-23-10 3.83 Credits Albany-Lebanon Investments, LLC PO Box 39
Lebanon, OR 97355

DSL Permit 39843 RF COE Permit 2007-00571
Balance remaining: 3.99 Credits

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# Marion Mitigation Bank Phase I Vegetation Monitoring - 2010

## Introduction, Summary, and Methods

This report summarizes vegetation assessment and monitoring conducted at the Marion Mitigation Bank (MMB) site on May 31st and June 1st, 2010. The following table presents a summary of the 2010 vegetation sampling results:

| MMB Phase 1 Habitats | Emergent | Scrub/Shrub | Forested |
|---|---|---|---|
| Percent FAC and better cover | 100 | 90 | 63 |
| Percent native cover | 57 | 40 | 40 |
| Percent non-vegetated | 34 | 26 | 16 |

The approach and rationale for the sampling strategy used can be found in the 2001 report on vegetation monitoring at the MMB. Sampling was completed at the same locations as in 2009. There were 10, 13, and 12 locations in the Emergent, Scrub/Shrub, and Forested habitat types, respectively.

Species found in a one-square meter rectangular quadrat placed at each of the sampling stations were recorded and the cover of each was estimated as a percent of the quadrat area. Estimates of bare ground and other non-vegetated space were made at each quadrat, and estimates of overstory cover (canopy) were also included, if present.

## Vegetation in the Habitat Types in the Phase I Restoration Unit at the MMB

Vegetation sampling data for the different habitat types is in the attached tables.

To calculate the relative proportion of typical wetland species, those with an indicator status of FAC or better were considered. Species were assigned the indicator status for the Northwest region from the USFWS 1996 list. The most conservative National indicator status was used when the indicator status for the Northwest region was "NI" or blank. In determining proportions of cover for FAC and better species, the cover of those species was calculated as a percentage of the total cover. Calculations were also made which included: 1) the proportion of native taxa, and 2) a Moisture Index.

The following sections summarize the dominant vegetation within each of the habitat types. Unlike the reports for years prior to 2005, the three wetland types were not evaluated as a combined unit in later years. Each of the habitat types is evaluated only as a distinct unit.

**Emergent Habitat Type**

This habitat type was dominated by *Agrostis stolonifera*, *Mentha pulegium*, *Carex obnupta*, *Salix sitchensis*, and *Eleocharis palustris*. FAC and better species made up 100% of the total cover. Native species accounted for about 60% of the total cover in this area. The moisture index for this habitat type was 1.50, and 34% of the area was not

vegetated.

**Scrub/shrub Habitat Type**

This habitat type was dominated by *Salix sitchensis*, *Agrostis castellana/capillaris*, *Mentha pulegium*, *Agrostis stolonifera*, *Alopecurus geniculatus*, and *Lythrum portula*. FAC and better species made up 90% of the total cover. Native species accounted for about 42% of the total cover in this area. The moisture index for this habitat type was 1.96, and 26% of the area was not vegetated.

**Forested Habitat Type**

This habitat type was dominated by *Agrostis castellana/capillaris*, *Vicia pannonica*, *Deschampsia cespitosa*, *Salix sitchensis*, *Lolium arundinacea*, and *Equisetum arvense*. FAC and better species made up 63% of the total cover. The *Equisetum* was found in only one quadrat. Native species accounted for about 40% of the total cover in this area. The moisture index for this habitat type was 3.12, and 16% of the area was not vegetated.

# Marion Mitigation Bank Plant Monitoring, 2010 Phase 1

| | | Percent FAC and better | | | | | | Percent native | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Habitat | Station | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| E | E-003 | 86 | 100 | 100 | 100 | 100 | 100 | 85 | 89 | 56 | 80 | 95 | 55 |
| E | E-053 | 80 | 60 | 100 | 100 | 100 | 100 | 64 | 84 | 98 | 99 | 98 | 99 |
| E | E-066 | 99 | 100 | 100 | 100 | 100 | 100 | 43 | 48 | 50 | 56 | 29 | 52 |
| E | E-079 | 100 | 100 | 99 | 99 | 100 | 100 | 32 | 47 | 86 | 97 | 94 | 97 |
| E | E-080 | 100 | 100 | 96 | 99 | 100 | 99 | 39 | 60 | 78 | 82 | 72 | 69 |
| E | EN-008 | M | 100 | 58 | 100 | 100 | 100 | M | 82 | 31 | 76 | 61 | 41 |
| E | EN-052 | M | 100 | 68 | 100 | 100 | 100 | M | 98 | 64 | 83 | 69 | 58 |
| E | EN-070 | M | 82 | 99 | 90 | 36 | 99 | M | 48 | 90 | 68 | 27 | 14 |
| E | EN-076 | M | 87 | 100 | 100 | R | 100 | M | 48 | 95 | 23 | R | 8 |
| E | S-116 | 100 | 87 | 56 | 100 | 100 | 100 | 94 | 12 | 36 | 77 | 40 | 76 |
| F | E-082 | M | 90 | 86 | 91 | 98 | 93 | M | 63 | 57 | 72 | 68 | 73 |
| F | F-033 | 87 | 95 | 81 | 97 | 99 | 100 | 12 | 75 | 72 | 95 | 97 | 98 |
| F | F-034 | 81 | 87 | 93 | 100 | 98 | 98 | 42 | 91 | 90 | 98 | 98 | 98 |
| F | F-071 | 33 | 44 | 18 | 54 | S | 35 | 1 | 1 | 0 | 1 | S | 0 |
| F | F-096 | 53 | 50 | 67 | 55 | 63 | 59 | 14 | 26 | 28 | 29 | 43 | 55 |
| F | F-097 | 76 | 73 | 72 | 84 | 74 | 84 | 44 | 57 | 50 | 61 | 68 | 73 |
| F | F-103 | 38 | 59 | 62 | 95 | R | 22 | 1 | 1 | 0 | 0 | R | 2 |
| F | F-144 | 9 | 16 | 40 | 21 | R | 31 | 3 | 1 | 1 | 3 | R | 2 |
| F | F-149 | 77 | 65 | 63 | 61 | R | 45 | 42 | 62 | 11 | 54 | R | 50 |
| F | F-205 | 47 | 58 | 56 | 74 | 57 | 76 | 6 | 7 | 7 | 10 | 11 | 17 |
| F | S-056 | 13 | 69 | 68 | 88 | 72 | 84 | 0 | 18 | 29 | 27 | 31 | 62 |
| F | S-119 | 77 | 42 | 46 | 65 | 50 | 78 | 11 | 15 | 5 | 8 | 7 | 8 |
| S | E-035 | 26 | 82 | 94 | 97 | 75 | 79 | 4 | 17 | 70 | 12 | 29 | 11 |
| S | E-052 | 100 | 98 | 100 | 100 | 89 | 100 | 61 | 22 | 83 | 73 | 81 | 79 |
| S | E-086 | 100 | 100 | 99 | 100 | 100 | 100 | 56 | 66 | 72 | 48 | 53 | 71 |
| S | E-109 | 100 | 86 | 99 | 99 | 90 | 93 | 33 | 16 | 39 | 43 | 52 | 37 |
| S | E-123 | 71 | 96 | 70 | 97 | 93 | 81 | 60 | 57 | 36 | 20 | 21 | 17 |
| S | F-009 | 21 | 39 | 95 | 95 | 97 | 99 | 3 | 14 | 39 | 47 | 53 | 48 |
| S | S-011 | 45 | 27 | 12 | 17 | 7 | 41 | 10 | 2 | 4 | 0 | 3 | 2 |
| S | S-020 | 80 | 90 | 99 | 100 | 100 | 100 | 88 | 47 | 81 | 65 | 83 | 31 |
| S | S-021 | 100 | 99 | 92 | 97 | 99 | 100 | 28 | 43 | 59 | 46 | 31 | 48 |
| S | S-040 | 100 | 98 | 99 | 100 | 100 | 100 | 42 | 42 | 81 | 59 | 50 | 53 |
| S | S-046 | 84 | 94 | 100 | 100 | 100 | 100 | 65 | 41 | 80 | 83 | 94 | 92 |
| S | S-058 | 68 | 97 | 89 | 100 | 100 | 100 | 59 | 20 | 78 | 34 | 76 | 51 |
| S | S-155 | M | 99 | 87 | 96 | 98 | 90 | M | 66 | 57 | 41 | 67 | 15 |
| | Means: | 71 | 79 | 79 | 88 | 86 | 85 | 36 | 42 | 52 | 51 | 57 | 48 |

M = missing data
R = remediated
S = sprayed

difference in part due to Salix sp. (NOL) vs. S. sitchensis (FACW)
location error?

