| Marion Mitigation Bank Plant Monitoring, 2012 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** |
| Agrostis stolonifera | creeping bentgrass | | FACW | 2 | y | | | | | 5 | 22 | | 2 | 85 | |
| Alisma gramineum | narrowleaf water plantain | yes | OBL | 1 | y | 1 | | | | | | | | | |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | | | 1 | | 1 | | | | | |
| Bidens frondosa | leafy beggar's-tick | yes | FACW+ | 2 | y | | | | | | | | 2 | | |
| Brassica rapa | field [common] [birdsrape] mustard | | NOL | 5 | u | | | | | | | | 2 | | |
| Carex obnupta | slough sedge | yes | OBL | 1 | y | | 60 | | 55 | 45 | | 23 | | | |
| Eleocharis acicularis | needle spike-rush | yes | OBL | 1 | y | | | | | | | | | | 3 |
| Eleocharis palustris | common [creeping] spike-rush | yes | OBL | 1 | y | 1 | | 15 | 1 | 2 | 2 | 15 | | | 20 |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | | | | | | 45 | | |
| Gratiola ebracteata | bractless hedgehyssop | yes | OBL | 1 | y | | | | | | | | | | 1 |
| Juncus articulatus | jointed rush | yes | OBL | 1 | y | | | 3 | 2 | 3 | 2 | 12 | | | |
| Juncus effusus | soft rush | yes | FACW | 2 | y | | | | | | 10 | | | 1 | |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | 5 | 2 | 1 | 2 | | 2 | 13 | | | |
| Lythrum hyssopifolia | hyssop loosestrife | | OBL | 1 | y | | | | | | | | | | 3 |
| Lythrum portula | spatulaleaf loosestrife | | OBL | 1 | y | | | | | | | 1 | 20 | | 10 |
| Mentha pulegium | pennyroyal | | OBL | 1 | y | | 1 | 18 | 2 | 4 | 5 | 20 | | | 47 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | | | | | 12 | 1 | 3 | |
| Plagiobothrys scouleri | Scouler's popcornflower | yes | FACW | 2 | y | | | | | | | | 1 | | |
| Polygonum hydropiperoides | waterpepper | yes | OBL | 1 | y | 60 | | | | | 3 | | | | |
| Populus balsamifera ssp. trichocarpa | black cottonwood | yes | FAC | 3 | y | | | | | 50 | 5 | | | | |
| Salix hookeriana | Hooker willow | yes | FACW | 2 | y | | | | | | 25 | | | | |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | | | | 18 | | | | | |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | 95 | | 10 | | | | | | |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | 10 | | | | | | | | |
| | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 5 | 1 | 0 | 0 | 0 | | | 65 | | 5 |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | 30 | 2 | 65 | 35 | 40 | 25 | 25 | 10 | 15 | 20 |
| standing water (inches) | | | | | | 24 | 8 | 12 | 6 | 1 | 1 | 10 | | | 2 |

| Marion Mitigation Bank Plant Monitoring, 2012 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** |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | | | | | | 15 | 10 | | | | | | |
| Agrostis stolonifera | creeping bentgrass | | FACW | 2 | y | | | | 60 | 62 | | | 12 | 4 | 18 | | | 30 |
| Alisma gramineum | narrowleaf water plantain | yes | OBL | 1 | y | | | | | | | | | | | | | 1 |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | 3 | | | | | | | | | | | 15 | 10 |
| Beckmannia syzigachne | American slough grass | yes | OBL | 1 | y | | | | | | | | 27 | | | | 5 | 3 |
| Callitriche sp. | water starwort | NA | OBL | 1 | y | | | | | | | | 25 | 1 | | | | |
| Carex feta | green-sheathed sedge | yes | FACW | 2 | y | | | | | 8 | | | | 10 | | | | |
| Carex obnupta | slough sedge | yes | OBL | 1 | y | 18 | 50 | 75 | | | | | | | | | | |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | 1 | | | | | | 10 | | | | | 30 | |
| Eleocharis acicularis | needle spike-rush | yes | OBL | 1 | y | 25 | | | | | | | | | 28 | 80 | 2 | |
| Eleocharis palustris | common [creeping] spike-rush | yes | OBL | 1 | y | 5 | 2 | 1 | 18 | | | | 1 | 1 | | 1 | | 10 |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | | | | | | | 1 | | | | | | |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | | 50 | | 1 | | | | | | | |
| Galium aparine | catchweed bedstraw/ cleavers | yes | FACU | 4 | | | | | | | 1 | | | | | | | |
| Geranium carolinianum | Carolina geranium | yes | NOL | 5 | u | | | | | | | 1 | | | | | | |
| Gratiola ebracteata | bractless hedgehyssop | yes | OBL | 1 | y | | | | | | | | | | 4 | | | |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | | | | | | 15 | | | | | | | |
| Holcus mollis | creeping velvetgrass | | FACU | 4 | | | | | | | 55 | | | | | | | |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | | | | | | | 28 | | | | | | |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | 3 | | | | | | 1 | | | | | | |
| Juncus articulatus | jointed rush | yes | OBL | 1 | y | 2 | | | | | | | | | | | | |
| Juncus effusus | soft rush | yes | FACW | 2 | y | | | | | | | | | 1 | | | | |
| Lolium arundinacea | tall fescue | | FAC- | 3 | | | | | | | 5 | | | | | | | |
| Lotus corniculatus | birdsfoot trefoil | | FAC | 3 | y | | | | | 2 | | | | | | | | |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | | 1 | | | | | | | | | | | |
| Lythrum portula | spatulaleaf loosestrife | | OBL | 1 | y | 8 | | | 6 | | | | | | | | 7 | |
| Mentha pulegium | pennyroyal | | OBL | 1 | y | 25 | 6 | 22 | 15 | 2 | | | 1 | 3 | 10 | 3 | 1 | 33 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | | | | | | 4 | 60 | | | | |
| Plagiobothrys scouleri | Scouler's popcornflower | yes | FACW | 2 | y | | | | | | | | | | | | 1 | |
| Plantago major | broadleaf plantain | | FAC | 3 | y | | | | 5 | | | | | | | | | |
| Poa compressa | Canada bluegrass | | FACU+ | 4 | | | | | | | | 65 | | | | | | |
| Polygonum hydropiperoides | waterpepper | yes | OBL | 1 | y | | | | | | | | 5 | | | | | |
| Populus balsamifera ssp. trichocarpa | black cottonwood | yes | FAC | 3 | y | | 22 | | | | | | | | | 18 | | |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | 20 | | | | | | | | | | | |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | | 35 | | | 98 | | | 50 | | 27 | | |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | | 10 | | | | | 45 | 40 | 15 | | | |
| Veronica peregrina ssp. xalapense | hairy purslane speedwell | yes | OBL | 1 | y | | | | | | | | | | | | 1 | |
| Vicia hirsuta | tiny vetch | | NOL | 5 | u | | | | | | | 1 | | | | | | |

try 60

| Marion Mitigation Bank Plant Monitoring, 2012 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** |
| Vicia sativa | common vetch | | UPL | 5 | | | | | | | 2 | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 15 | 2 | 1 | 2 | 1 | | 1 | | 3 | 15 | 5 | | |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | 10 | 40 | 4 | 18 | 35 | | 4 | 15 | 12 | 7 | 10 | 40 | 18 |
| standing water (inches) | | | | | | | 8 | 10 | | | | | 4 | | 1 | 8 | | |

| Marion Mitigation Bank Plant Monitoring, 2012 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** |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | | | | 3 | | | 15 | 45 | | 25 | | 3 |
| Agrostis stolonifera | creeping bentgrass | | FACW | 2 | y | 12 | | | | | | | | | | | 28 |
| Aira caryophyllea | silver hairgrass | | FACU | 4 | | | | | | | | | 2 | | | | |
| Bidens frondosa | leafy beggar's-tick | yes | FACW+ | 2 | y | 1 | | | | | | | | | | | 2 |
| Bromus catharticus | rescuegrass | | NOL | 5 | u | | | | | | | | | 7 | | | |
| Bromus hordeaceus ssp. hordeaceus | soft brome | | FACU | 4 | | | | | | | | 15 | 10 | 3 | | | |
| Carex feta | green-sheathed sedge | yes | FACW | 2 | y | | | 2 | | | | | | | | | |
| Carex leptopoda | Dewey's sedge | yes | FAC | 3 | y | | 5 | 1 | | | | | | | | | |
| Carex obnupta | slough sedge | yes | OBL | 1 | y | | | | | | 35 | | | | | | |
| Carex sp. | sedge | yes | --- | 5 | u | | | 1 | | | | | | | | | |
| Centaurium erythraea | European centaury | | FAC | 3 | y | | | | | | | | 8 | | | | |
| Cornus sericea | redosier dogwood | yes | FACW | 2 | y | | | 1 | | | | | | | | | |
| Daucus carota | wild carrot/ Queen Anne's lace | | NOL | 5 | u | | | | 2 | | | | 6 | | | | |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | 65 | 8 | 1 | | 60 | 32 | | | | | 50 | |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | | | 1 | | | | | | | | | |
| Equisetum arvense | common [field] horsetail | yes | FAC | 3 | y | | | | 2 | | | | | 95 | | | |
| Festuca rubra | red fescue | | FAC+ | 3 | y | | | | 28 | | | | | | | | |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | | | | | | | | 20 | | 40 |
| Galium aparine | catchweed bedstraw/ cleavers | yes | FACU | 4 | | | | | | | | | | 3 | | | |
| Geranium carolinianum | Carolina geranium | yes | NOL | 5 | u | | | | | | | | | 1 | | | |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | | | | 58 | | | 3 | 1 | 10 | 1 | | |
| Holcus mollis | creeping velvetgrass | | FACU | 4 | | | | | | | | 2 | | | | | |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | | | | | 1 | 1 | | | | | | |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | | | | | 1 | | | 1 | | 2 | 1 | 8 |
| Juncus articulatus | jointed rush | yes | OBL | 1 | y | | | 5 | | | 11 | | | | | | |
| Juncus bufonius | toad rush | yes | FACW | 2 | y | | | | | | | | | | | 1 | |
| Juncus effusus | soft rush | yes | FACW | 2 | y | 10 | 8 | 12 | | | 1 | | | | | | |
| Juncus ensifolius | dagger-leaf rush | yes | FACW | 2 | y | 1 | | | | | | | | | | | |
| Juncus patens | spreading rush | yes | FACW | 2 | y | | | 27 | | | | | | | 8 | | |
| Juncus tenuis | slender rush | yes | FACW- | 2 | y | 1 | | 3 | | | | | | | 5 | | |
| Leucanthemum vulgare | oxeye daisy | | UPL | 5 | | | | | | | | 4 | | | | | |
| Lolium arundinacea | tall fescue | | FAC- | 3 | | | | | 13 | 1 | | 7 | | | 35 | | |
| Lotus corniculatus | birdsfoot trefoil | | FAC | 3 | y | | | | | | 1 | | | | | | |
| Lotus unifoliolatus var. unifoliolatus | Spanish clover | yes | UPL | 5 | | | | | | | | | | | | 1 | 3 |
| Lythrum portula | spatulaleaf loosestrife | | OBL | 1 | y | | | | | | | | | | | 1 | |
| Mentha pulegium | pennyroyal | | OBL | 1 | y | | | | | 1 | 2 | | | | | 25 | 3 |
| Parentucellia viscosa | parentucellia | | FAC- | 3 | | | | | | | | | 5 | | | | |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | 15 | | | | 1 | 5 | | | | | | 10 |
| Poa compressa | Canada bluegrass | | FACU+ | 4 | | | | | | | | 40 | | | | | |

| Marion Mitigation Bank Plant Monitoring, 2012 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** |
| Alisma gramineum | narrowleaf water plantain | yes | OBL | 1 | y | | | | | | | | | | 2 |
| Alnus rhombifolia | white alder | yes | FACW | 2 | y | | | | | | | | | | 4 |
| Azolla mexicana | mexican mosquito-fern [water-fern] | yes | OBL | 1 | y | | | | | | | 1 | 1 | | |
| Bidens frondosa | leafy beggar's-tick | yes | FACW+ | 2 | y | | | | | | 1 | | | | |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | | | | | 3 | | | | | |
| Eleocharis ovata | ovate spikerush | yes | OBL | 1 | y | | | | | 3 | | | | | |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | 20 | 2 | | | 1 | | | | 7 | |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | | | | | 1 | | | | | |
| Equisetum arvense | common [field] horsetail | yes | FAC | 3 | y | | | | | | 1 | | | | |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | 1 | | | | 8 | 15 | | | | 8 |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | | | | | 28 | | | | | |
| Juncus effusus | soft rush | yes | FACW | 2 | y | | | 2 | 50 | 5 | 82 | 12 | 4 | | 20 |
| Juncus ensifolius | dagger-leaf rush | yes | FACW | 2 | y | | | | | 2 | | | | | |
| Lemna minor | duckweed | yes | OBL | 1 | y | 15 | 40 | 12 | 15 | | 2 | 20 | 15 | 5 | 1 |
| Lotus micranthus | small-flowered deervetch | yes | NOL | 5 | u | | | | | | | 3 | | | |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | 58 | | | 55 | | | | 5 | 2 | 1 |
| Mentha pulegium | pennyroyal | | OBL | 1 | y | 3 | | | | | | | | | |
| Myriophyllum hippuroides | western watermilfoil | yes | OBL | 1 | y | | 40 | | | | | | | | |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | | | | | 1 | | | 2 |
| Polygonum hydropiperoides | waterpepper | yes | OBL | 1 | y | 32 | | 2 | 25 | | | 5 | 28 | 72 | |
| Salix hookeriana | Hooker willow | yes | FACW | 2 | y | | | | | | 45 | | | | |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | | | | | 20 | 50 | 50 | | |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | | | | 11 | | | | 10 | |
| Schoenoplectus acutus | hardstem bulrush | yes | OBL | 1 | y | 1 | | | | | | | | | |
| Sparganium emersum | European bur-reed | yes | OBL | 1 | y | | 2 | 3 | 12 | | | | | 8 | |
| Trifolium repens | white clover | | FAC- | 3 | | | | | | 10 | | | | | |
| Wolffia borealis | northern watermeal | yes | OBL | 1 | y | | | 2 | | | | | | | |
| | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | | | | | 5 | | | | | |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | 3 | 35 | 80 | 8 | 40 | 18 | 55 | 47 | 10 | 65 |
| standing water (inches) | | | | | | 12 | 24 | 12 | 14 | tr | 4 | 16 | 24 | 14 | 6 |

