Appendix A. List of Soils within Benton County HCP Plan Area

Soil Type	Acreage
Abiqua silty clay loam, 0 to 3 percent slopes	158.72
Abiqua silty clay loam, 3 to 5 percent slopes	261.50
Abiqua silty clay loam, high ppt, 0 to 3 percent slopes	16.43
Abiqua silty clay loam, high ppt, 3 to 5 percent slopes	10.88
Abiqua silty clay loam, rarely flooded, 0 to 3 percent slopes	6.52
Alsea loam, 0 to 5 percent slopes	12.21
Alsea loam, rarely flooded, 0 to 3 percent slopes	3.09
Amity silt loam, 0 to 3 percent slopes	180.46
Apt-McDuff complex, 30 to 50 percent slopes	23.25
Apt-McDuff complex, 5 to 30 percent slopes	35.32
Aquents, 0 to 3 percent slopes	3.68
Awbrig silty clay loam, 0 to 2 percent slopes	47.91
Bashaw clay, 3 to 12 percent slopes	56.47
Bashaw clay, flooded, 0 to 3 percent slopes	400.96
Bashaw clay, nonflooded, 0 to 3 percent slopes	419.62
Bashaw silty clay loam, nonflooded, 0 to 3 percent slopes	264.67
Bellpine-Jory complex, 12 to 20 percent slopes	94.57
Bellpine-Jory complex, 2 to 12 percent slopes	75.60
Bellpine-Jory complex, 20 to 30 percent slopes	79.49
Bellpine-Jory complex, 30 to 60 percent slopes	68.19
Bohannon-Preacher complex, 30 to 60 percent slopes	28.80
Bohannon-Preacher complex, 60 to 90 percent slopes	1.19
Briedwell gravelly loam, 0 to 7 percent slopes	46.82
Briedwell gravelly loam, 7 to 20 percent slopes	3.66
Burntwoods-Oldblue complex, 30 to 60 percent slopes	4.41
Camas gravelly sandy loam, 0 to 3 percent slopes	6.89
Camas gravelly sandy loam, relict bar, 0 to 3 percent slopes	27.42
Caterl-Laderly-Romanose complex, 30 to 60 percent slopes	0.88
Chapman loam, 0 to 3 percent slopes	22.36
Chapman loam, high ppt, 0 to 3 percent slopes	0.13
Chehalem silty clay loam, 0 to 3 percent slopes	19.43
Chehalem silty clay loam, 3 to 12 percent slopes	3.90
Chehalis silt loam, 0 to 3 percent slopes	44.34
Chehalis silt loam, high ppt, 0 to 3 percent slopes	2.00
Chehalis silty clay loam, 0 to 3 percent slopes	164.54
Chismore-Pyburn complex, 0 to 3 percent slopes	1.03
Chismore-Pyburn complex, 3 to 12 percent slopes	8.32
Cloquato silt loam, 0 to 3 percent slopes	55.52
Coburg complex, rarely and occasionally flooded, 0 to 3 percent	35.84
Coburg silty clay loam, 0 to 3 percent slopes	20.09