| Marion Mitigation Bank Plant Monitoring, 2010 Phase 1 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Emergent Habitat Type | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-003** | **E-053** | **E-066** | **E-079** | **E-080** | **EN-008** | **EN-052** | **EN-070** | **EN-076** | **S-116** | **Mean** |
| Agrostis stolonifera | creeping bentgrass | | FACW | 2 | y | | | | | 35 | 30 | | | 80 | | 14.5 |
| Mentha pulegium | pennyroyal | | OBL | 1 | y | | 1 | 16 | 2 | | 2 | 28 | 48 | 10 | 17 | 12.4 |
| Carex obnupta | slough sedge | yes | OBL | 1 | y | | 28 | | 35 | 25 | | | | | | 8.8 |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | 78 | | | | | 4 | | | | 8.2 |
| Eleocharis palustris | common [creeping] spike-rush | yes | OBL | 1 | y | 5 | | 14 | 2 | 2 | 3 | 32 | | | 10 | 6.8 |
| Juncus articulatus | jointed rush | yes | OBL | 1 | y | | 8 | 3 | 15 | 8 | 3 | 2 | | | | 3.9 |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | | | | 18 | 18 | | | | | 3.6 |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | 15 | | | 12 | 1 | 1 | 5 | | | | 3.4 |
| Veronica peregrina ssp. xalapense | hairy purslane speedwell | yes | OBL | 1 | y | | | | | | | 1 | 1 | | 28 | 3.0 |
| Populus balsamifera ssp. trichocarpa | black cottonwood | yes | FAC | 3 | y | | | | | 25 | 4 | | | | | 2.9 |
| Callitriche sp. | water starwort | NA | OBL | 1 | y | | | | | | 27 | | | | | 2.7 |
| Gratiola ebracteata | bractless hedgehyssop | yes | OBL | 1 | y | | | | | | | | | | 20 | 2.0 |
| Polygonum persicaria | spotted ladysthumb | | FACW | 2 | y | 18 | | | | | 2 | | | | | 2.0 |
| Lythrum portula | spatulaleaf loosestrife | | OBL | 1 | y | | | | | | | | 5 | 10 | | 1.5 |
| Juncus effusus | soft rush | yes | FACW | 2 | y | | | | | | 12 | | | | | 1.2 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | | | | | 3 | 7 | | | 1.0 |
| Plagiobothrys scouleri | Scouler's popcornflower | yes | FACW | 2 | y | | | | | | | | 3 | 5 | | 0.8 |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | | | | | | | 1 | | 4 | 1 | 0.6 |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | | | | | | 5 | | | 0.5 |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | 5 | | | | | | | | | 0.5 |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | | | | | | | | | 4 | | 0.4 |
| Schoenoplectus acutus | hardstem bulrush | yes | OBL | 1 | y | 2 | | | | | 2 | | | | | 0.4 |
| Bidens frondosa | leafy beggar's-tick | yes | FACW+ | 2 | y | | | | | | | | 1 | 2 | | 0.3 |
| Trifolium hybridum | alsike [hybrid] clover | | FAC | 3 | y | | | | | | | | | 3 | | 0.3 |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | | | | | | | | | 2 | | 0.2 |
| Rumex crispus | curly dock | | FAC+ | 3 | y | | | | | | | | 2 | | | 0.2 |
| Alisma plantago-aquatica | American water-plantain | yes | OBL | 1 | y | | | | | 1 | | | | | | 0.1 |
| Daucus carota | wild carrot/ Queen Anne's lace | | NOL | 5 | u | | | | | | | | 1 | | | 0.1 |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | | | | 1 | | | | | | | 0.1 |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | | | | | 1 | | | | | | 0.1 |
| | | | | | | | | | | | | | | | | |
| moss, duff, dead vegetation, etc. | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 30 | 5 | 2 | 35 | 7 | 30 | 4 | 20 | 2 | 42 | 17.7 |
| bare (soil, mud, rock) | " | | | | | 30 | 2 | 75 | 0 | 3 | 0 | 25 | 18 | 2 | 10 | 16.5 |
| standing water (inches) | | | | | | 16 | 4 | 10 | 2 | 1 | 3 | 8 | | | | |

Marion Mitigation Bank Plant Monitoring, 2010 Phase 1

Emergent Habitat Type

Cover (%)

| | | | | | | Sample Station | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-003** | **E-053** | **E-066** | **E-079** | **E-080** | **EN-008** | **EN-052** | **EN-070** | **EN-076** | **S-116** | **Mean** |
| | | | Total cover: | | | 40 | 120 | 33 | 67 | 116 | 104 | 76 | 73 | 120 | 76 | 82.5 |
| | | | FAC and better cover: | | | 40 | 120 | 33 | 67 | 115 | 104 | 76 | 72 | 120 | 76 | 82.3 |
| | | | Native cover: | | | 22 | 119 | 17 | 65 | 80 | 43 | 44 | 10 | 9 | 58 | 46.7 |
| | | Percent FAC and better of total: | | | | 100 | 100 | 100 | 100 | 99 | 100 | 100 | 99 | 100 | 100 | 100 |
| | | | Percent native of total: | | | 55 | 99 | 52 | 97 | 69 | 41 | 58 | 14 | 8 | 76 | 57 |
| | | | | | | | | | | | | | | | Moisture Index: | 1.50 |

| Marion Mitigation Bank Plant Monitoring, 2010 Phase 1 | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scrub-Shrub Habitat Type | | | | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-035** | **E-052** | **E-086** | **E-109** | **E-123** | **F-009** | **S-011** | **S-020** | **S-021** | **S-040** | **S-046** | **S-058** | **S-155** | **Mean** |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | 7 | 10 | | | 95 | | | 22 | | 10 | | | 11.1 |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | | | | | 30 | 80 | 10 | | | | | | | 9.2 |
| Mentha pulegium | pennyroyal | | OBL | 1 | y | 20 | 15 | 12 | 20 | | | | 25 | 1 | 1 | 6 | 2 | 3 | 8.1 |
| Agrostis stolonifera | creeping bentgrass | | FACW | 2 | y | | | 12 | 8 | 5 | | | 1 | 20 | 18 | | | 28 | 7.1 |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | 30 | | | | 25 | | | 7 | | | | 10 | 15 | 6.7 |
| Lythrum portula | spatulaleaf loosestrife | | OBL | 1 | y | 22 | | | 45 | | | | 2 | | 2 | | 5 | 8 | 6.5 |
| Carex obnupta | slough sedge | yes | OBL | 1 | y | 2 | 30 | 33 | | | | | | | | | | | 5.0 |
| Eleocharis acicularis | needle spike-rush | yes | OBL | 1 | y | | | | | | | | | | 1 | 50 | | | 3.9 |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | | 8 | | | | | 20 | 7 | 15 | | | | 3.8 |
| Plagiobothrys scouleri | Scouler's popcornflower | yes | FACW | 2 | y | 5 | | | 30 | 7 | | | | | | | 1 | 1 | 3.4 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | | | | | | 6 | 37 | | | | | 3.3 |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | 20 | | | 9 | 1 | | | | | | | | 7 | 2.8 |
| Bromus hordeaceus ssp. hordeaceus | soft brome | | FACU | 4 | | | | | | | | 35 | | | | | | | 2.7 |
| Poa pratensis | Kentucky bluegrass | | FAC | 3 | y | | | | | | | 35 | | | | | | | 2.7 |
| Callitriche sp. | water starwort | NA | OBL | 1 | y | | | | | | | | 25 | 1 | | | 1 | | 2.1 |
| Lolium arundinacea | tall fescue | | FAC- | 3 | | | | | | | | 23 | | | | | | | 1.8 |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | | | | | | 20 | 2 | | | | | | | 1.7 |
| Trifolium repens | white clover | | FAC- | 3 | | 3 | | | | 18 | | | | | | | | | 1.6 |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | 1 | | | 1 | | | 2 | | 3 | 1 | | 12 | | 1.5 |
| Eleocharis palustris | common [creeping] spike-rush | yes | OBL | 1 | y | | 3 | 9 | 4 | | | | 2 | | | 2 | | | 1.5 |
| Beckmannia syzigachne | American slough grass | yes | OBL | 1 | y | | | | | | | | 4 | 12 | | | 1 | 1 | 1.4 |
| Bidens frondosa | leafy beggar's-tick | yes | FACW+ | 2 | y | | | | | 8 | | | | | | | 1 | 8 | 1.3 |
| Populus balsamifera ssp. trichocarpa | black cottonwood | yes | FAC | 3 | y | | 12 | | | | | | | | | 5 | | | 1.3 |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | | 14 | | | | | | | | | | 1.1 |
| Carex unilateralis | one-sided sedge | yes | FACW | 2 | y | | | | | | | | | 8 | | | | | 0.6 |
| Gratiola ebracteata | bractless hedgehyssop | yes | OBL | 1 | y | | | | | | | | 2 | | 2 | 1 | 3 | | 0.6 |
| Vicia hirsuta | tiny vetch | | NOL | 5 | u | | | | | | | 7 | | | | | | | 0.5 |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | | 2 | | | | | | | 1 | 2 | 1 | | | 0.5 |
| Lotus corniculatus | birdsfoot trefoil | | FAC | 3 | y | | | | | 4 | | | | | | | | | 0.3 |
| Veronica peregrina ssp. xalapense | hairy purslane speedwell | yes | OBL | 1 | y | 1 | | | | | | | | | 1 | | 1 | 1 | 0.3 |
| Juncus articulatus | jointed rush | yes | OBL | 1 | y | | 2 | | | | | | | | 1 | | | | 0.2 |
| Juncus effusus | soft rush | yes | FACW | 2 | y | | | | | | | | 1 | 2 | | | | | 0.2 |
| Vicia sativa | common vetch | | UPL | 5 | | | | | | | 2 | 1 | | | | | | | 0.2 |
| Cerastium glomeratum | sticky chickweed | | UPL | 5 | | | | | | | | 2 | | | | | | | 0.2 |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | 2 | | | | | | | | | | | | | 0.2 |
| Rorippa curvisiliqua | western yellowcress | yes | OBL | 1 | y | | | | | 2 | | | | | | | | | 0.2 |
| Gnaphalium palustre | lowland cudweed | yes | FAC+ | 3 | y | | | | | | | | | | 1 | | | | 0.1 |
| Juncus bufonius | toad rush | yes | FACW | 2 | y | 1 | | | | | | | | | | | | | 0.1 |