| Marion Mitigation Bank Plant Monitoring, 2012 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** |
| Rumex acetosella | sheep [red] sorrel | | FACU+ | 4 | | | | | | | | 1 | | | | | |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | | 50 | | | | | | | | | |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | 95 | 25 | | | | | | | | | |
| Senecio jacobaea | tansy ragwort | invasive | FACU | 4 | | | | | | | | | | | 1 | | |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | 7 | | | | | | | | | | |
| Trifolium repens | white clover | | FAC- | 3 | | | | | | | | 10 | | | | | |
| Typha latifolia | cattail | yes | OBL | 1 | y | | 1 | 3 | | | | | | | | | |
| Vicia hirsuta | tiny vetch | | NOL | 5 | u | | | | | | | | 25 | | | | |
| Vicia pannonica | Hungarian vetch | | NOL | 5 | u | | | | 10 | | | 18 | 5 | | | | |
| Vicia sativa | common vetch | | UPL | 5 | | | | | 8 | | | | 1 | 2 | | | |
| Vulpia bromoides | barren fescue | | UPL | 5 | | | | | | | | | 20 | | | | |
| | | | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 5 | 1 | 5 | 1 | 15 | 5 | 4 | | | | 10 | 5 |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | 5 | 70 | 60 | 10 | 20 | 12.0 | 15 | 5 | | 27 | 12 | 15 |

| Marion Mitigation Bank Plant Monitoring, 2012 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** |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | | | | | | | 10 | 5 | | |
| Alisma gramineum | narrowleaf water plantain | yes | OBL | 1 | y | | | 3 | | | | | | | |
| Alnus rhombifolia | white alder | yes | FACW | 2 | y | | | | | | | | | | 95 |
| Carex leptopoda | Dewey's sedge | yes | FAC | 3 | y | | 1 | | | | | | | | |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | | | | | | | | | 15 | |
| Elodea canadensis | Canadian waterweed | yes | OBL | 1 | y | | | | | | | | | 3 | |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | | | | | | 2 | | | | |
| Equisetum arvense | common [field] horsetail | yes | FAC | 3 | y | 90 | 1 | | | 25 | | | | | 28 |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | 2 | | | | | | | |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | 60 | 2 | | | 30 | | 10 | 35 | | |
| Holcus mollis | creeping velvetgrass | | FACU | 4 | | | | | | | | | | | 35 |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | | | | | | | | 1 | | |
| Juncus effusus | soft rush | yes | FACW | 2 | y | | 25 | 75 | | | 12 | 5 | | | 10 |
| Juncus ensifolius | dagger-leaf rush | yes | FACW | 2 | y | | 6 | | | | | | | | |
| Lemna minor | duckweed | yes | OBL | 1 | y | | | 1 | | | 1 | | | 1 | |
| Lotus corniculatus | birdsfoot trefoil | | FAC | 3 | y | | | | | | | 12 | | | |
| Lotus micranthus | small-flowered deervetch | yes | NOL | 5 | u | | | 2 | | | | | | | |
| Myosotis laxa | small-flowered forget-me-not | yes | OBL | 1 | y | | | 1 | | | | | | | 1 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | | 1 | | 4 | | | | |
| Poa trivialis | rough [roughstalk] bluegrass | | FACW | 2 | y | | | | | | | | | | 1 |
| Polygonum hydropiperoides | waterpepper | yes | OBL | 1 | y | | | | | | | | | 20 | |
| Populus balsamifera ssp. trichocarpa | black cottonwood | yes | FAC | 3 | y | | 2 | | | | | | | | |
| Rubus discolor | Himalayan blackberry | invasive | FACU | 4 | | | 4 | | | | | | 3 | | |
| Salix hookeriana | Hooker willow | yes | FACW | 2 | y | 80 | | | | | 18 | | 95 | | |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | | | 98 | | | | | | |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | 70 | 7 | | 98 | | 98 | | | |
| Senecio jacobaea | tansy ragwort | invasive | FACU | 4 | | | | | | | | | 2 | | |
| Sparganium emersum | European bur-reed | yes | OBL | 1 | y | | | | | | | | | 2 | |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | | 1 | | | | | | | |
| Trifolium pratense | red clover | | FACU | 4 | | | | | | | | | 6 | | |
| Veronica americana | American speedwell | yes | OBL | 1 | y | | | 6 | | | | | | | 5 |
| Vicia hirsuta | tiny vetch | | NOL | 5 | u | 2 | | | | | | | | | |
| Vicia sativa | common vetch | | UPL | 5 | | | | | | | | 3 | 2 | | |
| | | | | | | | | | | | | | | | |

| Marion Mitigation Bank Plant Monitoring, 2012 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** |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | | 2 | | 20 | | | | | | |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | | 40 | 15 | 80 | 45 | 80 | 72 | 45 | 60 | 25 |
| standing water (inches) | | | | | | | | 8 | | tr | 4 | | | 30 | tr |

| Marion Mitigation Bank Plant Monitoring, 2012 Phase 3 | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Emergent Habitat Type | | | | | | | | | | | | | w = deep water; no vegetation | | | | | | | | | | | | |
| 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-224** | **E-269** | **E-282** | **E-299** | **E-304** | **E-315** | **E-316** | **E-327** | **E-348** | **E-349** | **E-375** | **E-387** |
| Alisma gramineum | narrowleaf water plantain | yes | OBL | 1 | y | | | | | | | | w | | | | | | | | 2 | | | w | |
| Azolla mexicana | mexican mosquito-fern [water-fern] | yes | OBL | 1 | y | | | 35 | 95 | 95 | | 85 | w | | | | | | | | | | | w | |
| Callitriche heterophylla | twoheaded [different-leaved] water starwort | yes | OBL | 1 | y | 15 | 12 | | | | | | w | | | | | | | | | | | w | |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | 15 | | 35 | 1 | | 10 | 10 | w | 6 | 22 | 20 | 35 | 58 | 1 | | | 25 | 37 | w | 10 |
| Elodea canadensis | Canadian waterweed | yes | OBL | 1 | y | | | | | | | | w | | | | | | | | | | | w | 6 |
| Juncus effusus | soft rush | yes | FACW | 2 | y | | | | 8 | | | | w | 10 | | | | | | 95 | 58 | | | w | |
| Lemna minor | duckweed | yes | OBL | 1 | y | 5 | 2 | 30 | | 3 | 5 | 5 | w | 5 | 1 | 1 | 2 | 1 | 2 | 30 | 55 | 1 | 2 | w | 1 |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | | | | 7 | | 3 | | w | | | | | 1 | 1 | | 2 | 1 | | w | 90 |
| Myriophyllum hippuroides | western watermilfoil | yes | OBL | 1 | y | | | | | | 5 | | w | | | | 3 | | 12 | | | 2 | 15 | w | |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | 1 | | 17 | 30 | 45 | | 50 | w | | 12 | | | | | 10 | 15 | | | w | |
| Populus balsamifera ssp. trichocarpa | black cottonwood | yes | FAC | 3 | y | | | 5 | | | | 12 | w | | | | | | | | | | | w | |
| Ranunculus sceleratus | cursed [blister] [celery-leaved] buttercup/crowfoot | yes | OBL | 1 | y | | | | 2 | | | | w | | | | | | | | | | | w | |
| Salix hookeriana | Hooker willow | yes | FACW | 2 | y | | | | | | | | w | | | | | | 22 | | 25 | | | w | |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | | 9 | 15 | | | 12 | w | | 50 | | 1 | | | | 3 | | | w | |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | | | | | | | w | | | | | | | | 10 | | | w | |
| Sparganium emersum | European bur-reed | yes | OBL | 1 | y | 8 | 1 | | | | 5 | | w | 8 | | | 35 | | 2 | | | | | w | 3 |
| Spirodela polyrrhiza | common duckmeat | yes | OBL | 1 | y | | | | | | 1 | | w | | | | | | | | | | | w | |
| Typha latifolia | cattail | yes | OBL | 1 | y | | | 10 | | | | | w | | | | | | | | | | | w | |
| Wolffia borealis | northern watermeal | yes | OBL | 1 | y | | | | | | | | w | 3 | 7 | 3 | 5 | 2 | 6 | | 10 | 1 | 2 | w | 1 |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | | | | | | | | | | 10 | | | | | | | | | | |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | 60 | 85 | 12 | | | 75 | | | 85 | 30 | 77 | 25 | 38 | 62 | | 2 | 75 | 55 | | |
| standing water (inches) | | | | | | 18 | 20 | 10 | 12 | 14 | 18 | 8 | 36 | 12 | 20 | 30 | 26 | 20 | 18 | 3 | 24 | 32 | 24 | ? | 12 |

| Marion Mitigation Bank Plant Monitoring, 2012 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** |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | 50 | | | | 42 | | 68 | | | 10 |
| Alisma gramineum | narrowleaf water plantain | yes | OBL | 1 | y | | | | | | 1 | | | | |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | 5 | | 2 | | | 92 | 7 | 1 | | 4 |
| Anthemis cotula | mayweed chamomile/ stinking mayweed | | FACU | 4 | | 1 | | | | | | | | | |
| Azolla mexicana | mexican mosquito-fern [water-fern] | yes | OBL | 1 | y | | 1 | 1 | | | | | | | |
| Bromus hordeaceus ssp. hordeaceus | soft brome | | FACU | 4 | | | | | | | | | | 2 | |
| Bromus sterilis | barren brome | | NOL | 5 | u | 1 | | | 2 | | | | | | |
| Cerastium glomeratum | sticky chickweed | | UPL | 5 | | 2 | | | | 1 | | | | | 1 |
| Cirsium arvense | Canada thistle | invasive | FAC- | 3 | | | | | 1 | | | | | | |
| Daucus carota | wild carrot/ Queen Anne's lace | | NOL | 5 | u | 10 | | | | | | | | | |
| Eleocharis ovata | ovate spikerush | yes | OBL | 1 | y | | | | | | 1 | | | | |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | | | 2 | | | | | | | |
| Epilobium brachycarpum | tall annual willowherb | yes | UPL | 5 | | | | | | | | | | | 1 |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | 4 | | | | | | | 1 | 3 | 70 |
| Equisetum arvense | common [field] horsetail | yes | FAC | 3 | y | | | | | | | | 4 | | |
| Galium aparine | catchweed bedstraw/ cleavers | yes | FACU | 4 | | 2 | | | | | | | | 1 | |
| Geranium carolinianum | Carolina geranium | yes | NOL | 5 | u | 18 | | | | | | | | | |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | 2 | | | 28 | 38 | | 8 | 30 | 10 | 8 |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | 1 | | | | 8 | | | | | |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | | | | | | | 2 | | | |
| Lemna minor | duckweed | yes | OBL | 1 | y | | 12 | 18 | | | | | | | |
| Lolium perenne ssp. multiflorum | Italian ryegrass | | FAC | 3 | y | | | | 12 | | | 2 | | | |
| Lotus corniculatus | birdsfoot trefoil | | FAC | 3 | y | | | | | 3 | | | | | |
| Mentha pulegium | pennyroyal | | OBL | 1 | y | | | | | | 5 | 3 | | | |
| Myosotis discolor | yellow and blue forget-me-not | | FACW | 2 | y | | | | | 1 | | | | | |
| Myriophyllum hippuroides | western watermilfoil | yes | OBL | 1 | y | | 90 | 20 | | | | | | | |
| Parentucellia viscosa | parentucellia | | FAC- | 3 | | | | | 1 | 1 | | | | | |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | | | | 5 | | | 18 | |
| Poa compressa | Canada bluegrass | | FACU+ | 4 | | 5 | | | | | | | 1 | | |

| Marion Mitigation Bank Plant Monitoring, 2012 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** |
| Poa trivialis | rough [roughstalk] bluegrass | | FACW | 2 | y | | | | 20 | 27 | | 12 | 60 | 55 | 25 |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | | 7 | | | | | | | |
| Sonchus asper | prickly sow-thistle | | FAC- | 3 | | 1 | | | 1 | | | | | | |
| Trifolium dubium | small hop-clover | | UPL | 5 | | | | | 3 | | | 1 | | | |
| Trifolium repens | white clover | | FAC- | 3 | | 50 | | | 45 | 7 | | 22 | | | |
| Typha latifolia | cattail | yes | OBL | 1 | y | | 1 | | | | | | | | |
| Vicia pannonica | Hungarian vetch | | NOL | 5 | u | 4 | | | | | | 1 | | | |
| Vicia sativa | common vetch | | UPL | 5 | | 7 | | | 2 | 1 | | | | 1 | |
| Vicia tetrasperma | four-seeded vetch | | NOL | 5 | u | | | | | 1 | | | | | |
| Vicia villosa | winter [woolly] vetch | | NOL | 5 | u | | | | 3 | | | | | | |
| | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | | | 10 | | | 3 | 3 | 5 | | 2 |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | 3 | 5 | 40 | 3 | 15 | 3 | 3 | 10 | 12 | 2 |
| standing water (inches) | | | | | | | 28 | 18 | | | | | | | |