Soil Type	Acreage
Coburg silty clay loam, rarely flooded, 0 to 3 percent slopes	122.37
Concord silt loam, 0 to 2 percent slopes	51.62
Conser silty clay loam, 0 to 3 percent slopes	177.17
Dayton silt loam, 0 to 2 percent slopes	113.40
Dayton silt loam, clay substratum, 0 to 2 percent slopes	7.15
Digger-Bohannon complex, 5 to 30 percent slopes	10.62
Digger-Remote-Umpcoos complex, 30 to 60 percent slopes	5.03
Digger-Umpcoos-Remote complex, 60 to 90 percent slopes	3.16
Dixonville-Gellatly complex, 12 to 30 percent slopes	3432.02
Dixonville-Gellatly complex, 30 to 60 percent slopes	761.70
Dixonville-Gellatly-Witham complex, 2 to 12 percent slopes	2019.30
Dupee silt loam, 12 to 20 percent slopes	1.10
Dupee silt loam, 3 to 12 percent slopes	144.77
Elsie silt loam, 0 to 7 percent slopes	49.60
Elsie silt loam, 7 to 15 percent slopes	8.36
Fluvents-Fluvaquents complex, 0 to 3 percent slopes	2.50
Fluvents-Fluvaquents complex, high ppt, 0 to 3 percent slopes	1.26
Formader-Hemcross complex, 35 to 60 percent slopes	1.11
Goodin-Dupee-Chehulpum complex, 12 to 20 percent slopes	10.70
Goodin-Dupee-Chehulpum complex, 2 to 12 percent slopes	4.74
Harslow-Kilchis-Rock outcrop complex, 60 to 90 percent slopes	0.78
Helmick silt loam, 3 to 12 percent slopes	23.05
Helvetia silt loam, 2 to 7 percent slopes	1.86
Hemcross-Klistan complex, 30 to 60 percent slopes	7.34
Holcomb silt loam, 0 to 3 percent slopes	76.28
Honeygrove-Peavine complex, 3 to 30 percent slopes	60.95
Honeygrove-Peavine complex, 3 to 30 percent slopes, basalts	28.55
Honeygrove-Peavine complex, 30 to 60 percent slopes	27.29
Honeygrove-Peavine complex, 30 to 60 percent slopes, basalts	10.29
Honeygrove-Shivigny complex, 3 to 30 percent slopes	9.12
Jory silty clay loam, 12 to 20 percent slopes	220.78
Jory silty clay loam, 2 to 12 percent slopes	929.80
Jory silty clay loam, 20 to 30 percent slopes	59.13
Jory silty clay loam, sediments, 12 to 20 percent slopes	73.62
Jory silty clay loam, sediments, 2 to 12 percent slopes	128.93
Jory silty clay loam, sediments, 20 to 30 percent slopes	16.80
Jory-Dupee complex, 2 to 12 percent slopes	47.04
Jory-Gelderman complex, 12 to 30 percent slopes	1115.64
Jory-Nekia complex, 20 to 30 percent slopes	0.29
Kirkendall-Nekoma-Quosatana complex, 0 to 3 percent slopes	43.83
Klistan-Harslow complex, 30 to 60 percent slopes	7.72
Linslaw loam, 0 to 3 percent slopes	0.39
Linslaw loam, 3 to 8 percent slopes	3.81
MacDunn-Price-Ritner complex, 60 to 90 percent slopes	135.28

Soil Type	Acreage
Malabon silty clay loam, 0 to 3 percent slopes	43.87
Malabon sitly clay loam, rarely flooded, 0 to 3 percent slopes	81.24
McAlpin silty clay loam, 0 to 3 percent slopes	581.36
McAlpin silty clay loam, 3 to 6 percent slopes	31.31
McAlpin silty clay loam, high ppt, 0 to 3 percent slopes	1.08
McAlpin silty clay loam, high ppt, 3 to 6 percent slopes	3.28
McAlpin silty clay loam, rarely flooded, 0 to 3 percent slopes	261.19
McBee silty clay loam, 0 to 3 percent slopes	49.45
McBee silty clay loam, nonflooded, 0 to 3 percent slopes	16.31
Meda-Treharne-Wasson complex, 2 to 20 percent slopes	28.93
Nekoma-Fluvaquents complex, 0 to 3 percent slopes	36.44
Newberg fine sandy loam, 0 to 3 percent slopes	19.84
Newberg fine sandy loam, high ppt, 0 to 3 percent slopes	4.77
Newberg loam, 0 to 3 percent slopes	40.56
Oldblue-Burntwoods complex, 5 to 30 percent slopes	18.39
Pengra silt loam, 2 to 12 percent slopes	60.46
Philomath silty clay loam, 3 to 12 percent slopes	104.37
Pilchuck fine sandy loam, 0 to 3 percent slopes	0.85
Pits	2.71
Preacher-Blachly-Bohannon complex, 5 to 30 percent slopes	6.24
Preacher-Bohannon complex, 5 to 35 percent slopes	10.51
Preacher-Bohannon-Slickrock complex, 35 to 60 percent slopes	20.64
Price-MacDunn-Ritner complex, 30 to 60 percent slopes	1795.93
Salem gravelly silt loam, 0 to 3 percent slopes	5.37
Santiam silt loam, 2 to 8 percent slopes	167.41
Santiam silt loam, 8 to 20 percent slopes	32.93
Shivigny-Honeygrove complex, 30 to 60 percent slopes	11.10
Slickrock gravelly medial loam, 3 to 25 percent slopes	14.58
Treharne-Eilertsen-Zyzzug complex, 0 to 7 percent slopes	94.24
Verboort silty clay loam, 0 to 3 percent slopes	13.20
Waldo silty clay loam, 0 to 3 percent slopes	408.62
Waldo silty clay loam, high ppt, 0 to 3 percent slopes	4.83
Wapato silty clay loam, 0 to 3 percent slopes	11.11
Wapato silty clay loam, high ppt, 0 to 3 percent slopes	0.09
Water	47.00
Wellsdale-Willakenzie complex, 20 to 30 percent north slopes	9.34
Wellsdale-Willakenzie-Dupee complex, 12 to 20 percent north slopes	20.89
Wellsdale-Willakenzie-Dupee complex, 2 to 12 percent slopes	83.42
Willakenzie loam, 12 to 20 percent slopes	24.69
Willakenzie loam, 2 to 12 percent slopes	53.69
Willakenzie loam, 20 to 30 percent slopes	16.21
Willakenzie loam, 30 to 60 percent slopes	9.11
Willakenzie-Wellsdale complex, 12 to 20 percent south slopes	53.23