| Marion Mitigation Bank Plant Monitoring, 2010 Phase 1 | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scrub-Shrub Habitat Type | | | | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-035** | **E-052** | **E-086** | **E-109** | **E-123** | **F-009** | **S-011** | **S-020** | **S-021** | **S-040** | **S-046** | **S-058** | **S-155** | **Mean** |
| Lactuca serriola | prickly lettuce | | FACU | 4 | | | | | | | | 1 | | | | | | | 0.1 |
| Myosotis discolor | yellow and blue forget-me-not | | FACW | 2 | y | | | | | | | 1 | | | | | | | 0.1 |
| Myosurus minimus | tiny mousetail | yes | OBL | 1 | y | | | | | | | | | | 1 | | | | 0.1 |
| Parentucellia viscosa | parentucellia | | FAC- | 3 | | | | | | | | 1 | | | | | | | 0.1 |
| Plantago major | broadleaf plantain | | FAC | 3 | y | | | | 1 | | | | | | | | | | 0.1 |
| Polygonum aviculare | doorweed/ prostrate knotweed | | FACW- | 2 | y | | | | | | | | | | 1 | | | | 0.1 |
| Vicia pannonica | Hungarian vetch | | NOL | 5 | u | | | | | | | 1 | | | | | | | 0.1 |
| | | | | | | | | | | | | | | | | | | | |
| moss, duff, dead vegetation, etc. | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 15 | 5 | 20 | 5 | 0 | 0 | 5 | 10 | 7 | 1 | 1 | 30 | 5 | 8.0 |
| bare (soil, mud, rock) | " | | | | | 3 | 30 | 0 | 2 | 17 | 0 | 0 | 2 | 3 | 75 | 40 | 40 | 25 | 18.2 |
| standing water (inches) | | | | | | | 6 | 4 | | | | | | | | 6 | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | Total cover: | | | 107 | 71 | 84 | 132 | 100 | 197 | 121 | 95 | 114 | 47 | 75 | 37 | 72 | 96.3 |
| | | | FAC and better cover: | | | 84 | 71 | 84 | 123 | 81 | 195 | 50 | 95 | 114 | 47 | 75 | 37 | 65 | 86.2 |
| | | | Native cover: | | | 12 | 56 | 60 | 49 | 17 | 95 | 2 | 29 | 55 | 25 | 69 | 19 | 11 | 38.4 |
| | | | | | | | | | | | | | | | | | | | |
| | | | Percent FAC and better of total: | | | 79 | 100 | 100 | 93 | 81 | 99 | 41 | 100 | 100 | 100 | 100 | 100 | 90 | 90 |
| | | | Percent native of total: | | | 11 | 79 | 71 | 37 | 17 | 48 | 2 | 31 | 48 | 53 | 92 | 51 | 15 | 40 |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | Moisture Index: | | | 1.96 |

| Marion Mitigation Bank Plant Monitoring, 2010 Phase 1 | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forested Habitat Type | | | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-082** | **F-033** | **F-034** | **F-071** | **F-096** | **F-097** | **F-103** | **F-144** | **F-149** | **F-205** | **S-056** | **S-119** | **Mean** |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | 5 | | | | | | 20 | 50 | | 65 | 5 | 45 | 15.8 |
| Vicia pannonica | Hungarian vetch | | NOL | 5 | u | | | | 27 | 1 | | 38 | 42 | 65 | | | | 14.4 |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | 30 | 20 | 4 | | 32 | 25 | | | | | 52 | | 13.6 |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | 98 | 18 | | | | | | | | | | 9.7 |
| Lolium arundinacea | tall fescue | | FAC- | 3 | | | | | 45 | 12 | | | | 3 | 20 | | 20 | 8.3 |
| Equisetum arvense | common [field] horsetail | yes | FAC | 3 | y | | | | | | | | | 80 | | | | 6.7 |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | | 3 | | 40 | 1 | 2 | 1 | | 1 | 7 | | 7 | 5.2 |
| Vicia sativa | common vetch | | UPL | 5 | | | | | 12 | | | 15 | 18 | 2 | 1 | | | 4.0 |
| Agrostis stolonifera | creeping bentgrass | | FACW | 2 | y | 3 | | | | | | | | | | | 36 | 3.3 |
| Daucus carota | wild carrot/ Queen Anne's lace | | NOL | 5 | u | | | | 3 | | 1 | 4 | 25 | 2 | 2 | | | 3.1 |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | 2 | | 1 | | 8 | 4 | | 4 | | 2 | 10 | 6 | 3.1 |
| Juncus patens | spreading rush | yes | FACW | 2 | y | | | 25 | | | | | | | 8 | | | 2.8 |
| Juncus effusus | soft rush | yes | FACW | 2 | y | 6 | 5 | 17 | | | | | | | | | | 2.3 |
| Trifolium repens | white clover | | FAC- | 3 | | 1 | | | | | | 8 | 1 | | 1 | 4 | 2 | 1.4 |
| Carex leptopoda | Dewey's sedge | yes | FAC | 3 | y | | 12 | 4 | | | | | | | | | | 1.3 |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | | | | | | | | 7 | | 8 | 1.3 |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | 3 | | 1 | | 4 | 3 | | | | | | 2 | 1.1 |
| Juncus tenuis | slender rush | yes | FACW- | 2 | y | 1 | | 7 | | | | | | | 5 | | | 1.1 |
| Vicia hirsuta | tiny vetch | | NOL | 5 | u | 1 | | | 5 | | | 3 | 1 | 2 | | | | 1.0 |
| Vulpia bromoides | barren fescue | | UPL | 5 | | | | | | | | 1 | 10 | | | | | 0.9 |
| Festuca rubra | red fescue | | FAC+ | 3 | y | | | | 10 | | | | | | | | | 0.8 |
| Mentha pulegium | pennyroyal | | OBL | 1 | y | | | | | | 1 | | | | | 8 | | 0.8 |
| Parentucellia viscosa | parentucellia | | FAC- | 3 | | 1 | | | | | 1 | 2 | 1 | 2 | 1 | | 1 | 0.8 |
| Trifolium pratense | red clover | | FACU | 4 | | | | 1 | | 6 | 2 | | | | | | | 0.8 |
| Bromus catharticus | rescuegrass | | NOL | 5 | u | | | | | | | | | 8 | | | | 0.7 |
| Juncus articulatus | jointed rush | yes | OBL | 1 | y | | | 5 | | | 3 | | | | | | | 0.7 |
| Epilobium brachycarpum | tall annual willow-herb | yes | UPL | 5 | | | | | | | | | | 6 | 1 | | | 0.6 |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | 5 | | | | | 1 | | | | | | | 0.5 |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | 4 | | 1 | | | 1 | | | | | | | 0.5 |
| Lupinus bicolor | two-color lupine | yes | NOL | 5 | u | | | | | | | 2 | 4 | | | | | 0.5 |
| Lathyrus sphaericus | grass peavine | | NOL | 5 | u | | | | | | | 2 | 3 | | | | | 0.4 |
| Lythrum portula | spatulaleaf loosestrife | | OBL | 1 | y | | | | | | | | | | | 5 | | 0.4 |
| Poa pratensis | Kentucky bluegrass | | FAC | 3 | y | | | | | | | | | | | | 5 | 0.4 |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | 5 | | | | | | | | | | | 0.4 |
| Typha latifolia | cattail | yes | OBL | 1 | y | | 2 | 3 | | | | | | | | | | 0.4 |
| Carex obnupta | slough sedge | yes | OBL | 1 | y | | | | | | 4 | | | | | | | 0.3 |
| Galium aparine | catchweed bedstraw/ cleavers | yes | FACU | 4 | | | | | | | | | | 4 | | | | 0.3 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | | | 2 | 1 | | | | | | 1 | 0.3 |
| Bromus hordeaceus ssp. hordeaceus | soft brome | | FACU | 4 | | | | | | | | | | 3 | | | | 0.3 |
| Centaurium erythraea | European centaury | | FAC | 3 | y | | | | | | | | | | 2 | | | 0.2 |

| Marion Mitigation Bank Plant Monitoring, 2010 Phase 1 | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forested Habitat Type | | | | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-082** | **F-033** | **F-034** | **F-071** | **F-096** | **F-097** | **F-103** | **F-144** | **F-149** | **F-205** | **S-056** | **S-119** | **Mean** | |
| Convolvulus arvensis | field bindweed | | NOL | 5 | u | | | | | | | | 2 | | | | | 0.2 | |
| Juncus ensifolius | dagger-leaf rush | yes | FACW | 2 | y | 2 | | | | | | | | | | | | 0.2 | |
| Aira caryophyllea | silver hairgrass | | FACU | 4 | | | | | | | | 1 | | | | | | 0.1 | |
| Bidens frondosa | leafy beggar's-tick | yes | FACW+ | 2 | y | 1 | | | | | | | | | | | | 0.1 | |
| Cerastium glomeratum | sticky chickweed | | UPL | 5 | | | | | | | | | 1 | | | | | 0.1 | |
| Crataegus douglasii | black hawthorn | yes | FAC | 3 | y | | 1 | | | | | | | | | | | 0.1 | |
| Glyceria occidentalis | western mannagrass | yes | OBL | 1 | y | 1 | | | | | | | | | | | | 0.1 | |
| Leucanthemum vulgare | oxeye daisy | | UPL | 5 | | | | | | | | | | | 1 | | | 0.1 | |
| Myosotis discolor | yellow and blue forget-me-not | | FACW | 2 | y | | | | | | | | | 1 | | | | 0.1 | |
| Plagiobothrys scouleri | Scouler's popcornflower | yes | FACW | 2 | y | | | | | | | | | | | 1 | | 0.1 | |
| Sonchus asper | prickly sow-thistle | | FAC- | 3 | | | | | | | | | | 1 | | | | 0.1 | |
| Taraxacum officinale | dandelion | | FACU | 4 | | | | | | | | | | 1 | | | | 0.1 | |
| Veronica peregrina ssp. xalapense | hairy purslane speedwell | yes | OBL | 1 | y | 1 | | | | | | | | | | | | 0.1 | |
| | | | | | | | | | | | | | | | | | | | |
| moss, duff, dead vegetation, etc. | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 20 | 0 | 25 | 0 | 20 | 35 | 0 | 7 | 0 | 5 | 15 | 0 | 10.6 | |
| bare (soil, mud, rock) | " | | | | | 15 | 0 | 1 | 0 | 15 | 1 | 25 | 0 | 0 | 5 | 3 | 0 | 5.4 | 16.0 |
| standing water (inches) | | | | | | | | 1 | | | | | | | | | | 16.0 | |
| | | | | | | | | | | | | | | | | | | | |
| | | Total cover: | | | | 67 | 146 | 87 | 142 | 66 | 49 | 97 | 162 | 181 | 123 | 85 | 133 | 111.5 | |
| | | FAC and better cover: | | | | 62 | 146 | 85 | 50 | 39 | 41 | 21 | 50 | 82 | 94 | 71 | 104 | 70.4 | |
| | | Native cover: | | | | 49 | 143 | 85 | 0 | 36 | 36 | 2 | 4 | 90 | 21 | 53 | 10 | 44.1 | |
| | | | | | | | | | | | | | | | | | | | |
| | | Percent FAC and better of total: | | | | 93 | 100 | 98 | 35 | 59 | 84 | 22 | 31 | 45 | 76 | 84 | 78 | 63 | |
| | | Percent native of total: | | | | 73 | 98 | 98 | 0 | 55 | 73 | 2 | 2 | 50 | 17 | 62 | 8 | 40 | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | Moisture Index: | | | 3.12 | |