| Marion Mitigation Bank Plant Monitoring, 2011 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** | **O-EB** | **O-NB** |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | 52 | 20 | 38 | 17 | 8 | 55 | 75 | 85 | 25 |
| Alopecurus pratensis | meadow foxtail | | | | | | | | | 1 | |
| Anthemis cotula | mayweed chamomile/ stinking mayweed | | | 4 | 3 | | | | | | |
| Bromus hordeaceus ssp. hordeaceus | soft brome | | 1 | | 2 | | | | | | |
| Bromus sitchensis | Alaska brome | yes | 2 | 5 | 28 | 20 | 3 | 4 | | 2 | 3 |
| Daucus carota | wild carrot/ Queen Anne's lace | | 55 | | | 4 | 2 | | | | 2 |
| Elymus glaucus | blue wildrye | yes | 2 | 12 | 6 | 10 | 12 | | | 2 | |
| Epilobium brachycarpum | tall annual willowherb | yes | | | 1 | 2 | | | | | |
| Festuca rubra | red fescue | | 12 | 5 | 10 | 28 | 37 | | | | |
| Galium aparine | catchweed bedstraw/ cleavers | yes | | | 5 | 2 | | 2 | | | |
| Galium parisiense | creeping [wall] bedstraw | | | 2 | | | | | | | |
| Geranium carolinianum | Carolina geranium | yes | | 7 | 4 | | | | 1 | | |
| Geranium molle | dovefoot geranium | | | | | | | 1 | | | |
| Holcus lanatus | common velvetgrass | | 1 | | 3 | 5 | 3 | 65 | 10 | 1 | 25 |
| Hordeum brachyantherum | meadow barley | yes | | | | | | | 12 | | |
| Lactuca serriola | prickly lettuce | | 1 | 1 | 5 | 2 | | | | | |
| Leucanthemum vulgare | oxeye daisy | | 1 | | | | | | | | |
| Lolium arundinacea | tall fescue | | | | | | | | | 15 | 10 |
| Lolium perenne | perennial ryegrass | | | | 5 | | | | | | 10 |
| Parentucellia viscosa | parentucellia | | 1 | 3 | 9 | 5 | 2 | | 3 | | |
| Phalaris arundinacea | reed-canary grass | invasive | | | | 2 | 20 | | 7 | 1 | |
| Plantago lanceolata | buckhorn plantain | | | | | | | 8 | | | |
| Poa trivialis | rough [roughstalk] bluegrass | | | | | | | 3 | | | |
| Rubus discolor | Himalayan blackberry | invasive | | | 2 | | | | | | |
| Rumex acetosella | sheep [red] sorrel | | 1 | 20 | | 2 | 20 | | | | |
| Rumex crispus | curly dock | | 1 | 1 | | | | | | | |
| Rumex obtusifolius | broad-leaved dock | | | | | | | 8 | | | |
| Trifolium pratense | red clover | | 2 | | | | | | | | |
| Trifolium repens | white clover | | | | | | 13 | | | | |
| Vicia pannonica | Hungarian vetch | | 9 | 37 | 4 | 1 | 18 | | | | |
| Vitus vinifera | European grape | | | 22 | 27 | 65 | | | | | |
| Vulpia bromoides | barren fescue | | 12 | 3 | 3 | | 2 | | 15 | | 5 |
| | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | | 1 | | | | |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | 2 | | 2 | | 1 | | | | 7 |

Marion Mitigation Bank Cover Sheet 2011

| 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 (all habitats) | Yes (all habitats) | Yes (all habitats) |
| 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 |

# 2011 MONITORING REPORT
# for
# MARION MITIGATION BANK
# MARION, OR
# (Phases I, II & III)

This is the eleventh 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. Richard P. Novitzki and Maureen Stellrecht of R.P. 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 and June. Maureen Stellrecht cut and sprayed blackberry, reed canary grass, velvet grass, queen ann's lace, teasel, and scott's broom at different times during the year. Reed canary grass was sprayed heavily in Sept. and Oct. 2011 by a professional contract sprayer.

Phase I Phase II, and Phase III achieved and exceeded hydrology and vegetation performance standards in each habitat type. An aggressive weed management program, initiated in 2005 was continued through 2011. Reed canary grass was a primary focus of weed management efforts this year. Velvet grass, blackberry, scott's broom, Canadian 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 have been measured since April 2003. Shallow wells S8 through S11 have been measured since March 2005. Data from the shallow well measurements taken throughout 2011 are presented in Table 2.

Wells 7-13 are located in Phase I and of these, wells 7, 9, 11 and 13 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, S4,S5 and S7 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 in Phase I (10.06 acres) as well as the remedial area of Phase I are shown on Figure 2.

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 in Phase II (16.80 acres) is shown on Figure 3.

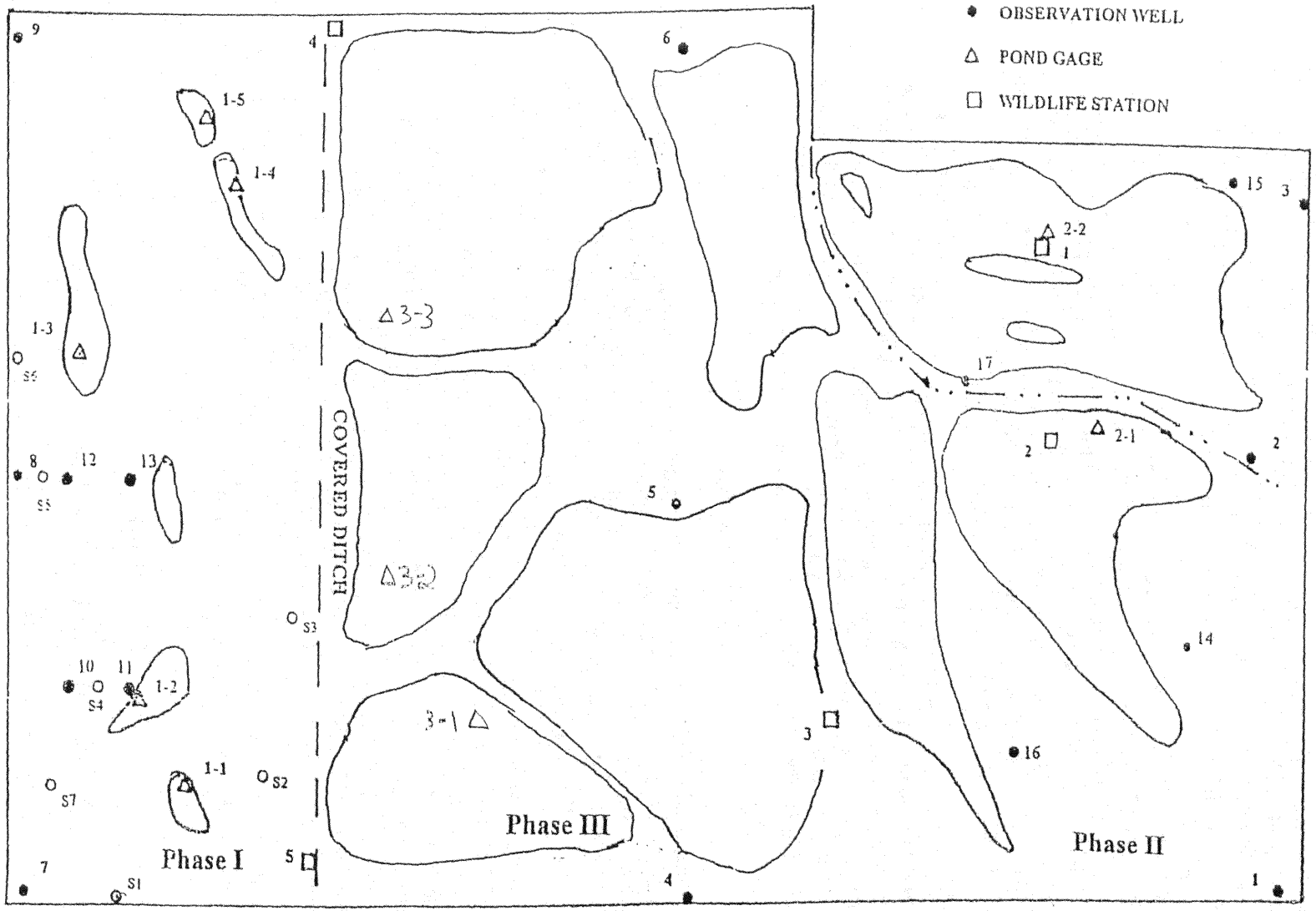


Figure 1. Sketch of the Marion Mitigation Bank site showing locations of observation wells, pond gages, and wildlife monitoring stations.

| | Observation Well Number | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** |
| **1/15/11** | 42 | 6 | 11 | 16 | 14 | +3 | 18 | 40 | 24 | 17 | 16 | 21 | 9 | 0 | 12 | 14 | 13 |
| **2/17/11** | 38 | 9 | 13 | 22 | 10 | +7 | 0 | 35 | 5 | 12 | 10 | 7 | 6 | 2 | 7 | 8 | 5 |
| **3/15/11** | 24 | 8 | 28 | 13 | 12 | +6 | 5 | 12 | 7 | 12 | 0 | 10 | +2 | +3 | 6 | 6 | 7 |
| **4/16/11** | 35 | 6 | 10 | 18 | 15 | 3 | 3 | 33 | 6 | 10 | 9 | 5 | 4 | 0 | 4 | 8 | +5 |
| **5/15/11** | 36 | 8 | 9 | 21 | 14 | 6 | 4 | 26 | 9 | 4 | 13 | 9 | 11 | 4 | 8 | 11 | +2 |
| **6/16/11** | 42 | 5 | 14 | 13 | 8 | 9 | 12 | 13 | 11 | 12 | 21 | 12 | 8 | 2 | 13 | 10 | 4 |
| **7/15/11** | 60 | 15 | 18 | 19 | 17 | 31 | 19 | 43 | 27 | 27 | 29 | 30 | 24 | 6 | 18 | 16 | 2 |
| **8/15/11** | 50 | 18 | 29 | 42 | 22 | 40 | 28 | 82 | 49 | 46 | 32 | 51 | 29 | 11 | 19 | 23 | 11 |
| **9/17/11** | 54 | 24 | 33 | 27 | 29 | 43 | 60 | 88 | 71 | 53 | 50 | 64 | 58 | 14 | 21 | 25 | 8 |
| **10/14/11** | 56 | 27 | 46 | 30 | 34 | 69 | 44 | 64 | 78 | 51 | 41 | 43 | 37 | 12 | 27 | 28 | 12 |
| **11/15/11** | 41 | 30 | 19 | 21 | 18 | 61 | 39 | 41 | 38 | 27 | 34 | 26 | 29 | 7 | 14 | 17 | 9 |
| **12/15/11** | 46 | 12 | 12 | 23 | 13 | 55 | 35 | 54 | 21 | 30 | 22 | 23 | 16 | 6 | 10 | 11 | +2 |

Table 1. Water levels in 2011 in observation wells at the Marion Mitigation Bank.

| | Shallow Well Number | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | S9 | S10 | S11 |
| | | | | | | | | | | | |
| 1/15/11 | 0 | 2 | 3 | 8 | 11 | 12 | 6 | 10 | 0 | 3 | 2 |
| 2/17/11 | 3 | 3 | 6 | 4 | 10 | 20 | 13 | 5 | 3 | 2 | 1 |
| 3/15/11 | 11 | 5 | 2 | 1 | 8 | 13 | 11 | 3 | 0 | 0 | +2 |
| 4/16/11 | 4 | 7 | 4 | 3 | 10 | 16 | 9 | +1 | 2 | 2 | 0 |
| 5/15/11 | 6 | 11 | 9 | 7 | 15 | _ | _ | 6 | 5 | 0 | 3 |
| 6/16/11 | _ | _ | _ | _ | 15 | _ | _ | 7 | 3 | 1 | 10 |
| 7/15/11 | _ | _ | _ | _ | _ | _ | _ | 12 | 8 | 7 | 13 |
| 8/15/11 | _ | _ | _ | _ | _ | _ | _ | 12 | 12 | 13 | _ |
| 9/17/11 | _ | _ | 23 | _ | _ | _ | _ | _ | _ | _ | _ |
| 10/14/11 | _ | 10 | 14 | _ | _ | 18 | _ | 11 | 6 | 11 | 9 |
| 11/15/11 | 13 | 11 | 16 | _ | 19 | 13 | 12 | 12 | 14 | 10 | 7 |
| 12/15/11 | 13 | 9 | 7 | _ | _ | _ | _ | 9 | 5 | 6 | 3 |

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 5 of these 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 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 five new ponds. Water levels for three of these ponds (3-1, 3-2, 3-3) has been collected since November 2008. The water level data are presented in Table 3.

**Table 3**. Depth of Water (in feet) in ponds in 2011 at the Marion Bank. Ponds (Figure 1) are identified by two digits: the first 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).

| Date | 1-1 | 1-2 | 1-3 | 1-4 | 1-5 | 2-1 | 2-2 | 3-1 | 3-2 | 3-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
| **1/15/11** | 1.1 | 2.3 | 1.1 | 3.12 | 2.62 | 1.98 | 2.3 | 1.74 | 2.12 | 2.1 |
| **2/17/11** | 0.9 | 2.42 | 2.1 | 2.64 | 2.7 | 2.52 | 2.48 | 1.6 | 1.78 | 2.22 |
| **3/15/11** | 1.42 | 2.94 | 2.5 | 2.14 | 2.2 | 2.84 | 2.6 | 1.8 | 2.32 | 2.34 |
| **4/16/11** | 1 | 2.54 | 2.54 | 2.74 | 2.84 | 1.53 | 1.7 | 1.7 | 3.1 | 2.5 |
| **5/15/11** | 0.98 | 2.35 | 2.48 | 2.56 | 2.64 | 1.3 | 1.45 | 1.69 | 2.3 | 2.05 |
| **6/16/11** | 0.9 | 2.04 | 2.34 | 2.18 | 2.12 | 1.2 | 1.52 | 1.54 | 1.72 | 2.1 |
| **7/15/11** | 0.64 | 1.5 | 2.14 | 2.22 | 1.42 | 0.88 | 1.22 | 1.38 | 1.46 | 1.78 |
| **8/15/11** | 0.36 | 0.8 | | | | 0 | 0.8 | | 0.24 | 0.97 |
| **9/17/11** | | | | | | 0.08 | 0.68 | | 0.78 | 0.65 |
| **10/14/11** | 0.7 | 0.9 | | 0 | | 1.96 | 1.84 | 0.54 | 1.32 | 0.82 |
| **11/15/11** | 0.52 | 0.86 | | 1.2 | 0.9 | 1.92 | 1.46 | 0.8 | 1.34 | 1.56 |
| **12/15/11** | 0.88 | 1.98 | 1.84 | 1.98 | 1.94 | 2.48 | 2.22 | 1.36 | 1.68 | 2 |

Precipitation was below average for much of the year (Table 4). Despite this precipitation pattern, the ponds contained water until mid-June. Ponds 2-1, 2-2, 3-2, and 3-3 contained water through out the year. The rest of the ponds began to refill in October and November. 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 2011 comfortably exceed performance standards.