Soil Type	Acreage
Willakenzie-Wellsdale complex, 20 to 30 percent south slopes	0.42
Willamette silt loam, 0 to 3 percent slopes	80.43
Willamette silt loam, 3 to 12 percent slopes	130.80
Witham silty clay loam, 12 to 20 percent slopes	76.30
Witham silty clay loam, 2 to 12 percent slopes	1032.12
Witzel-Ritner complex, 12 to 30 percent slopes	152.19
Witzel-Ritner complex, 3 to 12 percent slopes	55.80
Witzel-Ritner complex, 30 to 60 percent slopes	246.80
Woodburn silt loam, 0 to 3 percent slopes	234.57
Woodburn silt loam, 12 to 20 percent slopes	0.99
Woodburn silt loam, 20 to 55 percent slopes	1.02
Woodburn silt loam, 3 to 12 percent slopes	42.33
Total	**19027.92**

Appendix B: Native Vegetation of Wet and Upland Prairies

Native Vegetation of Wet Prairies

Scientific Name	Common Name
TREES AND SHRUBS	
Fraxinus latifolia	Oregon ash
Rosa nutkana	Nootka rose
Spirea douglasii	Douglas spirea
GRASSES, SEDGES, AND RUSHES	
Beckmannia syzigachne	American sloughgrass
Carex unilateralis	One-sided sedge
Carex densa	Dense sedge
Danthonia californica	California oatgrass
Deschampsia cespitosa	tufted hairgrass
Eleocharis acicularis	needle spikerush
Eleocharis palustris	creeping spikerush
Glyceria occidentalis	western mannagrass
Hordeum brachyantherum	meadow barley
Juncus bufonius	toad rush
Juncus nevadensis	sierra rush
Juncus tenuis	slender rush
Panicum capillare	common witchgrass
Panicum occidentale	western witchgrass
FORBS	
Boisduvalia densiflora	dense spike primrose
Brodiaea coronaria	crown brodiaea
Camassia quamash	common camas
Cardamine penduliflora	Willamette Valley bittercress
Centaurium muehlenbergii	Muehlenberg's centaury
Centunculus minimus	chaffweed
Downingia elegans	blue calico-flower
Epilobium paniculatum	tall annual willowherb
Eriophyllum lanatum	Oregon sunshine
Eryngium petiolatum	coyote thistle
Galium spp.	bedstraw
Gnaphalium palustre	lowland cudweed
Grindelia integrifolia	Oregon gumweed
Heterocodon rariflorum	rareflower hetercodon
Lotus fomosissimus	seaside bird's foot trefoil
Lotus purshianus	American bird's foot trefoil
Madia glomerata	mountain tarweed
Microseris laciniata	cutleaf silverpuffs
Myosotis laxa	bay forget-me-not
Plagiobothrys figuratus	fragrant popcornflower
Plagiobothrys scouleri	Scouler's popcornflower
Plogyonum douglasii	Douglas' knotweed
Prunella vulgaris var. lanceolata	lance selfheal
Sidalcea virgata	dwarf checkermallow
Sisyrinchium angustifolium	narrowleaf blue-eyed grass

Scientific Name	Common Name
Veronica scutellata	skullcap speedwell
Zigadenus venenosus	death camas

(Wilson and OSU, 2006).