# Marion Mitigation Bank Phase II Vegetation Monitoring - 2010

## Introduction, Summary, and Methods

This report summarizes vegetation assessment and monitoring conducted at the Marion Mitigation Bank (MMB) site on June 1st and 5th, and July 6th, 2010. The following table presents a summary of the 2010 vegetation sampling results:

| MMB Phase 2 Habitats | Emergent | Scrub/Shrub | Forested |
|---|---|---|---|
| Percent FAC and better cover | 99 | 94 | 75 |
| Percent native cover | 73 | 71 | 53 |
| Percent non-vegetated | 11 | 16 | 37 |

The approach and rationale for the sampling strategy used can be found in the 2001 report on vegetation monitoring at the MMB. Sampling was completed at the same locations as in 2009.

Species found in a one-square meter rectangular quadrat placed at each of the sampling stations were recorded and the cover of each was estimated as a percent of the quadrat area. Estimates of bare ground and other non-vegetated space were made at each quadrat, and estimates of overstory cover (canopy) were also included, if present.

## Vegetation in the Habitat Types in the Phase II Restoration Unit at the MMB

Vegetation sampling data for the different habitat types is in the attached tables.

To calculate the relative proportion of typical wetland species, those with an indicator status of FAC or better were considered. Species were assigned the indicator status for the Northwest region from the USFWS 1996 list. The most conservative National indicator status was used when the indicator status for the Northwest region was "NI" or blank. In determining proportions of cover for FAC and better species, the cover of those species was calculated as a percentage of the total cover. Calculations were also made which included: 1) the proportion of native taxa, and 2) a Moisture Index.

The following sections summarize the dominant vegetation within each of the habitat types. Unlike the reports for years prior to 2005, the three wetland types were not evaluated as a combined unit in later years. Each of the habitat types is evaluated only as a distinct unit.

**Emergent Habitat Type**

This habitat type was dominated by *Juncus effusus*, *Polygonum persicaria*, *Lemna minor*, *Eleocharis palustris*, *Sparganium angustifolium*, and *Ludwigia palustris*. FAC and better species made up 99% of the total cover. Native species accounted for about 73% of the total cover in this area. The moisture index for this habitat type was 1.67 and bare ground accounted for 11% of the area.

**Scrub/shrub Habitat Type**

This habitat type was dominated by *Juncus effusus*, *Salix sitchensis*, *Phalaris arundinacea*, *Salix lucida ssp. lasiandra*, *Holcus lanatus*, *Salix hookeriana*, and *Alnus rhombifolia*. The *Alnus* and *Salix lucida* were only in one quadrat each. FAC and better species made up 94% of the total cover. Native species accounted for about 71% of the total cover in this area. The moisture index for this habitat type was 2.21 and bare ground accounted for 16% of the area.

**Forested Habitat Type**

This habitat type was dominated by *Alnus rhombifolia*, *Phalaris arundinacea*, *Holcus mollis*, *Trifolium repens*, and *Lemna minor*. The *Holcus* was only in one quadrat. FAC and better species made up 75% of the total cover. Native species accounted for about 53% of the total cover in this area. The moisture index for this habitat type was 2.25 and bare ground accounted for 37% of the area. These values in this habitat type are significantly different than last year because three sampling stations that were remediated and not included in 2009 had low numbers of hydrophytic and native species in 2010.

# Marion Mitigation Bank Plant Monitoring, 2010 Phase 2

| | | Percent FAC and better | | | | | | Percent native | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Habitat | Station | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| E | E-020 | 100 | 100 | 100 | 100 | 100 | 100 | 40 | 90 | 56 | 39 | 29 | 44 |
| E | E-143 | 100 | 100 | 100 | 100 | 100 | 100 | 19 | 100 | 95 | 95 | 94 | 92 |
| E | E-160 | 100 | 100 | 100 | 100 | 100 | 100 | 52 | 89 | 98 | 95 | 95 | 81 |
| E | E-162 | 100 | 99 | 100 | 100 | 100 | 100 | 88 | 98 | 88 | 92 | 66 | 72 |
| E | F-083 | 15 | 38 | 34 | 64 | 72 | 85 | 3 | 8 | 5 | 6 | 4 | 21 |
| E | F-090 | 32 | 84 | 82 | 100 | 100 | 100 | 16 | 78 | 78 | 100 | 100 | 99 |
| E | F-103 | 98 | 100 | 95 | 100 | 100 | 100 | 50 | 85 | 79 | 99 | 99 | 94 |
| E | S-073 | 37 | 100 | 91 | 100 | 100 | 100 | 27 | 98 | 94 | 100 | 97 | 94 |
| E | S-140 | 100 | 100 | 100 | 100 | 100 | 100 | 85 | 97 | 98 | 53 | 49 | 26 |
| E | S-195 | 98 | 100 | 100 | 100 | 100 | 100 | 94 | 97 | 97 | 95 | 92 | 81 |
| F | E-014 | 100 | 100 | 100 | 100 | 100 | 100 | 84 | 100 | 98 | 100 | 100 | 100 |
| F | E-055 | 16 | 65 | 80 | 100 | R | 100 | 1 | 6 | 35 | 58 | R | 71 |
| F | E-081 | 76 | 98 | 100 | 100 | 100 | 100 | 57 | 96 | 58 | 65 | 56 | 98 |
| F | E-091 | 87 | 91 | 99 | 97 | 100 | 100 | 75 | 94 | 71 | 67 | 77 | 83 |
| F | E-112 | 84 | 93 | 100 | 100 | 100 | 100 | 53 | 63 | 79 | 47 | 48 | 26 |
| F | E-189 | 100 | 100 | 100 | 94 | 100 | 100 | 100 | 100 | 100 | 100 | 88 | 46 |
| F | F-006 | 13 | 79 | 58 | 67 | R | 4 | 0 | 0 | 0 | 3 | R | 2 |
| F | F-028 | 15 | 44 | 38 | 23 | R | 27 | 18 | 9 | 19 | 4 | R | 0 |
| F | F-049 | 20 | 74 | 49 | 22 | R | 1 | 0 | 0 | 0 | 0 | R | 2 |
| F | S-245 | 75 | 99 | 98 | 99 | 97 | 100 | 63 | 99 | 98 | 100 | 86 | 85 |
| S | F-070 | 68 | 52 | 81 | 57 | 81 | 95 | 15 | 28 | 9 | 24 | 19 | 75 |
| S | F-076 | 37 | 55 | 33 | 63 | 55 | 86 | 16 | 40 | 16 | 49 | 30 | 76 |
| S | F-106 | 66 | 89 | 93 | 100 | 100 | 100 | 32 | 82 | 72 | 100 | 100 | 100 |
| S | F-112 | 67 | 63 | 63 | 63 | 77 | 77 | 34 | 38 | 38 | 38 | 46 | 46 |
| S | S-022 | 89 | 82 | 100 | 100 | 100 | 100 | 52 | 81 | 80 | 83 | 75 | 53 |
| S | S-036 | 89 | 44 | 17 | 98 | 100 | 100 | 50 | 25 | 19 | 97 | 99 | 98 |
| S | S-056 | 38 | 57 | 66 | 87 | 92 | 96 | 1 | 15 | 30 | 48 | 71 | 80 |
| S | S-106 | 89 | 58 | 16 | 48 | 71 | 89 | 10 | 5 | 4 | 19 | 23 | 55 |
| S | S-153 | 100 | 99 | 100 | 100 | 100 | 100 | 93 | 99 | 100 | 97 | 89 | 52 |
| S | S-227 | 84 | 64 | 95 | 97 | 99 | 100 | 58 | 26 | 59 | 66 | 78 | 88 |
| | Means: | 70 | 81 | 80 | 86 | 94 | 89 | 43 | 61 | 59 | 65 | 70 | 70 |

R = remediated

location error?