**Table 4**. Monthly Precipitation in inches in 2009 at the National Weather Service Station in Salem, OR.

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | YEAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Observed | 3.25 | 4.31 | 7.16 | 4.15 | 3.40 | 0.98 | 0.74 | 0.11 | 0.35 | 2.15 | 5.96 | 3.32 | 35.88 |
| Normal | 5.92 | 4.50 | 4.17 | 2.42 | 1.88 | 1.34 | 0.56 | 0.76 | 1.55 | 2.99 | 6.28 | 6.98 | 39.16 |

(Based on 1960-1990 period)

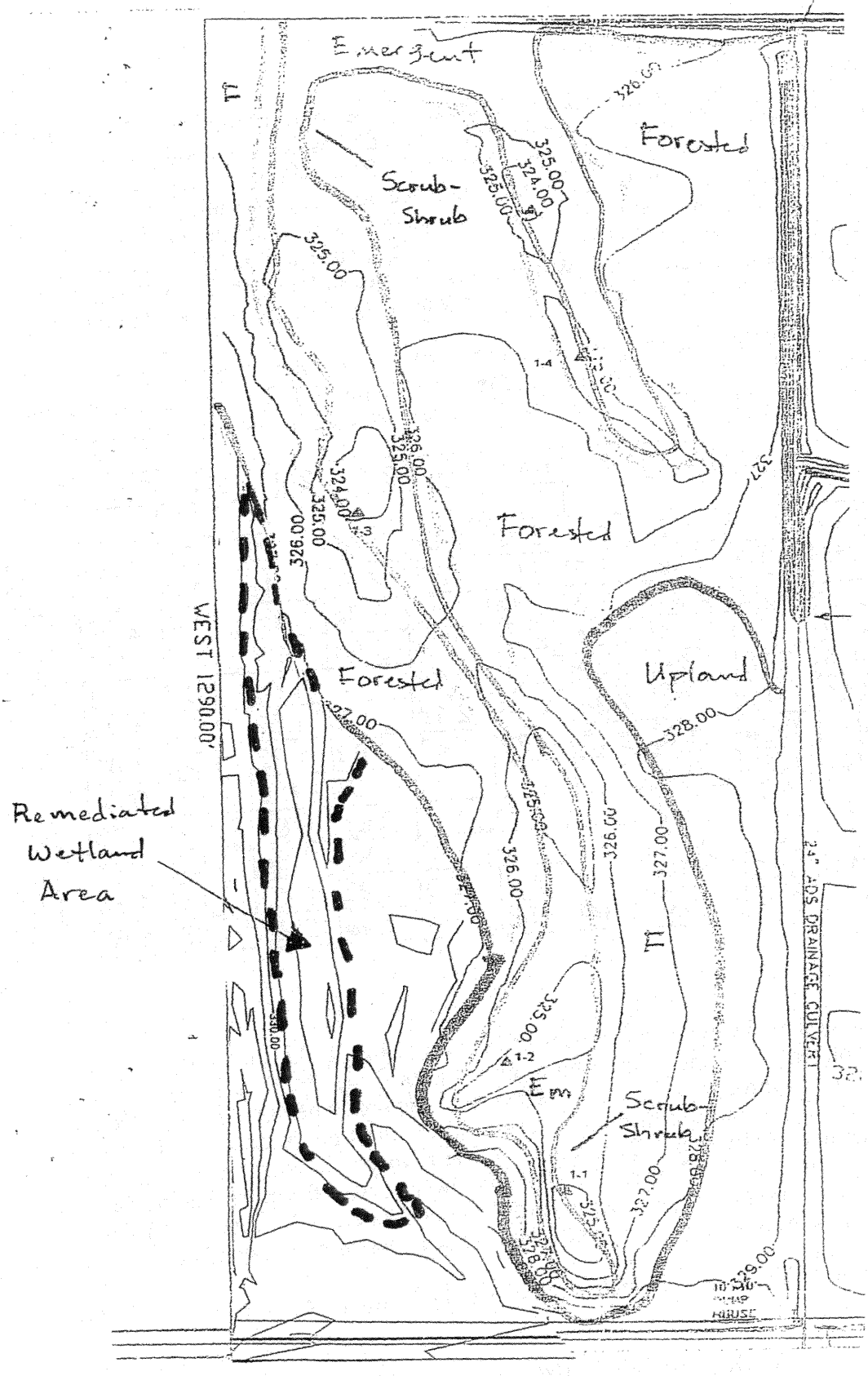


Figure 2. Phase I habitat boundaries resulting after construction and planting.

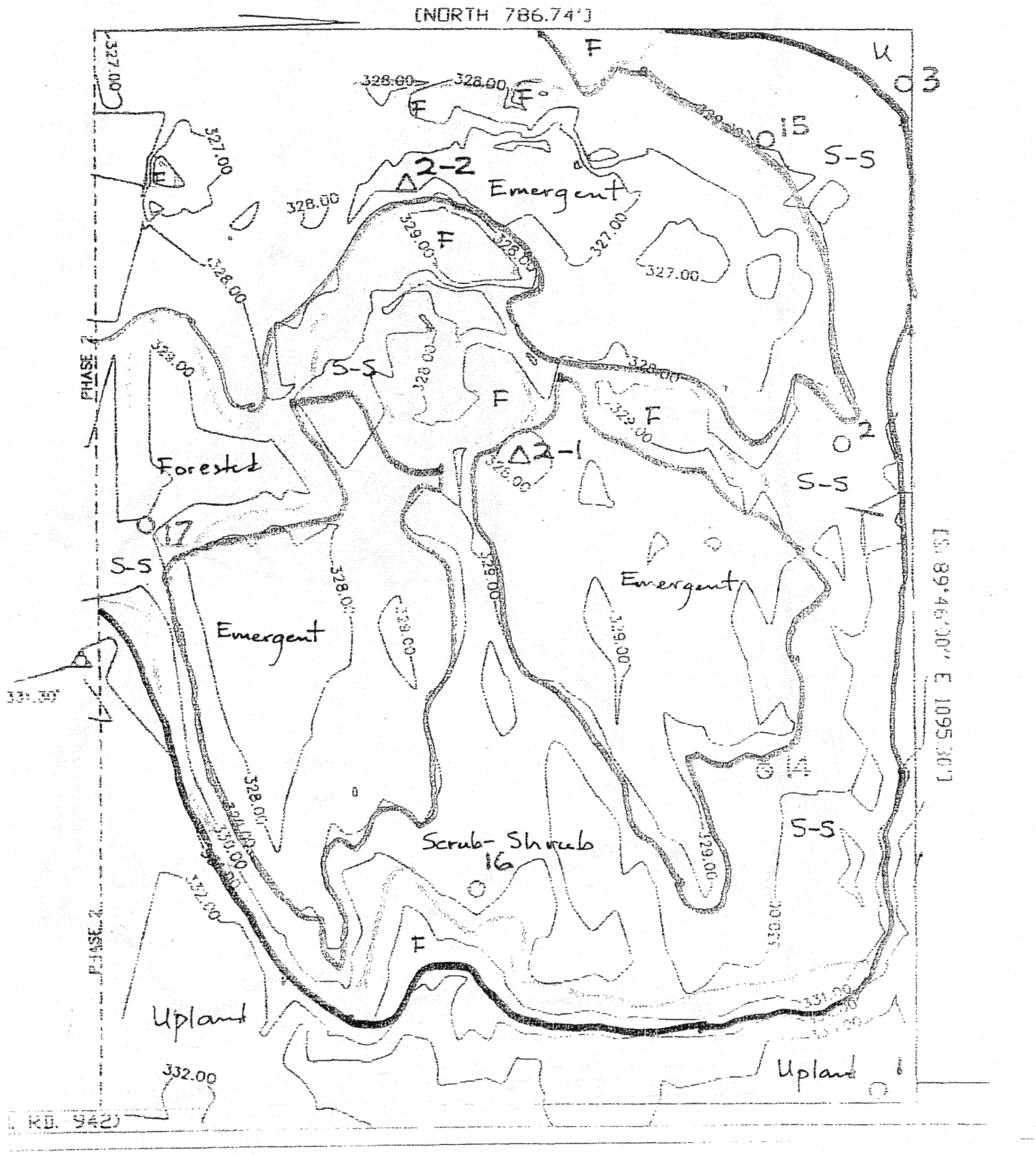


Figure 3. Phase II habitat boundaries resulting after construction and planting.

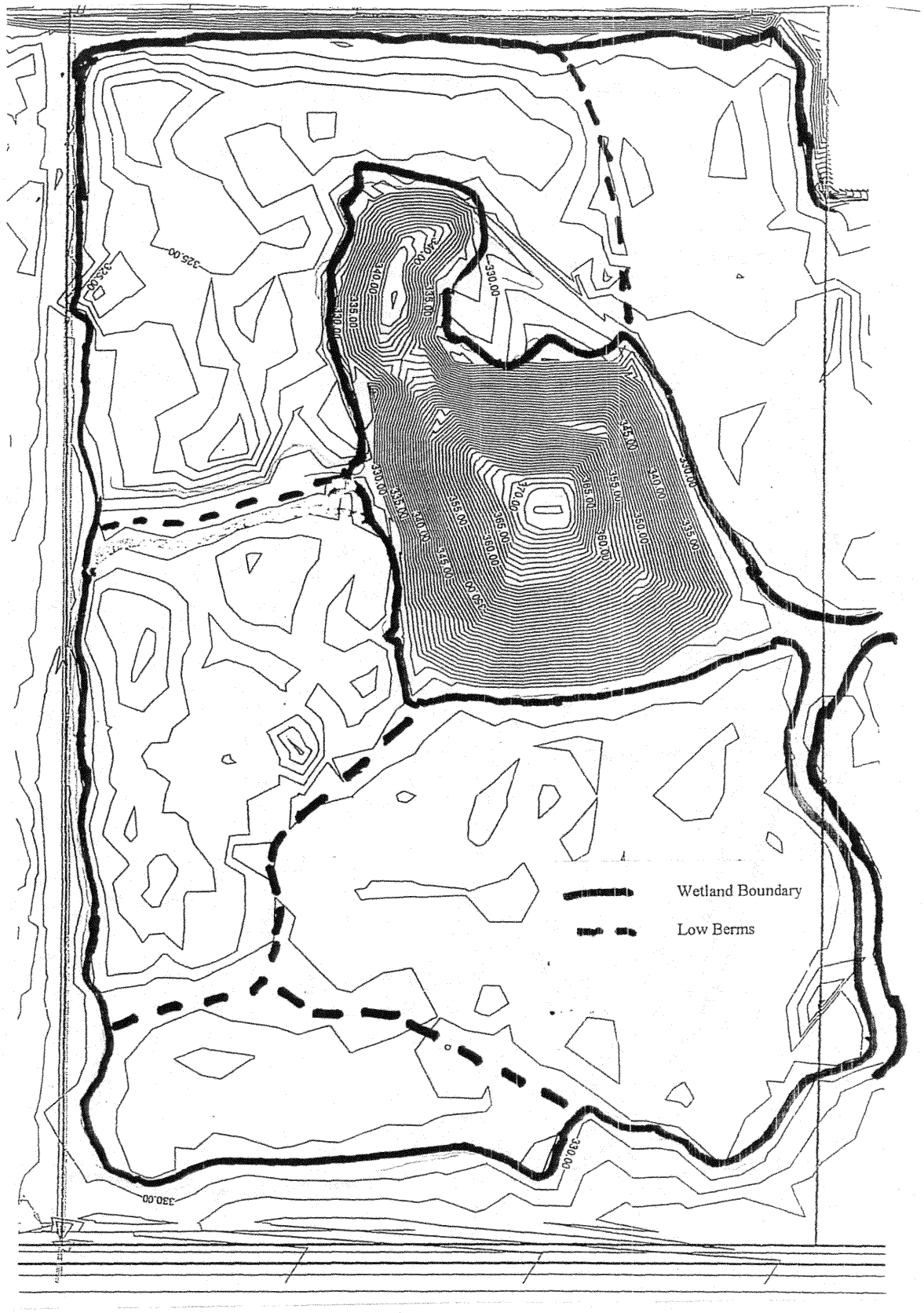


Figure 4. Approximate wetland boundary after construction. Boundary between emergent and scrub-shrub habitats will be defined as distinct plant communities develop.

## Vegetation Monitoring - Phase I

The plant community observed in 2011 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 have been marked with a tag or permanent identification in spring of 2010. Also, each sampling location will be located with GPS and documented for future management of the site. 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 - 99%; Scrub-shrub - 97%; and Forested - 77%. 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 2010, apparently responding to wetness that persisted throughout much of the year as well as continued management of blackberry and other undesirable species. 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 | 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Emergent | | 54 | 93 | 91 | 88 | 98 | 91 | 100 | 99 |
| Scrub/shrub | | 48 | 68 | 80 | 84 | 90 | 85 | 90 | 97 |
| Forested | | 27 | 49 | 57 | 58 | 72 | 75 | 63 | 77 |

We discussed with the MBRT 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 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 of many of the desirable grasses which were planted. Pictures 1 and 2 show the difference in appearance since the remedial plan was completed. In 2011, we planted a mix of spirea, alders, willows, and nootka rose, for a total of 1,000 trees and shrubs. We plan to make a survival count of these in spring 2012 and plant additional trees if needed.

**Picture 1**. Taken from southeast entrance (southeast corner of Phase 1) at Woodpecker Drive looking west- the oak tree is at the southwest corner of the bank site. The photo (taken October 22, 2008) shows the area before any remedial excavation was done.

**Picture 2**. Taken from south entrance at Woodpecker Drive looking west towards the same oak tree as is in picture 1. The photo was taken in December 2009. It shows good growth of planted species, as well as water ponding.

## Vegetation Monitoring - Phase II

The plant communities observed in each habitat in 2011 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 2011 the percentage of FAC or better cover in each habitat type was: Emergent - 100%; Scrub-shrub - 92%; and Forested - 77%. 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 | 2011 |
|---|---|---|---|---|---|---|---|---|
| Emergent | 83 | 70 | 88 | 90 | 96 | 98 | 99 | 100 |
| Scrub/shrub | 66 | 70 | 66 | 67 | 79 | 87 | 94 | 92 |
| Forested | 61 | 53 | 83 | 80 | 78 | 99 | 75 | 77 |

## Vegetation Monitoring- Phase III

Vegetation sampling in Phase III began in 2010. The majority of this phase (other that the hill upland) is emergent with open water, with scrub/ shrub habitat surrounding the ponds. Twenty emergent sampling stations were picked at random, and 10 scrub/ shrub plots and in the Oak Savanah. No forested plots were delineated at this time. The FAC and wetter species in each habitat were: Emergent- 100%, Scrub/ Shrub- 85%. The emergent habitat was dominated by soft rush (*Juncus effuses*), mexican mosquito-fern (*Azolla Mexicana*), common spike rush ( *Eleocharis palustris*), and duckweed (*Lema Minor*). All 20 stations had standing water at the time of sampling.

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

| Habitat | New 2010 | 2011 |
|---|---|---|
| Emergent | 100% | 100% |
| Scrub/ shrub | 74% | 85% |

## Summary

Emergent habitats (ponds) at the Marion Mitigation Bank site contained water through most of the year despite below normal precipitation. 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 99% FAC or wetter, the scrub-shrub habitat is 97%, and forested habitat is 77%. 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 MBRT.

In the Phase II restoration the emergent habitat is 100% FAC or wetter, the scrub-shrub habitat is 92%, and the forested habitat is 97%.

In the Phase III restoration, the emergent habitat is 100% FAC or wetter, and the scrub/ shrub habitat is 85% FAC or wetter.

We initiated an aggressive weed management plan in 2005 to focus on reed canary grass, velvet grass, Himalayan blackberry, oxeye daisy and other non-natives. This has greatly increased FAC or wetter values shown in all 3 phases of the bank. 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. We will continue to strive to exceed the performance standards established with the MBRT in the banking instrument in 2001.

Wildlife surveys were not conducted in 2011. The wildlife surveys have shown in previous years that the site is successful habitat for native wildlife. Now that construction is completed and the site begins to mature, it will undoubtedly attract more wildlife.

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-173 | 0 | 0 | 15 | 0 | 0 | 4 | 0 | 10 | 362 | 12 | 391 |
| S-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---2011

Date: 11-11-11 0.21 credit Mountain West Senior Housing, LLC

DSL Permit: ENF 2501 Impact Location: T8N, R3W. Sec 12, Tax Lot 2501

Credit Balance: 3.78

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# Marion Mitigation Bank Phase I Vegetation Monitoring - 2011

## Introduction, Summary, and Methods

This report summarizes vegetation assessment and monitoring conducted at the Marion Mitigation Bank (MMB) site on May 30th and June 4th and 12th, 2011. The following table presents a summary of the 2011 vegetation sampling results:

| MMB Phase 1 Habitats | Emergent | Scrub/Shrub | Forested |
|---|---|---|---|
| Percent FAC and better cover | 99 | 97 | 77 |
| Percent native cover | 56 | 41 | 51 |
| Percent non-vegetated (under canopy) | 22 | 15 | 27 |

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 2010. 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*, *Carex obnupta*, *Mentha pulegium*, *Salix sitchensis*, and *Ludwigia palustris*. FAC and better species made up 99% of the total cover. Native species accounted for about 56% of the total cover in this area. The moisture index for this habitat type was 1.53, and 22% of the area was not vegetated.

**Scrub/Shrub Habitat Type**

This habitat type was dominated by *Salix sitchensis*, *Mentha pulegium*, *Agrostis stolonifera*, *Carex obnupta*, and *Alopecurus geniculatus*. FAC and better species made up 97% of the total cover. Native species accounted for about 41% of the total cover in this area. The moisture index for this habitat type was 1.84, and 15% of the area was not vegetated.

**Forested Habitat Type**

This habitat type was dominated by *Deschampsia cespitosa*, *Agrostis castellana/capillaris*, *Salix sitchensis*, *Equisetum arvense*, and *Vulpia bromoides*. FAC and better species made up 77% of the total cover. Native species accounted for about 51% of the total cover in this area. The moisture index for this habitat type was 2.75, and 27% of the area was not vegetated.

| 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 |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | 5 | | 5 | 20 | 15 | 15 | 10 | 20 | 2 | | 9.2 |

| 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** |
| standing water (inches) | | | | | | 16 | 8 | 20 | 5 | 4 | 1 | 8 | | | | |
| | | | | | | | | | | | | | | | | |
| | | | Total cover: | | | 94 | 161 | 69 | 83 | 97 | 110 | 94 | 62 | 108 | 27 | 91 |
| | | | FAC and better cover: | | | 94 | 161 | 69 | 83 | 97 | 110 | 94 | 56 | 108 | 27 | 90 |
| | | | Native cover: | | | 67 | 160 | 24 | 78 | 53 | 44 | 51 | 17 | 2 | 8 | 50 |
| | | | | | | | | | | | | | | | | |
| | | | Percent FAC and better of total: | | | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 90 | 100 | 100 | 99 |
| | | | Percent native of total: | | | 71 | 99 | 35 | 94 | 55 | 40 | 54 | 27 | 2 | 30 | 56 |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | Moisture Index: | | 1.53 |

| 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 |
| Lotus corniculatus | birdsfoot trefoil | | FAC | 3 | y | 1 | | | | 40 | | | | | | | | | 3.2 |
| Lythrum portula | spatulaleaf loosestrife | | OBL | 1 | y | 10 | | | 30 | 1 | | | | | | | | | 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 |
| Lolium arundinacea | tall fescue | | FAC- | 3 | | | | | | | 3 | 4 | | | | | | | 0.5 |
| Plagiobothrys scouleri | Scouler's popcornflower | yes | FACW | 2 | y | 1 | | | 5 | 1 | | | | | | | | | 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 |
| 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 |
| 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 |

| Marion Mitigation Bank Plant Monitoring, 2011 Phase | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scrub-Shrub Habitat Type | | | | | | | | | | | | | | | | | | | | |
| Cover (%) | | | | | | | | | | | | | | | | | | | | |
| | | | | | | Sample Sta | | | | | | | | | | | | | | |
| **Species** | **Common Name** | **Native** | | **MTI** | **Wet** | **E-035** | **E** | | **E-109** | **E-123** | **F-** | | **S-020** | **S-021** | **S-040** | **S-046** | **S-058** | **S-155** | **Mean** |
| Vicia hirsuta | tiny vetch | | | 5 | u | | | | | | | 2 | | | | | | | 0.2 |
| Anthemis cotula | mayweed chamomile/ stinking mayweed | | | 4 | | | | | | | 1 | | | | | | | | 0.1 |
| Daucus carota | wild carrot/ Queen Anne's lace | | | 5 | | | | | | | | 1 | | | | | | | 0.1 |
| Epilobium brachycarpum | tall annual willow-herb | | | 5 | | | | | | | | 1 | | | | | | | 0.1 |
| Geranium carolinianum | Carolina geranium | | 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 |
| Veronica scutellata | marsh speedwell | yes | OBL | 1 | y | | | | | | | | | | | | | | 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 |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | 7 | 1 | 5 | 3 | 3 | | 6 | 10 | 7 | 5 | 27 | 10 | 12 | 7.4 |
| standing water (inches) | | | | | | | 8 | 4 | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | Total cover: | | | 105 | 107 | 121 | 115 | 101 | 204 | 127 | 120 | 169 | 73 | 75 | 82 | 100 | 115 |
| | | | FAC and better cover: | | | 93 | 107 | 121 | 114 | 99 | 199 | 97 | 120 | 169 | 73 | 75 | 82 | 98 | 111 |
| | | | Native cover: | | | 32 | 91 | 91 | 36 | 3 | 99 | 11 | 57 | 76 | 35 | 65 | 20 | 6 | 48 |
| | | | | | | | | | | | | | | | | | | | |
| | | | Percent FAC and better of total: | | | 89 | 100 | 100 | 99 | 98 | 98 | 76 | 100 | 100 | 100 | 100 | 100 | 98 | 97 |
| | | | Percent native of total: | | | 30 | 85 | 75 | 31 | 3 | 49 | 9 | 48 | 45 | 48 | 87 | 24 | 6 | 41 |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | Moisture Index: | 1.84 |

| 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 (~canopy) | 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 |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | | | | | 2 | 2 | 1 | 1 | | 3 | 4 | 5 | 1.5 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | 1 | | | | 2 | 9 | | | | | | 6 | 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 |
| Holcus mollis | creeping velvetgrass | | FACU | 4 | | | | | | | | 8 | | | | | | 0.7 |
| Poa trivialis | rough [roughstalk] bluegrass | | FACW | 2 | y | | | | | | | 7 | | | 1 | | | 0.7 |
| Carex leptopoda | Dewey's sedge | yes | FAC | 3 | y | | 5 | 2 | | | | | | | | | | 0.6 |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | 7 | | | | | | | | | | | 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 |
| 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 |
| Myosotis discolor | yellow and blue forget-me-not | | FACW | 2 | y | | | | | | | 1 | 1 | 2 | 1 | | | 0.4 |
| Aira caryophyllea | silver hairgrass | | FACU | 4 | | | | | | | | 2 | 2 | | | | | 0.3 |
| Lythrum hyssopifolia | hyssop loosestrife | | OBL | 1 | y | | | | | | | | | | | 4 | | 0.3 |
| Trifolium hybridum | alsike [hybrid] clover | | FAC | 3 | y | | | | | | | 4 | | | | | | 0.3 |
| Typha latifolia | cattail | yes | OBL | 1 | y | | 2 | 2 | | | | | | | | | | 0.3 |
| Centaurium erythraea | European centaury | | FAC | 3 | y | | | | | | | | 1 | | 2 | | | 0.3 |
| Lotus corniculatus | birdsfoot trefoil | | FAC | 3 | y | | | | | | 3 | | | | | | | 0.3 |
| Vicia sativa | common vetch | | UPL | 5 | | 1 | | | 1 | | | | | | | | 1 | 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 |
| Galium aparine | catchweed bedstraw/ cleavers | yes | FACU | 4 | | | | | | | | | | 2 | | | | 0.2 |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | 1 | | | | 1 | | | | | | | | 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 |
| 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 bufonius | toad rush | yes | FACW | 2 | y | | | | | | | | | | | 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 |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | 8 | 70 | 58 | 60 | 5 | 18 | 7 | 10 | | 15 | 7 | 12 | 22.5 |
| standing water (inches) | | | | | | 1 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | Total cover: | | | 89 | 127 | 82 | 34 | 78 | 80 | 141 | 152 | 131 | 81 | 93 | 100 | 99 |
| | | | FAC and better cover: | | | 88 | 127 | 82 | 20 | 71 | 78 | 53 | 61 | 106 | 56 | 88 | 85 | 76 |
| | | | Native cover: | | | 73 | 126 | 82 | 1 | 67 | 62 | 1 | 0 | 97 | 22 | 57 | 16 | 50 |
| | | | | | | | | | | | | | | | | | | |
| | | | Percent FAC and better of total: | | | 99 | 100 | 100 | 59 | 91 | 98 | 38 | 40 | 81 | 69 | 95 | 85 | 77 |
| | | | Percent native of total: | | | 82 | 99 | 100 | 3 | 86 | 78 | 1 | 0 | 74 | 27 | 61 | 16 | 51 |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | Moisture Index: | 2.75 |

# Marion Mitigation Bank Plant Monitoring, 2011 Phase 1

| | | Percent FAC and better | | | | | | | Percent native | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Habitat | Station | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
| E | E-003 | 86 | 100 | 100 | 100 | 100 | 100 | 100 | 85 | 89 | 56 | 80 | 95 | 55 | 71 |
| E | E-053 | 80 | 60 | 100 | 100 | 100 | 100 | 100 | 64 | 84 | 98 | 99 | 98 | 99 | 99 |
| E | E-066 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 43 | 48 | 50 | 56 | 29 | 52 | 35 |
| E | E-079 | 100 | 100 | 99 | 99 | 100 | 100 | 100 | 32 | 47 | 86 | 97 | 94 | 97 | 94 |
| E | E-080 | 100 | 100 | 96 | 99 | 100 | 99 | 100 | 39 | 60 | 78 | 82 | 72 | 69 | 55 |
| E | EN-008 | M | 100 | 58 | 100 | 100 | 100 | 100 | M | 82 | 31 | 76 | 61 | 41 | 40 |
| E | EN-052 | M | 100 | 68 | 100 | 100 | 100 | 100 | M | 98 | 64 | 83 | 69 | 58 | 54 |
| E | EN-070 | M | 82 | 99 | 90 | 36 | 99 | 90 | M | 48 | 90 | 68 | 27 | 14 | 27 |
| E | EN-076 | M | 87 | 100 | 100 | R | 100 | 100 | M | 48 | 95 | 23 | R | 8 | 2 |
| E | S-116 | 100 | 87 | 56 | 100 | 100 | 100 | 100 | 94 | 12 | 36 | 77 | 40 | 76 | 30 |
| F | E-082 | M | 90 | 86 | 91 | 98 | 93 | 99 | M | 63 | 57 | 72 | 68 | 73 | 82 |
| F | F-033 | 87 | 95 | 81 | 97 | 99 | 100 | 100 | 12 | 75 | 72 | 95 | 97 | 98 | 99 |
| F | F-034 | 81 | 87 | 93 | 100 | 98 | 98 | 100 | 42 | 91 | 90 | 98 | 98 | 98 | 100 |
| F | F-071 | 33 | 44 | 18 | 54 | S | 35 | 59 | 1 | 1 | 0 | 1 | S | 0 | 3 |
| F | F-096 | 53 | 50 | 67 | 55 | 63 | 59 | 91 | 14 | 26 | 28 | 29 | 43 | 55 | 86 |
| F | F-097 | 76 | 73 | 72 | 84 | 74 | 84 | 98 | 44 | 57 | 50 | 61 | 68 | 73 | 78 |
| F | F-103 | 38 | 59 | 62 | 95 | R | 22 | 38 | 1 | 1 | 0 | 0 | R | 2 | 1 |
| F | F-144 | 9 | 16 | 40 | 21 | R | 31 | 40 | 3 | 1 | 1 | 3 | R | 2 | 0 |
| F | F-149 | 77 | 65 | 63 | 61 | R | 45 | 81 | 42 | 62 | 11 | 54 | R | 50 | 74 |
| F | F-205 | 47 | 58 | 56 | 74 | 57 | 76 | 69 | 6 | 7 | 7 | 10 | 11 | 17 | 27 |
| F | S-056 | 13 | 69 | 68 | 88 | 72 | 84 | 95 | 0 | 18 | 29 | 27 | 31 | 62 | 61 |
| F | S-119 | 77 | 42 | 46 | 65 | 50 | 78 | 85 | 11 | 15 | 5 | 8 | 7 | 8 | 16 |
| S | E-035 | 26* | 82 | 94 | 97 | 75 | 79 | 89 | 4 | 17 | 70 | 12 | 29 | 11 | 30 |
| S | E-052 | 100 | 98 | 100 | 100 | 89 | 100 | 100 | 61 | 22 | 83 | 73 | 81 | 79 | 85 |
| S | E-086 | 100 | 100 | 99 | 100 | 100 | 100 | 100 | 56 | 66 | 72 | 48 | 53 | 71 | 75 |
| S | E-109 | 100 | 86 | 99 | 99 | 90 | 93 | 99 | 33 | 16 | 39 | 43 | 52 | 37 | 31 |
| S | E-123 | 71 | 96 | 70 | 97 | 93 | 81 | 98 | 60 | 57 | 36 | 20 | 21 | 17 | 3 |
| S | F-009 | ***21*** | ***39*** | 95 | 95 | 97 | 99 | 98 | 3 | 14 | 39 | 47 | 53 | 48 | 49 |
| S | S-011 | 45 | 27 | 12 | 17 | 7 | 41 | 76 | 10 | 2 | 4 | 0 | 3 | 2 | 9 |
| S | S-020 | 80 | 90 | 99 | 100 | 100 | 100 | 100 | 88 | 47 | 81 | 65 | 83 | 31 | 48 |
| S | S-021 | 100 | 99 | 92 | 97 | 99 | 100 | 100 | 28 | 43 | 59 | 46 | 31 | 48 | 45 |
| S | S-040 | 100 | 98 | 99 | 100 | 100 | 100 | 100 | 42 | 42 | 81 | 59 | 50 | 53 | 48 |
| S | S-046 | 84 | 94 | 100 | 100 | 100 | 100 | 100 | 65 | 41 | 80 | 83 | 94 | 92 | 87 |
| S | S-058 | 68 | 97 | 89 | 100 | 100 | 100 | 100 | 59 | 20 | 78 | 34 | 76 | 51 | 24 |
| S | S-155 | M | 99 | 87 | 96 | 98 | 90 | 98 | M | 66 | 57 | 41 | 67 | 15 | 6 |
| | Means: | 71 | 79 | 79 | 88 | 86 | 85 | 91 | 36 | 42 | 52 | 51 | 57 | 48 | 48 |