Marion Mitigation Bank Plant Monitoring, 2010 Phase 2

Emergent Habitat Type

Cover (%)

| | | | | | | Sample Station | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-020** | **E-143** | **E-160** | **E-162** | **F-083** | **F-090** | **F-103** | **S-073** | **S-140** | **S-195** | **Mean** |
| Juncus effusus | soft rush | yes | FACW | 2 | y | | 25 | | 30 | | 90 | 35 | 25 | | 72 | 27.7 |
| Polygonum persicaria | spotted ladysthumb | | FACW | 2 | y | 80 | 10 | 22 | 40 | | | 4 | 10 | 65 | | 23.1 |
| Lemna minor | duckweed | yes | OBL | 1 | y | 40 | 2 | 2 | 25 | | 1 | 12 | 75 | 7 | | 16.4 |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | 30 | | 75 | | | | 23 | 5 | 1 | | 13.4 |
| Sparganium angustifolium | simplestem bur-reed | yes | OBL | 1 | y | | 75 | 12 | | | | | | | | 8.7 |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | 5 | 5 | 2 | 50 | | 4 | | 10 | 10 | | 8.6 |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | | | | | 65 | 1 | | | | | 6.6 |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | | | | | | 35 | 28 | | | 6.3 |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | | | 5 | 25 | | | | 25 | 5.5 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | 15 | | | 1 | | | | | | 30 | 4.6 |
| Alisma plantago-aquatica | American water-plantain | yes | OBL | 1 | y | | 1 | | 2 | | | 4 | 8 | 5 | 4 | 2.4 |
| Alnus rhombifolia | white alder | yes | FACW | 2 | y | | | | | | | | | | 20 | 2.0 |
| Azolla mexicana | mexican mosquito-fern [water-fern] | yes | OBL | 1 | y | | | | | | | 4 | 15 | | | 1.9 |
| Elodea canadensis | Canadian waterweed | yes | OBL | 1 | y | | 15 | | | | | | | | | 1.5 |
| Salix hookeriana | Hooker willow | yes | FACW | 2 | y | | | | | | 12 | | | | 3 | 1.5 |
| Trifolium repens | white clover | | FAC- | 3 | | | | | | 15 | | | | | | 1.5 |
| Juncus bufonius | toad rush | yes | FACW | 2 | y | | | | | 12 | | | | | | 1.2 |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | | | | | 7 | | | | | | 0.7 |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | | | | | 4 | | | | | | 0.4 |
| Agrostis stolonifera | creeping bentgrass | | FACW | 2 | y | | | | | | | 3 | | | | 0.3 |
| Bidens frondosa | leafy beggar's-tick | yes | FACW+ | 2 | y | | | | | | 1 | | | | 2 | 0.3 |
| Parentucellia viscosa | parentucellia | | FAC- | 3 | | | | | | 2 | | | | | | 0.2 |
| Eleocharis ovata | ovate spikerush | yes | OBL | 1 | y | | | | | 1 | | | | | | 0.1 |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | | | | | 1 | | | | | | 0.1 |
| | | | | | | | | | | | | | | | | |
| algae, moss, duff, dead vegetation, etc. | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 3 | 2 | 10 | 15 | 10 | 5 | 22 | 1 | 20 | 7 | 9.5 |
| bare (soil, mud, rock) | " | | | | | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 1.0 |
| standing water (inches) | | | | | | 12 | 16 | 10 | 10 | | 5 | 14 | 20 | 11 | 2 | |
| | | | | | | | | | | | | | | | | |
| | | | Total cover: | | | 170 | 133 | 113 | 148 | 112 | 134 | 120 | 176 | 88 | 156 | 135.0 |
| | | | FAC and better cover: | | | 170 | 133 | 113 | 148 | 95 | 134 | 120 | 176 | 88 | 156 | 133.3 |
| | | | Native cover: | | | 75 | 123 | 91 | 107 | 23 | 133 | 113 | 166 | 23 | 126 | 98.0 |
| | | | | | | | | | | | | | | | | |
| | | | Percent FAC and better of total: | | | 100 | 100 | 100 | 100 | 85 | 100 | 100 | 100 | 100 | 100 | 99 |
| | | | Percent native of total: | | | 44 | 92 | 81 | 72 | 21 | 99 | 94 | 94 | 26 | 81 | 73 |

| Marion Mitigation Bank Plant Monitoring, 2010 Phase 2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Emergent Habitat Type | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-020** | **E-143** | **E-160** | **E-162** | **F-083** | **F-090** | **F-103** | **S-073** | **S-140** | **S-195** | **Mean** |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | Moisture Index: | | | 1.67 |

Marion Mitigation Bank Plant Monitoring, 2010 Phase 2

Scrub/Shrub Habitat Type

Cover (%)

| | | | | | | Sample Station | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **F-070** | **F-076** | **F-106** | **F-112** | **S-022** | **S-036** | **S-056** | **S-106** | **S-153** | **S-227** | **Mean** |
| Juncus effusus | soft rush | yes | FACW | 2 | y | | 55 | 92 | | | 90 | 2 | | | 70 | 30.9 |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | 32 | | | 95 | | 98 | | | | 22.5 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | | 60 | 85 | 2 | | | | 2 | 14.9 |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | | | 90 | | | | | | | 9.0 |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | 17 | 10 | | | | | 10 | 48 | | 3 | 8.8 |
| Salix hookeriana | Hooker willow | yes | FACW | 2 | y | | | | | | 2 | | 80 | | | 8.2 |
| Alnus rhombifolia | white alder | yes | FACW | 2 | y | | | | | | | | | | 80 | 8.0 |
| Rubus discolor | Himalayan blackberry | invasive | FACU | 4 | | | 15 | | 45 | | | | 4 | | | 6.4 |
| Polygonum persicaria | spotted ladysthumb | | FACW | 2 | y | | | | | | | | | 30 | | 3.0 |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | 16 | 1 | 3 | | | 3 | | | | 5 | 2.8 |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | 28 | | | | | | | | 2.8 |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | | 2 | | | | | 10 | | | 15 | 2.7 |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | 22 | | | | | | | 1 | | | 2.3 |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | 20 | | | | | | 2 | | | | 2.2 |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | | | | | | | | | 20 | | 2.0 |
| Equisetum arvense | common [field] horsetail | yes | FAC | 3 | y | 5 | | | | 1 | | | | | 10 | 1.6 |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | | | 1 | | | | | | 8 | | 0.9 |
| Hypericum perforatum | St. John'swort/ Klamathweed | | NOL | 5 | u | | | | | | | | 6 | | | 0.6 |
| Veronica americana | American speedwell | yes | OBL | 1 | y | | | | | | | | | | 5 | 0.5 |
| Lemna minor | duckweed | yes | OBL | 1 | y | | | 1 | | | 1 | | | 2 | | 0.4 |
| Parentucellia viscosa | parentucellia | | FAC- | 3 | | | 1 | | | | | | 3 | | | 0.4 |
| Alisma plantago-aquatica | American water-plantain | yes | OBL | 1 | y | | | | | | | | | 2 | | 0.2 |
| Convolvulus arvensis | field bindweed | | NOL | 5 | u | | | | | | | 2 | | | | 0.2 |
| Leucanthemum vulgare | oxeye daisy | | UPL | 5 | | | | | | | | 1 | 1 | | | 0.2 |
| Lotus corniculatus | birdsfoot trefoil | | FAC | 3 | y | | | | | | | 1 | | | 1 | 0.2 |
| Myosotis discolor | yellow and blue forget-me-not | | FACW | 2 | y | | | | | | | | 1 | | 1 | 0.2 |
| Poa trivialis | rough [roughstalk] bluegrass | | FACW | 2 | y | | | | | | | | | | 2 | 0.2 |
| Rumex acetosella | sheep [red] sorrel | | FACU+ | 4 | | 2 | | | | | | | | | | 0.2 |
| Vicia sativa | common vetch | | UPL | 5 | | 2 | | | | | | | | | | 0.2 |
| Bidens frondosa | leafy beggar's-tick | yes | FACW+ | 2 | y | | | 1 | | | | | | | | 0.1 |
| Cirsium arvense | Canada thistle | invasive | FAC- | 3 | | | | | | | | 1 | | | | 0.1 |
| Geranium molle | dovefoot geranium | | NOL | 5 | u | | | | | | | | 1 | | | 0.1 |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | | | | | | | | 1 | | | 0.1 |
| Mimulus guttatus | yellow [seep-spring] monkeyflower | yes | OBL | 1 | y | | | | | 1 | | | | | | 0.1 |
| Vicia hirsuta | tiny vetch | | NOL | 5 | u | | | | | | | 1 | | | | 0.1 |

Marion Mitigation Bank Plant Monitoring, 2010 Phase 2

Scrub/Shrub Habitat Type

Cover (%)

| | | | | | | Sample Station | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **F-070** | **F-076** | **F-106** | **F-112** | **S-022** | **S-036** | **S-056** | **S-106** | **S-153** | **S-227** | **Mean** |
| algae, moss, duff, dead vegetation, etc. | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 33 | 25 | 2 | 0 | 0 | 10 | 0 | 38 | 45 | 4 | 15.7 |
| bare (soil, mud, rock) | " | | | | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0.6 |
| standing water (inches) | | | | | | | | 7 | | 2 | 3 | | | 30 | 1 | |
| | | | Total cover: | | | 84 | 116 | 126 | 195 | 182 | 98 | 128 | 146 | 62 | 194 | 133.1 |
| | | | FAC and better cover: | | | 80 | 100 | 126 | 150 | 182 | 98 | 123 | 130 | 62 | 194 | 124.5 |
| | | | Native cover: | | | 63 | 88 | 126 | 90 | 97 | 96 | 102 | 81 | 32 | 170 | 94.5 |
| | | | Percent FAC and better of total: | | | 95 | 86 | 100 | 77 | 100 | 100 | 96 | 89 | 100 | 100 | 94 |
| | | | Percent native of total: | | | 75 | 76 | 100 | 46 | 53 | 98 | 80 | 55 | 52 | 88 | 71 |
| | | | | | | | | | | | | | | | Moisture Index: | 2.21 |