*location error?  M = missing data  R = remediated  S = sprayed

***difference in part due to Salix sp. (NOL) vs. S. sitchensis (FACW)***

# Marion Mitigation Bank Phase II Vegetation Monitoring - 2011

## Introduction, Summary, and Methods

This report summarizes vegetation assessment and monitoring conducted at the Marion Mitigation Bank (MMB) site on June 7th, 11th, and 12th, and July 7th, 2011. The following table presents a summary of the 2011 vegetation sampling results:

| MMB Phase 2 Habitats | Emergent | Scrub/Shrub | Forested |
|---|---|---|---|
| Percent FAC and better cover | 100 | 92 | 77 |
| Percent native cover | 73 | 81 | 61 |
| Percent non-vegetated (under canopy) | 30 | 46 | 34 |

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 2010.

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*, *Azolla mexicana*, and *Phalaris arundinacea*. FAC and better species made up 100% 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 1.63 and bare ground accounted for 30% of the area.

**Scrub/Shrub Habitat Type**

This habitat type was dominated by *Salix sitchensis*, *Juncus effusus*, *Salix lucida* ssp. *lasiandra*, *Eleocharis palustris*, *Alnus rhombifolia*, *Equisetum arvense*, and *Salix hookeriana*. The *Alnus* and *Salix lucida* were only in one quadrat each. FAC and better species made up 92% of the total cover. Native species accounted for about 81% of the total cover in this area. The moisture index for this habitat type was 2.21 and bare ground accounted for 46% of the area.

**Forested Habitat Type**

This habitat type was dominated by *Alnus rhombifolia*, *Eleocharis palustris*, *Elodea canadensis*, *Holcus mollis*, *Poa trivialis*, and *Spiraea douglasii*. The *Elodea* and *Holcus* were each in only one quadrat. FAC and better species made up 77% of the total cover. Native species accounted for about 61% of the total cover in this area. The moisture index for this habitat type was 2.21 and bare ground accounted for 34% of the area.

| 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 | | 12 | | 20 | | 85 | 25 | 8 | | 62 | 21.2 |
| Polygonum persicaria | spotted ladysthumb | | FACW | 2 | y | 50 | 7 | 10 | 6 | | | 1 | 5 | 80 | 1 | 16.0 |
| Lemna minor | duckweed | yes | OBL | 1 | y | 50 | 5 | 1 | 20 | | | 5 | 20 | 5 | 15 | 12.1 |
| Azolla mexicana | mexican mosquito-fern [water-fern] | yes | OBL | 1 | y | 1 | 1 | | | | 10 | 88 | | | | 10.0 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | 1 | 1 | | 1 | | | 1 | | | 55 | 5.9 |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | | | | | 5 | 20 | 30 | | | 5.5 |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | 10 | | | 10 | | | 1 | 10 | 20 | | 5.1 |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | | | 1 | 20 | | | | 18 | 3.9 |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | 5 | | 25 | | | | | | 5 | | 3.5 |
| Sparganium angustifolium | simplestem bur-reed | yes | OBL | 1 | y | 2 | 18 | 10 | | | | | | 1 | | 3.1 |
| Potamogeton sp. | pondweed | NA | OBL | 1 | y | | 15 | 10 | | | | | | | | 2.5 |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | | | | 1 | | | 20 | | 2 | 2.3 |
| Salix hookeriana | Hooker willow | yes | FACW | 2 | y | | | | | | 20 | | | | | 2.0 |
| Alnus rhombifolia (canopy) | white alder | yes | FACW | 2 | y | | | | | | | | | | 10 | 1.0 |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | | | | | 8 | 1 | | | | | 0.9 |
| Juncus bufonius | toad rush | yes | FACW | 2 | y | | | | | 5 | | | | | | 0.5 |
| Alisma plantago-aquatica | American water-plantain | yes | OBL | 1 | y | | | | | | | 1 | | | | 0.1 |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | | 1 | | | | | | | | | 0.1 |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | | | | | 1 | | | | | | 0.1 |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | | | | | 1 | | | | | | 0.1 |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | | | | | 1 | | | | | | 0.1 |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | | | | | 1 | | | | | | 0.1 |
| Trifolium repens | white clover | | FAC- | 3 | | | | | | 1 | | | | | | 0.1 |
| | | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | | | | | 55 | 3 | | 20 | | 1 | 7.9 |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | 5 | 40 | 43 | 45 | 25 | 12 | 1 | 40 | 1 | 5 | 21.7 |
| standing water (inches) | | | | | | 20 | 8 | 10 | 8 | 1 | 5 | 20 | 24 | 14 | 4 | |
| | | | | | | | | | | | | | | | | |
| | | Total cover: | | | | 119 | 60 | 56 | 57 | 20 | 141 | 142 | 93 | 111 | 163 | 96 |
| | | FAC and better cover: | | | | 119 | 60 | 56 | 57 | 18 | 141 | 142 | 93 | 111 | 163 | 96 |
| | | Native cover: | | | | 68 | 36 | 36 | 50 | 10 | 140 | 140 | 88 | 31 | 107 | 71 |
| | | | | | | | | | | | | | | | | |
| | | Percent FAC and better of total: | | | | 100 | 100 | 100 | 100 | 90 | 100 | 100 | 100 | 100 | 100 | 100 |
| | | Percent native of total: | | | | 57 | 60 | 64 | 88 | 50 | 99 | 99 | 95 | 28 | 66 | 73 |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | Moisture Index: | 1.63 |

| 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 (~canopy) | Sitka willow | yes | FACW | 2 | y | | 75 | 1 | | 98 | | 95 | | | | 26.9 |
| Juncus effusus | soft rush | yes | FACW | 2 | y | 2 | 20 | 68 | | | 65 | | | | 25 | 18.0 |
| Salix lucida ssp. lasiandra (~canopy) | Pacific [red] willow | yes | FACW+ | 2 | y | | | | 98 | | | | | | | 9.8 |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | | | | | | 2 | | | 80 | | 8.2 |
| Alnus rhombifolia (canopy) | white alder | yes | FACW | 2 | y | | | | | | | | | | 80 | 8.0 |
| Equisetum arvense | common [field] horsetail | yes | FAC | 3 | y | 52 | | | | 3 | | | | | 25 | 8.0 |
| Salix hookeriana | Hooker willow | yes | FACW | 2 | y | | | | | | | | 80 | | | 8.0 |
| Rubus discolor | Himalayan blackberry | invasive | FACU | 4 | | | 12 | | 65 | | | | 2 | | | 7.9 |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | 15 | | | | | | 15 | 28 | | | 5.8 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | | 1 | 15 | 8 | | | | 7 | 3.1 |
| Poa trivialis | rough [roughstalk] bluegrass | | FACW | 2 | y | | | | | | | | | | 20 | 2.0 |
| Lotus corniculatus | birdsfoot trefoil | | FAC | 3 | y | | | | | | | 18 | | | 1 | 1.9 |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | 12 | | | | | | 1 | | | | 1.3 |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | 10 | | | | | | | | | | 1.0 |
| Azolla mexicana | mexican mosquito-fern [water-fern] | yes | OBL | 1 | y | | | 9 | | | | | | | | 0.9 |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | 4 | 1 | | | | 2 | | | | 2 | 0.9 |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | | | | | | | 1 | 3 | | | 0.4 |
| Fraxinus latifolia | Oregon ash | yes | FACW | 2 | y | | | 3 | | | | 1 | | | | 0.4 |
| Veronica americana | American speedwell | yes | OBL | 1 | y | | | 2 | | | | | | | 2 | 0.4 |
| Lemna minor | duckweed | yes | OBL | 1 | y | | | 1 | | | 1 | | | 1 | | 0.3 |
| Alisma plantago-aquatica | American water-plantain | yes | OBL | 1 | y | | | 2 | | | | | | | | 0.2 |
| Lolium arundinacea | tall fescue | | FAC- | 3 | | | | | | | | | 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 |
| Convolvulus arvensis | field bindweed | | NOL | 5 | u | | | | | | | 1 | | | | 0.1 |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | | | | | | | | 1 | | | 0.1 |
| Juncus ensifolius | dagger-leaf rush | yes | FACW | 2 | y | | 1 | | | | | | | | | 0.1 |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | | | 1 | | | | | | | | 0.1 |
| Myosotis laxa | small-flowered forget-me-not | yes | OBL | 1 | y | | | 1 | | | | | | | | 0.1 |
| Plantago lanceolata | buckhorn plantain | | FACU+ | 4 | | | | | | | | | 1 | | | 0.1 |
| Rumex acetosella | sheep [red] sorrel | | FACU+ | 4 | | | | | | | | | 1 | | | 0.1 |
| Senecio jacobaea | tansy ragwort | invasive | FACU | 4 | | | | | | | | | 1 | | | 0.1 |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | | 1 | | | | | | | | 0.1 |
| Trifolium pratense | red clover | | FACU | 4 | | | | | | | | | 1 | | | 0.1 |
| Vicia pannonica | Hungarian vetch | | NOL | 5 | u | | | | | | | | 1 | | | 0.1 |

| 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** |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | | 1 | | 5 | | | 5 | | 20 | | 3.1 |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | 6 | 65 | 20 | 94 | 82 | 25 | 65 | 55 | | 20 | 43.2 |
| standing water (inches) | | | | | | | trace | 6 | | 2 | 2 | | | 36 | 1 | |
| | | | Total cover: | | | 95 | 109 | 90 | 164 | 116 | 78 | 132 | 123 | 81 | 162 | 115 |
| | | | FAC and better cover: | | | 95 | 97 | 90 | 99 | 116 | 78 | 131 | 111 | 81 | 162 | 106 |
| | | | Native cover: | | | 80 | 97 | 90 | 98 | 101 | 70 | 97 | 80 | 81 | 134 | 93 |
| | | | Percent FAC and better of total: | | | 100 | 89 | 100 | 60 | 100 | 100 | 99 | 90 | 100 | 100 | 92 |
| | | | Percent native of total: | | | 84 | 89 | 100 | 60 | 87 | 90 | 73 | 65 | 100 | 83 | 81 |
| | | | | | | | | | | | | | | | Moisture Index: | 2.21 |