| Marion Mitigation Bank Plant Monitoring, 2010 Phase 2 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forested Habitat Type | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-014** | **E-055** | **E-081** | **E-091** | **E-112** | **E-189** | **F-006** | **F-028** | **F-049** | **S-245** | **Mean** |
| Alnus rhombifolia (canopy) | white alder | yes | FACW | 2 | y | | | 99 | | | | | | | 50 | 14.9 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | 1 | 1 | 40 | 60 | 7 | | | | | 10.9 |
| Holcus mollis | creeping velvetgrass | | FACU | 4 | | | | | | | | | | 98 | | 9.8 |
| Trifolium repens | white clover | | FAC- | 3 | | | | | | | | 20 | 75 | | | 9.5 |
| Lemna minor | duckweed | yes | OBL | 1 | y | 1 | 35 | 1 | 30 | 15 | | | | | | 8.2 |
| Juncus effusus | soft rush | yes | FACW | 2 | y | | | | 55 | | | | | | | 5.5 |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | | | 50 | | | | | | | 5.0 |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | | | | | | | | | | 45 | 4.5 |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | | 3 | | | | | 3 | 26 | 1 | 8 | 4.1 |
| Azolla mexicana | mexican mosquito-fern [water-fern] | yes | OBL | 1 | y | | 35 | | 5 | | | | | | | 4.0 |
| Trifolium pratense | red clover | | FACU | 4 | | | | | | | | 40 | | | | 4.0 |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | 7 | 28 | | | | 2 | | | | | 3.7 |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | | 35 | | | | | | | | | 3.5 |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | 2 | | 30 | | | | | | | 3.2 |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | 20 | 3 | | | 2 | | | | | | 2.5 |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | | | 20 | | | | | | | 2.0 |
| Elodea canadensis | Canadian waterweed | yes | OBL | 1 | y | | | | | | 15 | | | | | 1.5 |
| Potamogeton sp. | pondweed | NA | OBL | 1 | y | | | | | | 15 | | | | | 1.5 |
| Solanum dulcamara | bittersweet nightshade | | FAC+ | 3 | y | | | | | 15 | | | | | | 1.5 |
| Poa trivialis | rough [roughstalk] bluegrass | | FACW | 2 | y | | | 1 | | | | | | | 10 | 1.1 |
| Salix hookeriana | Hooker willow | yes | FACW | 2 | y | | | | | 10 | | | | | | 1.0 |
| Vulpia bromoides | barren fescue | | UPL | 5 | | | | | | | | 8 | 2 | | | 1.0 |
| Parentucellia viscosa | parentucellia | | FAC- | 3 | | | | | | | | 8 | | | | 0.8 |
| Veronica americana | American speedwell | yes | OBL | 1 | y | | 5 | | 2 | | | | | | | 0.7 |
| Lepidium sp. | pepperweed | NA | --- | 5 | u | | | | | | | 4 | 1 | | | 0.5 |
| Mentha pulegium | pennyroyal | | OBL | 1 | y | | 5 | | | | | | | | | 0.5 |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | | | | | | | | 4 | | | 0.4 |
| Alisma plantago-aquatica | American water-plantain | yes | OBL | 1 | y | 1 | 1 | | 2 | | | | | | | 0.4 |
| Daucus carota | wild carrot/ Queen Anne's lace | | NOL | 5 | u | | | | | | | 3 | 1 | | | 0.4 |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | | | | | | | | | | 4 | 0.4 |
| Vicia pannonica | Hungarian vetch | | NOL | 5 | u | | | | | | | 3 | | 1 | | 0.4 |
| Bromus hordeaceus ssp. hordeaceus | soft brome | | FACU | 4 | | | | | | | | 3 | | | | 0.3 |
| Plantago lanceolata | buckhorn plantain | | FACU+ | 4 | | | | | | | | | | 3 | | 0.3 |
| Rumex acetosella | sheep [red] sorrel | | FACU+ | 4 | | | | | | | | 2 | 1 | | | 0.3 |

Marion Mitigation Bank Plant Monitoring, 2010 Phase 2

Forested Habitat Type

Cover (%)

| | | | | | | Sample Station | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-014** | **E-055** | **E-081** | **E-091** | **E-112** | **E-189** | **F-006** | **F-028** | **F-049** | **S-245** | **Mean** |
| Brasenia schreberi | watershield | yes | OBL | 1 | y | | | | | | 2 | | | | | 0.2 |
| Cerastium glomeratum | sticky chickweed | | UPL | 5 | | | | | | | | 1 | 1 | | | 0.2 |
| Equisetum arvense | common [field] horsetail | yes | FAC | 3 | y | | | 2 | | | | | | | | 0.2 |
| Galium aparine | catchweed bedstraw/ cleavers | yes | FACU | 4 | | | | | | | | | | 2 | | 0.2 |
| Sparganium angustifolium | simplestem bur-reed | yes | OBL | 1 | y | 2 | | | | | | | | | | 0.2 |
| Beckmannia syzigachne | American slough grass | yes | OBL | 1 | y | | 1 | | | | | | | | | 0.1 |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | | | | | | | 1 | | | | 0.1 |
| Epilobium brachycarpum | tall annual willowherb | yes | UPL | 5 | | | | | | | | 1 | | | | 0.1 |
| Hypericum perforatum | St. John'swort/ Klamathweed | | NOL | 5 | u | | | | | | | | | 1 | | 0.1 |
| | | | | | | | | | | | | | | | | |
| algae, moss, duff, dead vegetation, etc. | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 70 | 3 | 96 | 0 | 20 | 90 | 1 | 7 | 2 | 35.0 | 32.4 |
| bare (soil, mud, rock) | " | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 33 | 8 | 0 | 5.0 | 4.6 |
| standing water (inches) | | | | | | 30 | 6 | 6 | 12 | 12 | 18 | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | Total cover: | | | 31 | 154 | 104 | 234 | 102 | 41 | 97 | 111 | 106 | 117 | 109.7 |
| | | | FAC and better cover: | | | 31 | 154 | 104 | 234 | 102 | 41 | 4 | 30 | 1 | 117 | 81.8 |
| | | | Native cover: | | | 31 | 110 | 102 | 194 | 27 | 19 | 2 | 0 | 2 | 99 | 58.6 |
| | | | | | | | | | | | | | | | | |
| | | | Percent FAC and better of total: | | | 100 | 100 | 100 | 100 | 100 | 100 | 4 | 27 | 1 | 100 | 75 |
| | | | Percent native of total: | | | 100 | 71 | 98 | 83 | 26 | 46 | 2 | 0 | 2 | 85 | 53 |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | Moisture Index: | | | 2.25 |

# Marion Mitigation Bank Phase III Vegetation Monitoring - 2010

## Introduction, Summary, and Methods

This report summarizes vegetation assessment and monitoring conducted at the Marion Mitigation Bank (MMB) site on June 1st and 5th, and July 6th, 2010. The following table presents a summary of the 2010 vegetation sampling results:

| MMB Phase 3 Habitats | Emergent | Scrub/Shrub |
|---|---|---|
| Percent FAC and better cover | 100 | 74 |
| Percent native cover | 70 | 7 |
| Percent non-vegetated | 57 | 13 |

Vegetation monitoring began at MMB Phase 3 in 2010. Reconnaissance from the top of the hill in early spring identified the boundaries of the emergent zone for this Phase. The vast spatial area of this Phase (other than the hill) was emergent and open water, with relatively narrow bands of scrub/shrub around the perimeter of the ponds. Accordingly, no Forested habitat type was delineated in the Phase. Twenty sampling stations were selected at random in the Emergent habitat type, ten in the Scrub/Shrub type, and nine in the Oak Savannah type (five on the hill and one each in the center of each of the perimeter berms), from a 10 x 10 meter scale grid of the area. The north and east berms were not assessed in 2010 because they had been mowed. Vegetative cover for nine of the Emergent sampling stations was not assessed because they were still under deep water (more than about three feet) on July 6th.

Species found in a one-square meter rectangular quadrat placed at each of the sampling stations were recorded and the cover of each was estimated as a percent of the quadrat area. Estimates of bare ground and other non-vegetated space were also made at each quadrat.

## Vegetation in the Habitat Types in the Phase III Restoration Unit at the MMB

Vegetation sampling data for the different habitat types is in the attached tables.

To calculate the relative proportion of typical wetland species, those with an indicator status of FAC or better were considered. Species were assigned the indicator status for the Northwest region from the USFWS 1996 list. The most conservative National indicator status was used when the indicator status for the Northwest region was "NI" or blank. In determining proportions of cover for FAC and better species, the cover of those species was calculated as a percentage of the total cover. Calculations were also made which included: 1) the proportion of native taxa, and 2) a Moisture Index.

**Emergent Habitat Type**

This habitat type was dominated by *Juncus effusus*, *Azolla mexicana*, *Callitriche* sp., *Phalaris arundinacea*, *Myriophyllum spicatum*, and *Eleocharis palustris*. The *Callitriche* was found in only one quadrat. FAC and better species made up 100% of the total cover. Native species accounted for about 80% of the total cover in this area. The moisture index for this habitat type was 1.41 and bare ground accounted for 57% of the area.

**Scrub/shrub Habitat Type**

This habitat type was dominated by *Holcus lanatus*, *Potamogeton* sp., *Trifolium repens*, *Vicia pannonica*, and *Poa pratensis*. FAC and better species made up 74% of the total cover. Native species accounted for about 7% of the total cover in this area. The moisture index for this habitat type was 2.70 and bare ground accounted for 13% of the area.

**Oak Savannah Habitat Type**

This habitat type was dominated by *Vicia sativa*, *Vicia pannonica*, *Agrostis castellana/capillaris*, *Lolium perenne* ssp. *multiflorum*, and *Trifolium repens*. Native species accounted for less than 1% of the total cover in this area.