| 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 | 14.4 |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | 6 | 66 | | 30 | | | | | | | 10.2 |
| Elodea canadensis | Canadian waterweed | yes | OBL | 1 | y | | | | | | 85 | | | | | 8.5 |
| Holcus mollis | creeping velvetgrass | | FACU | 4 | | | | | | | | | | 85 | | 8.5 |
| Poa trivialis | rough [roughstalk] bluegrass | | FACW | 2 | y | | | 1 | | | | | | | 75 | 7.6 |
| Spiraea douglasii | Douglas' spiraea | yes | FACW | 2 | y | | | | 75 | | | | | 1 | | 7.6 |
| Azolla mexicana | mexican mosquito-fern [water-fern] | yes | OBL | 1 | y | | 70 | | | | | | | | | 7.0 |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | | | | | | | 35 | 25 | | 4 | 6.4 |
| Trifolium pratense | red clover | | FACU | 4 | | | | | | | | 47 | | | | 4.7 |
| Salix sitchensis | Sitka willow | yes | FACW | 2 | y | | | | 20 | 18 | | | | 3 | | 4.1 |
| Trifolium repens | white clover | | FAC- | 3 | | | | | | | | 5 | 30 | | | 3.5 |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | | | | | | | | 1 | | 30 | 3.1 |
| Rubus discolor | Himalayan blackberry | invasive | FACU | 4 | | | | 18 | 5 | | | | | | | 2.3 |
| Typha latifolia | cattail | yes | OBL | 1 | y | | 23 | | | | | | | | | 2.3 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | 4 | 15 | | 1 | | | | | 2.0 |
| Lemna minor | duckweed | yes | OBL | 1 | y | | 4 | 2 | 2 | 1 | 9 | | | | | 1.8 |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | 1 | | 15 | | | | | | | 1.6 |
| Vulpia bromoides | barren fescue | | UPL | 5 | | | | | | | | 15 | | | | 1.5 |
| Carex stipata | awl-fruited sedge | yes | OBL | 1 | y | | | 10 | | | | | | | | 1.0 |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | | 8 | | | | | | | | | 0.8 |
| Bromus hordeaceus ssp. hordeaceus | soft brome | | FACU | 4 | | | | | | | | 7 | | | | 0.7 |
| Equisetum arvense | common [field] horsetail | yes | FAC | 3 | y | | | 7 | | | | | | | | 0.7 |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | | 6 | | | | | | | | | 0.6 |
| Sparganium angustifolium | simplestem bur-reed | yes | OBL | 1 | y | 6 | | | | | | | | | | 0.6 |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | | | | | | | 2 | 3 | | | 0.5 |
| Alisma plantago-aquatica | American water-plantain | yes | OBL | 1 | y | | 4 | | | | | | | | | 0.4 |
| Daucus carota | wild carrot/ Queen Anne's lace | | NOL | 5 | u | | | | | | | 3 | 1 | | | 0.4 |
| Plantago lanceolata | buckhorn plantain | | FACU+ | 4 | | | | | | | | 1 | 1 | 2 | | 0.4 |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | | | | | | | 1 | 2 | | | 0.3 |
| Polygonum persicaria | spotted ladysthumb | | FACW | 2 | y | | | | 1 | | 2 | | | | | 0.3 |
| Rumex acetosella | sheep [red] sorrel | | FACU+ | 4 | | | | | | | | 2 | 1 | | | 0.3 |
| Vicia hirsuta | tiny vetch | | NOL | 5 | u | | | | | | | | | 3 | | 0.3 |
| Vicia sativa | common vetch | | UPL | 5 | | | | | | | | | | 3 | | 0.3 |

| 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** |
| Deschampsia elongata | slender hairgrass | | FACW- | 2 | y | | | | | | | 2 | | | | 0.2 |
| Galium aparine | catchweed bedstraw/ cleavers | yes | FACU | 4 | | | | | | | | | | 2 | | 0.2 |
| Leucanthemum vulgare | oxeye daisy | | UPL | 5 | | | | | | | | 1 | 1 | | | 0.2 |
| Cerastium glomeratum | sticky chickweed | | UPL | 5 | | | | | | | | 1 | | | | 0.1 |
| Crepis capillaris | smooth hawksbeard | | FACU | 4 | | | | | | | | 1 | | | | 0.1 |
| Deschampsia cespitosa | tufted hairgrass | yes | FACW | 2 | y | | | | | | | | 1 | | | 0.1 |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | | | | | | | | | | 1 | 0.1 |
| Mentha pulegium | pennyroyal | | OBL | 1 | y | | 1 | | | | | | | | | 0.1 |
| Myosotis discolor | yellow and blue forget-me-not | | FACW | 2 | y | | | | | | | 1 | | | | 0.1 |
| Parentucellia viscosa | parentucellia | | FAC- | 3 | | | | | | | | 1 | | | | 0.1 |
| Ranunculus repens | creeping buttercup | | FACW | 2 | y | | | 1 | | | | | | | | 0.1 |
| Senecio jacobaea | tansy ragwort | invasive | FACU | 4 | | | | | | | | | 1 | | | 0.1 |
| Solanum dulcamara | bittersweet nightshade | | FAC+ | 3 | y | | | | | 1 | | | | | | 0.1 |
| Verbascum blattaria | moth mullein | | UPL | 5 | | | | | | | | 1 | | | | 0.1 |
| | | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 88 | | | | | 5 | 2 | 25 | | | 12.0 |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | | 13 | 60 | 5 | 98 | 10 | 5 | 12 | 15 | 3 | 22.1 |
| standing water (inches) | | | | | | 36 | 6 | 1 | 8 | 10 | 12 | | | | | |
| | | | | | | | | | | | | | | | | |
| | | Total cover: | | | | 12 | 183 | 142 | 163 | 20 | 97 | 126 | 67 | 99 | 155 | 106 |
| | | FAC and better cover: | | | | 12 | 183 | 124 | 158 | 20 | 97 | 40 | 30 | 4 | 155 | 82 |
| | | Native cover: | | | | 12 | 176 | 118 | 142 | 19 | 94 | 0 | 2 | 6 | 76 | 65 |
| | | | | | | | | | | | | | | | | |
| | Percent FAC and better of total: | | | | | 100 | 100 | 87 | 97 | 100 | 100 | 32 | 45 | 4 | 100 | 77 |
| | Percent native of total: | | | | | 100 | 96 | 83 | 87 | 95 | 97 | 0 | 3 | 6 | 49 | 61 |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | Moisture Index: | | 2.21 |

## Marion Mitigation Bank Plant Monitoring, 2011 Phase 2

| | | Percent FAC and better | | | | | | | Percent native | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Habitat** | **Station** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** |
| E | E-020 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 40 | 90 | 56 | 39 | 29 | 44 | 57 |
| E | E-143 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 19 | 100 | 95 | 95 | 94 | 92 | 60 |
| E | E-160 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 52 | 89 | 98 | 95 | 95 | 81 | 64 |
| E | E-162 | 100 | 99 | 100 | 100 | 100 | 100 | 100 | 88 | 98 | 88 | 92 | 66 | 72 | 88 |
| E | F-083 | 15 | 38 | 34 | 64 | 72 | 85 | 90 | 3 | 8 | 5 | 6 | 4 | 21 | 50 |
| E | F-090 | 32 | 84 | 82 | 100 | 100 | 100 | 100 | 16 | 78 | 78 | 100 | 100 | 99 | 99 |
| E | F-103 | 98 | 100 | 95 | 100 | 100 | 100 | 100 | 50 | 85 | 79 | 99 | 99 | 94 | 99 |
| E | S-073 | 37 | 100 | 91 | 100 | 100 | 100 | 100 | 27 | 98 | 94 | 100 | 97 | 94 | 95 |
| E | S-140 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 85 | 97 | 98 | 53 | 49 | 26 | 28 |
| E | S-195 | 98 | 100 | 100 | 100 | 100 | 100 | 100 | 94 | 97 | 97 | 95 | 92 | 81 | 66 |
| F | E-014 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 84 | 100 | 98 | 100 | 100 | 100 | 100 |
| F | E-055 | 16 | 65 | 80 | 100 | R | 100 | 100 | 1 | 6 | 35 | 58 | R | 71 | 96 |
| F | E-081 | 76 | 98 | 100 | 100 | 100 | 100 | 87 | 57 | 96 | 58 | 65 | 56 | 98 | 83 |
| F | E-091 | 87 | 91 | 99 | 97 | 100 | 100 | 97 | 75 | 94 | 71 | 67 | 77 | 83 | 87 |
| F | E-112 | 84 | 93 | 100 | 100 | 100 | 100 | 100 | 53 | 63 | 79 | 47 | 48 | 26 | 95 |
| F | E-189 | 100 | 100 | 100 | 94 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 88 | 46 | 97 |
| F | F-006 | 13 | 79 | 58 | 67 | R | 4 | 32 | 0 | 0 | 0 | 3 | R | 2 | 0 |
| F | F-028 | 15 | 44 | 38 | 23 | R | 27 | 45 | 18 | 9 | 19 | 4 | R | 0 | 3 |
| F | F-049 | 20 | 74 | 49 | 22 | R | 1 | 4 | 0 | 0 | 0 | 0 | R | 2 | 6 |
| F | S-245 | 75 | 99 | 98 | 99 | 97 | 100 | 100 | 63 | 99 | 98 | 100 | 86 | 85 | 49 |
| S | F-070 | 68 | 52 | 81 | 57 | 81 | 95 | 100 | 15 | 28 | 9 | 24 | 19 | 75 | 84 |
| S | F-076 | 37 | 55 | 33 | 63 | 55 | 86 | 89 | 16 | 40 | 16 | 49 | 30 | 76 | 89 |
| S | F-106 | 66 | 89 | 93 | 100 | 100 | 100 | 100 | 32 | 82 | 72 | 100 | 100 | 100 | 100 |
| S | F-112 | 67 | 63 | 63 | 63 | 77 | 77 | 60 | 34 | 38 | 38 | 38 | 46 | 46 | 60 |
| S | S-022 | 89 | 82 | 100 | 100 | 100 | 100 | 100 | 52 | 81 | 80 | 83 | 75 | 53 | 87 |
| S | S-036 | 89 | ***44*** | ***17*** | 98 | 100 | 100 | 100 | 50 | ***25*** | ***19*** | 97 | 99 | 98 | 90 |
| S | S-056 | 38 | 57 | 66 | 87 | 92 | 96 | 99 | 1 | 15 | 30 | 48 | 71 | 80 | 73 |
| S | S-106 | 89 | 58 | 16 | 48 | 71 | 89 | 90 | 10 | 5 | 4 | 19 | 23 | 55 | 65 |
| S | S-153 | 100 | 99 | 100 | 100 | 100 | 100 | 100 | 93 | 99 | 100 | 97 | 89 | 52 | 100 |
| S | S-227 | 84 | 64 | 95 | 97 | 99 | 100 | 100 | 58 | 26 | 59 | 66 | 78 | 88 | 83 |
| | Means: | 70 | 81 | 80 | 86 | 94 | 89 | 90 | 43 | 61 | 59 | 65 | 70 | 65 | 72 |

***location error?*** R = remediated

# Marion Mitigation Bank Phase III Vegetation Monitoring - 2011

## Introduction, Summary, and Methods

This report summarizes the vegetation assessment conducted at the Marion Mitigation Bank (MMB) Phase 3 site on June 11th and 12th, and July 7th, 2011. The following table presents a summary of the 2011 wetland vegetation sampling results:

| MMB Phase 3 Habitats | Emergent | Scrub/Shrub |
|---|---|---|
| Percent FAC and better cover | 100 | 85 |
| Percent native cover | 93 | 30 |
| Percent non-vegetated | 34 | 7 |

Vegetation monitoring at MMB Phase 3 followed the sampling design implemented in 2010. Twenty sampling stations were identified in the Emergent habitat, ten in the Scrub/Shrub habitat, and nine in the Oak Savannah habitat. No Forested habitat type was delineated in the Phase 3 area. Vegetative cover for two of the Emergent sampling stations was not assessed because they were still under deep water (more than about four feet) on July 7th; no emergent or floating vegetation was observed at these locations.

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 Soil Moisture Index. A Soil Moisture Index (SMI) value of 3.0 is considered to be the break-point between wetlands and uplands.

**Emergent Habitat Type**

This habitat type was dominated by *Azolla mexicana*, *Lemna minor*, *Eleocharis palustris*,

*Juncus effusus*, and *Phalaris arundinacea*. All 20 sampling stations had standing water on the soil surface at the time of sampling. FAC and better species made up 100% of the total cover. Native species accounted for about 93% of the total cover in this area. The SMI for this habitat type was 1.25 and bare ground accounted for 34% of the area.

**Scrub/shrub Habitat Type**

This habitat type was dominated by *Poa trivialis*, *Potamogeton* sp., *Agrostis castellana/capillaris*, *Holcus lanatus*, and *Claytonia perfoliata*. The *Claytonia* was found at only one sampling station. FAC and better species made up 85% of the total cover. Native species accounted for about 30% of the total cover in this area. The SMI for this habitat type was 2.32 and bare ground accounted for 7% of the area.

Marion Mitigation Bank Plant Monitoring, 2011 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-269** | **E-315** | **E-316** | **E-327** | **E-224** | **E-282** | **E-299** | **E-304** | **E-348** | **E-349** | **E-375** | **E-387** | **Mean** |
| Azolla mexicana | mexican mosquito-fern [water-fern] | yes | OBL | 1 | y | | 2 | 80 | 99 | 96 | | 95 | 1 | | | | | 2 | w | | | | | w | 60 | 24.2 |
| Lemna minor | duckweed | yes | OBL | 1 | y | 3 | 45 | 15 | 1 | 1 | 10 | 1 | 1 | 10 | 8 | 10 | 50 | 4 | w | 25 | 15 | 40 | 55 | w | 1 | 16.4 |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | 10 | | 55 | | | 5 | 5 | 1 | 18 | 2 | | | 1 | w | 10 | 80 | 40 | 15 | w | 1 | 13.5 |
| Juncus effusus | soft rush | yes | FACW | 2 | y | | | | | | 22 | | | | | 88 | 70 | | w | | | | | w | | 10.0 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | 17 | 12 | 15 | 8 | 25 | 8 | | | | 4 | 5 | | w | | | | | w | | 5.2 |
| Ludwigia palustris | marsh seedbox | yes | OBL | 1 | y | | | | | | 1 | 1 | | | 2 | | 1 | 2 | w | 2 | 1 | | | w | 60 | 3.9 |
| Salix lucida ssp. lasiandra | Pacific [red] willow | yes | FACW+ | 2 | y | | | 2 | 20 | | | 15 | | 3 | 2 | | 2 | | w | | 2 | | | w | | 2.6 |
| Sparganium angustifolium | simplestem bur-reed | yes | OBL | 1 | y | | | | | | | | | | 30 | | | | w | 9 | | | | w | | 2.2 |
| Salix hookeriana | Hooker willow | yes | FACW | 2 | y | | | | 4 | | | 2 | | | 5 | | 6 | | w | | | | | w | | 0.9 |
| Alisma plantago-aquatica | American water-plantain | yes | OBL | 1 | y | | | 1 | | | | | | | | | | | w | | | | | w | 15 | 0.9 |
| Populus balsamifera ssp. trichocarpa | black cottonwood | yes | FAC | 3 | y | | | 1 | | | | 9 | | | | | | | w | | | | | w | | 0.6 |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | | | 1 | | | | | | | 7 | | | | w | | | | | w | | 0.4 |
| Juncus bufonius | toad rush | yes | FACW | 2 | y | | | | 3 | | | | | | | | | 5 | w | | | | | w | | 0.4 |
| Typha latifolia | cattail | yes | OBL | 1 | y | | | | | 6 | | | | | | | | | w | | | | | w | | 0.3 |
| Carex stipata | awl-fruited sedge | yes | OBL | 1 | y | | | | | | | | | | | 2 | | | w | | | | | w | | 0.1 |
| Elodea canadensis | Canadian waterweed | yes | OBL | 1 | y | | | | | | 2 | | | | | | | | w | | | | | w | | 0.1 |
| Agrostis stolonifera | creeping bentgrass | | FACW | 2 | y | | | | | | | | | | | 1 | | | w | | | | | w | | 0.1 |
| Bidens frondosa | leafy beggar's-tick | yes | FACW+ | 2 | y | | | | | | 1 | | | | | | | | w | | | | | w | | 0.1 |
| Carex leptopoda | Dewey's sedge | yes | FAC | 3 | y | | | | | | | | | | | 1 | | | w | | | | | w | | 0.1 |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | | | | | | | | | | | 1 | | | w | | | | | w | | 0.1 |
| Leersia oryzoides | rice cut-grass | yes | OBL | 1 | y | | | | | | | | | | | | | | w | | 1 | | | w | | 0.1 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | 78 | 50 | 2 | | | | | 97 | 30 | 5 | 5 | | 32 | | 25 | | 5 | 5 | | | 18.6 |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | 10 | 5 | 2 | | 1 | 38 | 4 | | 40 | 40 | 3 | 8 | 54 | | 30 | 5 | 15 | 25 | | | 15.6 |
| standing water (inches) | | | | | | 18 | 24 | 8 | 8 | 10 | 4 | 8 | 28 | 12 | 10 | 0.5 | 8 | 12 | deep | 18 | 14 | 24 | 18 | deep | 4 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Total cover: | | | | 13 | 64 | 167 | 142 | 111 | 66 | 136 | 3 | 31 | 56 | 107 | 134 | 14 | 0 | 46 | 99 | 80 | 70 | 0 | 137 | 82 |
| | | FAC and better cover: | | | | 13 | 64 | 167 | 142 | 111 | 66 | 136 | 3 | 31 | 56 | 107 | 134 | 14 | 0 | 46 | 99 | 80 | 70 | 0 | 137 | 82 |
| | | Native cover: | | | | 13 | 47 | 154 | 127 | 103 | 41 | 128 | 3 | 31 | 49 | 102 | 129 | 14 | 0 | 46 | 99 | 80 | 70 | 0 | 137 | 76 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Percent FAC and better of total: | | | | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | NA | 100 | 100 | 100 | 100 | NA | 100 | 100 |
| | | Percent native of total: | | | | 100 | 73 | 92 | 89 | 93 | 62 | 94 | 100 | 100 | 88 | 95 | 96 | 100 | NA | 100 | 100 | 100 | 100 | NA | 100 | 93 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Moisture Index: | | 1.25 |

| Marion Mitigation Bank Plant Monitoring, 2011 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** |
| Poa trivialis | rough [roughstalk] bluegrass | | FACW | 2 | y | | | | 15 | 7 | | 1 | 62 | 37 | 60 | 18.2 |
| Potamogeton sp. | pondweed | NA | OBL | 1 | y | | 85 | 85 | | | | | | | | 17.0 |
| Agrostis castellana/capillaris | dryland/colonial bentgrass | | FAC | 3 | y | | | | | 60 | | 50 | | 2 | 1 | 11.3 |
| Holcus lanatus | common velvetgrass | | FAC | 3 | y | 4 | | | 6 | 30 | | 5 | 15 | 18 | 25 | 10.3 |
| Claytonia perfoliata | miner's lettuce | yes | FAC | 3 | y | 87 | | | | | | | | | | 8.7 |
| Azolla mexicana | mexican mosquito-fern [water-fern] | yes | OBL | 1 | y | | 68 | 6 | | | | | | | | 7.4 |
| Alopecurus geniculatus | water foxtail | | OBL | 1 | y | | | | | | 45 | 12 | | | | 5.7 |
| Lemna minor | duckweed | yes | OBL | 1 | y | | 7 | 48 | | | | | | | | 5.5 |
| Epilobium ciliatum | fringed willowherb | yes | FACW- | 2 | y | 10 | | | 3 | | | | 20 | 8 | 2 | 4.3 |
| Trifolium dubium | small hop-clover | | UPL | 5 | | | | | 10 | 1 | | 18 | | | | 2.9 |
| Raphanus sativus | wild radish | | UPL | 5 | | 28 | | | | | | | | | | 2.8 |
| Juncus bufonius | toad rush | yes | FACW | 2 | y | | | | | | | 15 | 2 | 5 | | 2.2 |
| Vicia sativa | common vetch | | UPL | 5 | | | | | 18 | 2 | | | | 1 | | 2.1 |
| Eleocharis ovata | ovate spikerush | yes | OBL | 1 | y | | | | | | 18 | | | | | 1.8 |
| Phalaris arundinacea | reed-canary grass | invasive | FACW | 2 | y | | | 2 | | | | | | 10 | 5 | 1.7 |
| Geranium molle | dovefoot geranium | | NOL | 5 | u | 12 | | | 2 | | | | | | 1 | 1.5 |
| Parentucellia viscosa | parentucellia | | FAC- | 3 | | | | | 4 | 8 | | 2 | | 1 | | 1.5 |
| Trifolium repens | white clover | | FAC- | 3 | | | | | | 3 | | 11 | | | 1 | 1.5 |
| Hordeum brachyantherum | meadow barley | yes | FACW- | 2 | y | | | | | 12 | 1 | | | | | 1.3 |
| Eleocharis acicularis | needle spikerush | yes | OBL | 1 | y | | | | | | 10 | | | | | 1.0 |
| Lolium perenne ssp. multiflorum | Italian ryegrass | | FAC | 3 | y | | | | 6 | | | 2 | | | 1 | 0.9 |
| Trifolium pratense | red clover | | FACU | 4 | | | | | 7 | | 2 | | | | | 0.9 |
| Veronica peregrina ssp. xalapense | hairy purslane speedwell | yes | OBL | 1 | y | | | | 7 | | | | | 1 | 1 | 0.9 |
| Vicia hirsuta | tiny vetch | | NOL | 5 | u | | | | 8 | | | | | | 1 | 0.9 |
| Vicia pannonica | Hungarian vetch | | NOL | 5 | u | | | | 6 | | | 1 | | | | 0.7 |
| Cerastium glomeratum | sticky chickweed | | UPL | 5 | | 1 | | | 3 | | | | | 1 | 1 | 0.6 |
| Daucus carota | wild carrot/ Queen Anne's lace | | NOL | 5 | u | 4 | | | | | | | | 2 | | 0.6 |
| Taraxacum officinale | dandelion | | FACU | 4 | | | | | | | | | | 5 | | 0.5 |
| Myosotis discolor | yellow and blue forget-me-not | | FACW | 2 | y | 1 | | | 1 | 1 | | | | 1 | | 0.4 |
| Typha latifolia | cattail | yes | OBL | 1 | y | | 3 | 1 | | | | | | | | 0.4 |
| Alisma plantago-aquatica | American water-plantain | yes | OBL | 1 | y | | | | | | 3 | | | | | 0.3 |
| Eleocharis palustris | common [creeping] spikerush | yes | OBL | 1 | y | | | 3 | | | | | | | | 0.3 |
| Galium aparine | catchweed bedstraw/ cleavers | yes | FACU | 4 | | 1 | | | | | | | 1 | 1 | | 0.3 |
| Mentha pulegium | pennyroyal | | OBL | 1 | y | | | | | | 1 | 2 | | | | 0.3 |
| Rorippa curvisiliqua | western yellowcress | yes | OBL | 1 | y | | | | | | 3 | | | | | 0.3 |
| Anthemis cotula | mayweed chamomile/ stinking mayweed | | FACU | 4 | | | | | 2 | | | | | | | 0.2 |
| Epilobium brachycarpum | tall annual willowherb | yes | UPL | 5 | | | | | | | | | 1 | 1 | | 0.2 |

| Marion Mitigation Bank Plant Monitoring, 2011 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** |
| Equisetum arvense | common [field] horsetail | yes | FAC | 3 | y | | | | | | | | 2 | | | 0.2 |
| Geranium carolinianum | Carolina geranium | yes | NOL | 5 | u | | | | | | | 1 | | 1 | | 0.2 |
| Juncus articulatus | jointed rush | yes | OBL | 1 | y | | | | | | 2 | | | | | 0.2 |
| Vulpia bromoides | barren fescue | | UPL | 5 | | | | | 1 | 1 | | | | | | 0.2 |
| 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 |
| Brassica rapa | field [common] [birdsrape] mustard | | NOL | 5 | u | | | | | | | | | | 1 | 0.1 |
| Bromus catharticus | rescuegrass | | NOL | 5 | u | 1 | | | | | | | | | | 0.1 |
| Bromus hordeaceus ssp. hordeaceus | soft brome | | FACU | 4 | | | | | 1 | | | | | | | 0.1 |
| Bromus tectorum | cheatgrass | | NOL | 5 | u | | | | 1 | | | | | | | 0.1 |
| Cardamine oligosperma | little western bittercress | yes | FAC | 3 | y | | | | 1 | | | | | | | 0.1 |
| Festuca rubra | red fescue | | FAC+ | 3 | y | | | | | 1 | | | | | | 0.1 |
| Geranium lucidum | shining geranium | | NOL | 5 | u | 1 | | | | | | | | | | 0.1 |
| Hypochaeris radicata | hairy cat's ear | | FACU | 4 | | | | | | | | 1 | | | | 0.1 |
| Lactuca serriola | prickly lettuce | | FACU | 4 | | | | | | | | | | 1 | | 0.1 |
| Lamium purpureum | red deadnettle | | NOL | 5 | u | 1 | | | | | | | | | | 0.1 |
| Lythrum portula | spatulaleaf loosestrife | | OBL | 1 | y | | | | | | 1 | | | | | 0.1 |
| | | | | | | | | | | | | | | | | |
| bare (soil, mud, rock) | DOES NOT INCLUDE CANOPY, IF ANY | | | | | | | | 1 | | 1 | 1 | 1 | | 2 | 0.6 |
| algae, moss, duff, dead vegetation, etc. (incl. sprayed veg.) | " | | | | | 2 | | 2 | 3 | 2 | 15 | 3 | 4 | 15 | 15 | 6.1 |
| standing water (inches) | | | | | | | 24 | 18 | | | trace | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | Total cover: | | | 151 | 163 | 145 | 103 | 126 | 87 | 121 | 103 | 96 | 100 | 120 |
| | | | FAC and better cover: | | | 102 | 163 | 145 | 39 | 111 | 85 | 87 | 101 | 82 | 95 | 101 |
| | | | Native cover: | | | 98 | 78 | 58 | 11 | 12 | 38 | 16 | 26 | 17 | 3 | 36 |
| | | | | | | | | | | | | | | | | |
| | | | Percent FAC and better of total: | | | 68 | 100 | 100 | 38 | 88 | 98 | 72 | 98 | 85 | 95 | 85 |
| | | | Percent native of total: | | | 65 | 48 | 40 | 11 | 10 | 44 | 13 | 25 | 18 | 3 | 30 |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | Moisture Index: | 2.32 |

| Marion Mitigation Bank Plant Monitoring, 2011 Phase 3 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Percent FAC and better | | | | | | Percent native | | | | | |
| Habitat | Station | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| E | E-031 | 100 | 100 | | | | | 100 | 100 | | | | |
| E | E-047 | 100 | 100 | | | | | 7 | 73 | | | | |
| E | E-051 | 100 | 100 | | | | | 40 | 92 | | | | |
| E | E-052 | 100 | 100 | | | | | 90 | 89 | | | | |
| E | E-070 | 100 | 100 | | | | | 32 | 93 | | | | |
| E | E-078 | 100 | 100 | | | | | 19 | 62 | | | | |
| E | E-138 | 100 | 100 | | | | | 80 | 94 | | | | |
| E | E-219 | 100 | 100 | | | | | 100 | 100 | | | | |
| E | E-315 | 100 | 100 | | | | | 76 | 100 | | | | |
| E | E-316 | 99 | 100 | | | | | 88 | 88 | | | | |
| E | E-327 | 100 | 100 | | | | | 98 | 95 | | | | |
| E | E-224 | 100 | 100 | | | | | 80 | 96 | | | | |
| E | E-269 | NA | 100 | | | | | NA | 100 | | | | |
| E | E-282 | NA | NA | | | | | NA | NA | | | | |
| E | E-299 | NA | 100 | | | | | NA | 100 | | | | |
| E | E-304 | NA | 100 | | | | | NA | 100 | | | | |
| E | E-348 | NA | 100 | | | | | NA | 100 | | | | |
| E | E-349 | NA | 100 | | | | | NA | 100 | | | | |
| E | E-375 | NA | NA | | | | | NA | NA | | | | |
| E | E-389 | NA | 100 | | | | | NA | 100 | | | | |
| S | S-002 | 8 | 68 | | | | | 0 | 65 | | | | |
| S | S-027 | 100 | 100 | | | | | 13 | 48 | | | | |
| S | S-028 | 100 | 100 | | | | | 12 | 40 | | | | |
| S | S-037 | 70 | 38 | | | | | 2 | 11 | | | | |
| S | S-055 | 73 | 88 | | | | | 13 | 10 | | | | |
| S | S-075 | 100 | 98 | | | | | 23 | 44 | | | | |
| S | S-076 | 46 | 72 | | | | | 10 | 13 | | | | |
| S | S-100 | 93 | 98 | | | | | 0 | 25 | | | | |
| S | S-103 | 87 | 85 | | | | | 2 | 18 | | | | |
| S | S-105 | 74 | 95 | | | | | 0 | 3 | | | | |
| | Means: | 89 | 94 | | | | | 40 | 70 | | | | |

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 |
| 11/11/2011 | MOUNTAIN WEST SENIOR HOUSING | T8N,R3W.SEC12,TAX LOT 2501 | ENF2501 | | 0.21 | 3.78 |