Marion Mitigation Bank Plant Monitoring, 2010 Phase 3

Emergent Habitat Type

Cover (%)

| | | | | | | Sample Station | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **E-031** | **E-047** | **E-051** | **E-052** | **E-070** | **E-078** | **E-138** | **E-219** | **E-315** | **E-316** | **E-327** | **Mean** |
| Juncus effusus | soft rush | yes | FACW | 2 | y | | | | 2 | | | | | 1 | 68 | 80 | 13.7 |
| Azolla mexicana | mexican mosquito-fern [water-fern] | yes | OBL | 1 | y | | | | 97 | 15 | | | | | | 15 | 11.5 |
| Callitriche sp. | water starwort | NA | OBL | 1 | y | | | | | | 75 | | | | | | 6.8 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | 40 | 1 | 4 | 8 | | 3 | | 5 | 2 | 2 | 5.9 |
| Myriophyllum spicatum | Eurasian watermilfoil | | OBL | 1 | y | | | | 10 | 30 | 2 | | | 18 | | | 5.5 |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | | | 3 | | | 12 | 5 | 18 | 15 | | | 4.8 |
| Elodea canadensis | Canadian waterweed | yes | OBL | 1 | y | | | | 12 | | 5 | | 20 | | | | 3.4 |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | | 1 | 20 | | | 5 | | | | 8 | 3.1 |
| Sparganium angustifolium | simplestem bur-reed | yes | OBL | 1 | y | | | | | | | | | 28 | | | 2.5 |
| Lemna minor | duckweed | yes | OBL | 1 | y | | | | 1 | 1 | | | 1 | 5 | 1 | 10 | 1.7 |
| Salix hookeriana | Hooker willow | yes | FACW | 2 | y | | | | | | | | | 15 | | | 1.4 |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | | | | | | | | | 5 | | 3 | 0.7 |
| Eleocharis ovata | ovate spikerush | yes | OBL | 1 | y | 7 | | | | | | | | | | | 0.6 |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | | | 5 | 1 | | | | | | | | 0.5 |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | | | | | | | | | | 3 | | 0.3 |
| Juncus articulatus | jointed rush | yes | OBL | 1 | y | | | | | | | | | 3 | | | 0.3 |
| Poa trivialis | rough [roughstalk] bluegrass | | FACW | 2 | y | | | | | | | | | | 3 | | 0.3 |
| Rorippa curvisiliqua | western yellowcress | yes | OBL | 1 | y | | 3 | | | | | | | | | | 0.3 |
| Carex leptopoda | Dewey's sedge | yes | FAC | 3 | y | | | | | | | | | | 2 | | 0.2 |
| Populus balsamifera ssp. trichocarpa | black cottonwood | yes | FAC | 3 | y | | | | | | | 2 | | | | | 0.2 |
| Typha latifolia | cattail | yes | OBL | 1 | y | | | | | 2 | | | | | | | 0.2 |
| Agrostis stolonifera | creeping bentgrass | | FACW | 2 | y | | | | | | | | | | 1 | | 0.1 |
| Alisma plantago-aquatica | American water-plantain | yes | OBL | 1 | y | | | | | | 1 | | | | | | 0.1 |
| Carex stipata | awl-fruited sedge | yes | OBL | 1 | y | | | | | | | | | | 1 | | 0.1 |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | | | | | | | | | | 1 | | 0.1 |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | | | | | | | | | | 1 | | 0.1 |
| | | | | | | | | | | | | | | | | | |
| algae, moss, duff, dead vegetation, etc. | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 5 | 2 | 80 | 1 | 45 | 75 | 80 | 80 | 60 | 13 | 2 | 40.3 |
| bare (soil, mud, rock) | " | | | | | 88 | 55 | 10 | 0 | 0 | 0 | 5 | 0 | 0 | 8 | 18 | 16.7 |
| standing water (inches) | | | | | | 12 | 16 | 10 | 4 | 8 | 12 | 8 | 24 | 16 | 1 | 6 | |
| | | | | | | | | | | | | | | | | | |
| | Total cover: | | | | | 7 | 43 | 10 | 147 | 56 | 95 | 15 | 39 | 95 | 83 | 118 | 64.4 |
| | FAC and better cover: | | | | | 7 | 43 | 10 | 147 | 56 | 95 | 15 | 39 | 95 | 82 | 118 | 64.3 |
| | Native cover: | | | | | 7 | 3 | 4 | 132 | 18 | 18 | 12 | 39 | 72 | 73 | 116 | 45 |

Marion Mitigation Bank Plant Monitoring, 2010 Phase 3

Emergent Habitat Type

Cover (%)

| Species | Common Name | Native | Indicator | MTI | Wet | E-031 | E-047 | E-051 | E-052 | E-070 | E-078 | E-138 | E-219 | E-315 | E-316 | E-327 | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Sample Station | | | | | | | | | | | |
| | Percent FAC and better of total: | | | | | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 100 | 100 |
| | Percent native of total: | | | | | 100 | 7 | 40 | 90 | 32 | 19 | 80 | 100 | 76 | 88 | 98 | 70 |
| | | | | | | | | | | | | | | | | Moisture Index: | 1.41 |

| Marion Mitigation Bank Plant Monitoring, 2010 Phase 3 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scrub/Shrub Habitat Type | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | |
| | | | | | | | | | Sample Station | | | | | | | |
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **S-002** | **S-027** | **S-028** | **S-037** | **S-055** | **S-075** | **S-076** | **S-100** | **S-103** | **S-105** | **Mean** |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | 7 | | | 40 | 25 | | 1 | 85 | 85 | 52 | 29.5 |
| Potamogeton sp. | pondweed | NA | OBL | 1 | y | | 90 | 55 | | | | | | | | 14.5 |
| Trifolium repens | white clover | | FAC- | 3 | | 40 | | | | 3 | | 40 | 2 | 2 | 22 | 10.9 |
| Vicia pannonica | Hungarian vetch | | NOL | 5 | u | 50 | | | 1 | 15 | | 2 | 2 | 1 | 8 | 7.9 |
| Poa pratensis | Kentucky bluegrass | | FAC | 3 | y | | | | | 15 | | 2 | 10 | 10 | 38 | 7.5 |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | | | | 2 | 20 | | 25 | 5 | 5 | 3 | 6.0 |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | | | 42 | | | 1 | 7 | | | 10 | 6.0 |
| Lythrum portula | spatulaleaf loosestrife | | OBL | 1 | y | | | | | | 48 | 2 | | | | 5.0 |
| Geranium molle | dovefoot geranium | | NOL | 5 | u | 12 | | | | | | | | 1 | 7 | 2.0 |
| Daucus carota | wild carrot/ Queen Anne's lace | | NOL | 5 | u | 5 | | | 6 | | | 1 | | 2 | | 1.4 |
| Lemna minor | duckweed | yes | OBL | 1 | y | | 2 | 12 | | | | | | | | 1.4 |
| Lolium perenne ssp. multiflorum | Italian ryegrass | | FAC | 3 | y | | | | | | | 1 | 2 | 1 | 8 | 1.2 |
| Parentucellia viscosa | parentucellia | | FAC- | 3 | | | | | 10 | 1 | | | | | | 1.1 |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | | | | | 10 | | | | | | 1.0 |
| Typha latifolia | cattail | yes | OBL | 1 | y | | 10 | | | | | | | | | 1.0 |
| Juncus bufonius | toad rush | yes | FACW | 2 | y | | | | | | 5 | 4 | | | | 0.9 |
| Trifolium dubium | small hop-clover | | UPL | 5 | | | | | | 1 | | 7 | | | | 0.8 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | 3 | | | | | | | | 4 | | 0.7 |
| Vicia sativa | common vetch | | UPL | 5 | | | | | | 2 | | | | 5 | | 0.7 |
| Cirsium vulgare | bull [common] thistle | | FACU | 4 | | | | | | | | | 3 | 2 | | 0.5 |
| Polygonum persicaria | spotted ladysthumb | | FACW | 2 | y | | | | | | 5 | | | | | 0.5 |
| Veronica peregrina ssp. xalapense | hairy purslane speedwell | yes | OBL | 1 | y | | | | | 2 | 2 | 1 | | | | 0.5 |
| Cerastium glomeratum | sticky chickweed | | UPL | 5 | | 2 | | | | 1 | | 1 | | | | 0.4 |
| Eleocharis ovata | ovate spikerush | yes | OBL | 1 | y | | | | | | 4 | | | | | 0.4 |
| Plagiobothrys scouleri | Scouler's popcornflower | yes | FACW | 2 | y | | | | | | 3 | 1 | | | | 0.4 |
| Vicia hirsuta | tiny vetch | | NOL | 5 | u | | | | 1 | | | | | | 3 | 0.4 |
| Bidens frondosa | leafy beggar's-tick | yes | FACW+ | 2 | y | | | | | | 1 | 2 | | | | 0.3 |
| Epilobium brachycarpum | tall annual willowherb | yes | UPL | 5 | | | | | | | | 1 | | 2 | | 0.3 |
| Leucanthemum vulgare | oxeye daisy | | UPL | 5 | | 3 | | | | | | | | | | 0.3 |
| Rumex obtusifolius | broad-leaved dock | | FAC | 3 | y | | | | | | | | | 1 | 2 | 0.3 |
| Vicia villosa | winter [woolly] vetch | | NOL | 5 | u | | | | | | | 3 | | | | 0.3 |
| Anthemis cotula | mayweed chamomile/ stinking mayweed | | FACU | 4 | | | | | | 1 | | 1 | | | | 0.2 |
| Azolla mexicana | mexican mosquito-fern [water-fern] | yes | OBL | 1 | y | | 1 | 1 | | | | | | | | 0.2 |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | | | | | 1 | | | | 1 | | 0.2 |

# Marion Mitigation Bank Plant Monitoring, 2010 Phase 3

Scrub/Shrub Habitat Type

Cover (%)

| | | | | | | Sample Station | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Common Name** | **Native** | **Indicator** | **MTI** | **Wet** | **S-002** | **S-027** | **S-028** | **S-037** | **S-055** | **S-075** | **S-076** | **S-100** | **S-103** | **S-105** | **Mean** |
| Myosotis discolor | yellow and blue forget-me-not | | FACW | 2 | y | | | | | 1 | | | | 1 | | 0.2 |
| Rorippa curvisiliqua | western yellowcress | yes | OBL | 1 | y | | | | | | 1 | 1 | | | | 0.2 |
| Sonchus asper | prickly sow-thistle | | FAC- | 3 | | 2 | | | | | | | | | | 0.2 |
| Veronica arvensis | corn speedwell | | FACU | 4 | | | | | | 2 | | | | | | 0.2 |
| Aphanes arvensis | field parsley piert/western lady's-mantle | | NOL | 5 | u | | | | | 1 | | | | | | 0.1 |
| Bromus hordeaceus ssp. hordeaceus | soft brome | | FACU | 4 | | | | | | | | | | 1 | | 0.1 |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | | 1 | | | | | | | 0.1 |
| Galium parisiense | creeping [wall] bedstraw | | UPL | 5 | | | | | | | | | 1 | | | 0.1 |
| Matricaria discoidea | disc mayweed | | FACU | 4 | | | | | | 1 | | | | | | 0.1 |
| | | | | | | | | | | | | | | | | |
| algae, moss, duff, dead vegetation, etc. | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 0 | 10 | 2 | 40 | 3 | 3 | 2 | 6 | 3 | 2 | 7.1 |
| bare (soil, mud, rock) | " | | | | | 0 | 0 | 0 | 1 | 3 | 30 | 25 | 0 | 1 | 0 | 6.0 |
| standing water (inches) | | | | | | 0 | 12 | 12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | |
| | | | | | | | | | | | | | | | | |
| | | | Total cover: | | | 124 | 103 | 110 | 61 | 102 | 70 | 103 | 110 | 124 | 153 | 106.0 |
| | | | FAC and better cover: | | | 10 | 103 | 110 | 43 | 74 | 70 | 47 | 102 | 108 | 113 | 78.0 |
| | | | Native cover: | | | 0 | 13 | 13 | 1 | 13 | 16 | 10 | 0 | 3 | 0 | 6.9 |
| | | | | | | | | | | | | | | | | |
| | | | Percent FAC and better of total: | | | 8 | 100 | 100 | 70 | 73 | 100 | 46 | 93 | 87 | 74 | 74 |
| | | | Percent native of total: | | | 0 | 13 | 12 | 2 | 13 | 23 | 10 | 0 | 2 | 0 | 7 |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | Moisture Index: | | | 2.70 |

| Marion Mitigation Bank Plant Monitoring, 2010 Phase 3 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Oak Savannah Habitat Type | | | | | | | | | | |
| Cover (%) | | | | | | | | | | |
| | | | | | | Sample Station | | | | |
| **Species** | **Common Name** | **Native** | **O-7** | **O-27** | **O-28** | **O-59** | **O-60** | **O-WB** | **O-SB** | **Mean** |
| Vicia sativa | common vetch | | 38 | 45 | 50 | 50 | 60 | | 12 | 36.4 |
| Vicia pannonica | Hungarian vetch | | 50 | 45 | 50 | 50 | | | | 27.9 |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | | | | | 2 | 90 | 75 | 23.9 |
| Lolium perenne ssp. multiflorum | Italian ryegrass | | 40 | 10 | 35 | 5 | 10 | | | 14.3 |
| Trifolium repens | white clover | | 5 | 4 | 2 | 2 | 3 | 4 | 45 | 9.3 |
| Vicia hirsuta | tiny vetch | | 15 | | 5 | | 25 | | | 6.4 |
| Daucus carota | wild carrot/ Queen Anne's lace | | 4 | | | | | 10 | 15 | 4.1 |
| Anthemis cotula | mayweed chamomile/ stinking mayweed | | 1 | 1 | 10 | | 3 | | 5 | 2.9 |
| Vicia tetrasperma | four-seeded vetch | | 6 | 6 | 4 | | | | | 2.3 |
| Parentucellia viscosa | parentucellia | | 13 | | | | 2 | | | 2.1 |
| Holcus lanatus | common velvetgrass | | | | | | | 5 | | 0.7 |
| Rumex acetosella | sheep [red] sorrel | | | 1 | | | 1 | | 2 | 0.6 |
| Raphanus sativus | wild radish | | | | 3 | | | | | 0.4 |
| Trifolium pratense | red clover | | 3 | | | | | | | 0.4 |
| Lactuca serriola | prickly lettuce | | | | | | 1 | | 1 | 0.3 |
| Rumex obtusifolius | broad-leaved dock | | 2 | | | | | | | 0.3 |
| Trifolium dubium | small hop-clover | | 2 | | | | | | | 0.3 |
| Aira caryophyllea | silver hairgrass | | 1 | | | | | | | 0.1 |
| Epilobium brachycarpum | tall annual willowherb | yes | 1 | | | | | | | 0.1 |
| Galium parisiense | creeping [wall] bedstraw | | | | 1 | | | | | 0.1 |
| Madia glomerata | cluster [mountain] [stinking] tarweed | yes | | | | | | 1 | | 0.1 |
| | | | | | | | | | | |
| algae, moss, duff, dead vegetation, etc. | DOES NOT INCLUDE CANOPY, IF ANY | | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0.7 |
| bare (soil, mud, rock) | " | | 2 | 10 | 0 | 0 | 17 | 0 | 0 | 4.1 |
| | | | | | | | | | | |
| | Total cover: | | 183 | 122 | 160 | 107 | 124 | 115 | 155 | 138.0 |

| Marion Mitigation Bank Plant Monitoring, 2010 Phase 3 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Oak Savannah Habitat Type | | | | | | | | | | |
| Cover (%) | | | | | | | | | | |
| | | | | | | Sample Station | | | | |
| **Species** | **Common Name** | **Native** | **O-7** | **O-27** | **O-28** | **O-59** | **O-60** | **O-WB** | **O-SB** | **Mean** |
| | Native cover: | | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0.3 |
| | Percent native of total: | | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0.2 |

MARION MITIGATION BANK

07/01/2009

| DATE | NAME | LOCATION | PERMIT | ADD | SOLD | BALANCE |
|---|---|---|---|---|---|---|
| 10/19/2001 | DSL/COE CREDIT RELEASE | INITIAL RELEASE | | 10.9 | | 10.90 |
| 4/20/2003 | DSL | RECINDED | | | 10.9 | 0.00 |
| 3/20/2003 | DSL/COE CREDIT RELEASE | PHASE I | | 2.84 | | 2.84 |
| 4/24/2003 | WILLAMETTE ESTATES, LLC | 3900 NE SANTIAM PASS WAY, SALEM,OR | 25263RF/1998-00145 | | 0.500 | 2.34 |
| 11/13/2003 | OREGON DEPT OF TRANSPORTATION | I-5 N. JEFFERSON TO N.ALBANY | 31156RF/2003-00622 | | 2.330 | 0.010 |
| 3/18/2004 | DSL/COE CREDIT RELEASE | PHASE II | | 3.21 | | 3.220 |
| 5/26/2004 | OREGON DEPT OF STATE LANDS | WETLAND MITIGATION BANK REVOLVING FUND | | | 0.167 | 3.053 |
| 6/14/2004 | CITY OF SALEM PUBLIC WORKS | GREEN IS. WATER TREATMENT FACILITY | RP12152/1996-01446 | | 1.540 | 1.513 |
| 10/5/2004 | WILLAMETTE DEVELOPMENT LLC | 9795 MILL CREEK RD.SE, AUMSVILLE, OR | APP32629/2004-00446 | | 1.510 | 0.003 |
| 4/28/2005 | DSL/COE CREDIT RELEASE | PHASE II | | 2.19 | | 2.193 |
| 5/4/2005 | TIMOTHY YOUNGKIN | NW 1/4 SEC.33,T13S,R01W,WM SWEETHOME, OR | FP13667/1997-00203 | | 1.000 | 1.193 |
| 6/30/2005 | RICH BRANDVOLD | T10S,R1W,SEC18,TAX LOT 100 SCIO,OR | RF33917/2005-00074 | | 0.090 | 1.103 |
| 9/30/2005 | RICH BRANDVOLD | T12S,R2W,SEC22,TAX LOT 504,LEBANON,OR | RF34107/2005-00164 | | 1.103 | 0.000 |
| 4/4/2008 | DSL CREDIT RELEASE | PHASE II | | 2.5 | | 2.500 |
| 10/3/2008 | KSD INVESTMENT,LLC | 11770 SUBLIMITY RD.,SUBLIMITY, OR | 41232RF/2008-00504 | | 1.845 | 0.655 |
| 11/6/2008 | KNIFE RIVER | 9710 WHEATLAND RD N.SALEM, OR | 39879RP/2008-0067 | | 0.007 | 0.648 |
| 12/5/2008 | DSL/COE CREDIT RELEASE | PHASE III | | 4.5 | | 5.148 |
| 12/9/2008 | WOOD WASTE, LLC DBA COMPOST OR | TAX LOT 1700,8712 AUMSVILLE HWY, AUMSVILLE,,OR | 39365RF/2007-00896 | | 1.83 | 3.318 |
| 6/18/2010 | DSL/COE CREDIT RELEASE | PHASE I | | 4.5 | | 7.818 |
| 6/23/2010 | ALBANY/LEBANON INVESTMENTS | 560 HANSARD AVE,/LEBANON OREGON TX LTS 1900/2000 | 39843RF/2007-00571 | | 3.83 | 3.988 |