Native Vegetation of Upland Prairies

Scientific Name	Common Name
TREES AND SHRUBS	
Quercus garryana	Oregon white oak
Psudotsuga menziesii	Douglas fir
Rhus diversiloba	Poison oak
Rosa gymnocarpa	Baldhip rose
GRASSES	
Elymus glaucus	blue wild rye
Festuca idahoensis var. *roemeri*	Roemer's fescue
Danthonia californica	California oatgrass
Achnatherum lemmonii	Lemmon's needlegrass
Koeleria macrantha	prairie junegrass
Agrostis diegoensis	seashore bentgrass
Bromus carinatus	California brome
Elymus trachycaulus	slender wheatgrass
FORBS	
Achillea millefolium	yarrow
Agoseris grandiflora	Bigflower agoseris
Allium amplectens	narrowleaf onion
Apocynum androsaemifolium	spreading dogbane
Aquilegia Formosa	western columbine
Aster hallii	Hall's aster
Balsamorhiza deltoidea	deltoid balsamroot
Brodiaea coronaria	crown brodiaea
Calochortus tolmiei	Tolmie star-tulip
Cirsium callilepis	fewleaf thistle
Clarkia amoena	farewell-to-spring
Clarkia gracilis	slender clarkia
Comandra umbellata	bastard toadflax
Convolvulus nyctagineus	nightblooming false bindweed
Daucus pusillus	American wild carrot
Delphinium menziesii	Menzie's larkspur
Dichelsostemma congestum	ookow
Dodecatheon hendersonii	Henderson's shooting star
Epilobium paniculatum	tall annual willowherb
Eriophyllum lanatum	Oregon sunshine
Erythronium oregonum	giant white fawnliy
Fragaria virginiana	mountain strawberry
Fritillaria lanceolata	checker lily
Geranium oreganum	Oregon germanium
Grindelia integrifolia	Oregon gumweed
Habenaria elegans	elegant piperia

Scientific Name	Common Name
Iris tenax	toughleaf iris
Lathyrus holochlorus	thinleaf pea
Lomatium macrocarpum	bigseed biscuitroot
Lomatium nudicaule	barestem bisquitroot
Lomatium utriculatum	common lomatium
Lotus formosissimus	seaside's bird'sfoot trefoil
Lotus purshiana	American's bird's foot trefoil
Lupinus arbustus	spur lupine
Lupinus bicolor	minature lupine
Madia elegans	common madia
Madia gracilis	slender tarweed
Marah oreganus	wild cucumber
Plectritis congesta	shortspur seablush
Potentilla gracilis	slender cinquefoil
Prunella vulgaris var *lanceolata*	lance self-heal
Ranunculus occidentalis	western buttercup
Sanicula bipinnatifida	purple sanicle
Sidalcea campestris	meadow checkermallow
Sidalcea virgata	rosy checkermallow
Silene hookeri	Hooker's silene
Sisyrinchium douglasii	Douglas' blue-eyed grass
Trifolium macraei	Chilean clover
Triteleia hyacinthina	white brodiaea
Vicia Americana	American vetch
Wyethia angustifolia	California compass plant
Zigadenus venenous	death camas

(Wilson and OSU 2006)

Appendix C. Wildlife in Benton County Prairies

Mammals of Prairie Habitat in Benton County

Common Name	Scientific Name
Big brown bat	*Eptesicus fuscus*
Black bear	*Ursus americanus*
Bobcat	*Lynx rafus*
Brush rabbit	*Sylvilagus bachmani*
California ground squirrel	*Spermophilus beecheyi*
California myotis	*Myotis californicus*
Coast mole	*Scapanus orarius*
Common gray fox	*Urocyon cineroargenteus*
Common raccoon	*Procyon lotor*
Coyote	*Canis latrans*
Creeping vole	*Microtus oregoni*
Deer mouse	*Permyscus maniculatus*
Dusky-footed woodrat	*Neotoma fuscipes*
Elk	*Cervus elaphus*
Gray tailed vole	*Microtus canicaudus*
Hoary bat	*Lasiurus cinereus*
Little brown myotis	*Myotis lucifugus*
Long eared myotis	*Myotis evotis*
Long legged myotis	*Myotis volans*
Long-tailed vole	*Microtus longicaudus*
Long-tailed weasel	*Mustela frenata*
Mink	*Mustela vison*
Mule deer	*Odocoileus hemionus*
Red fox	*Vulpes vulpes*
Silver haired myotis	*Lasionycteris noctivagans*
Striped skunk	*Mephitis mephitis*
Townsend's mole	*Scapanus townsendii*
Townsend's vole	*Microtus townsendii*
Vagrant shrew	*Sorex vagrans*
Virginia opossum	*Didelphis virginiana*
Western pocket squirrel	*Thomomys mazama*
Western spotted skunk	*Spilogale gracilis*
Yuma myotis	*Myotis yumanensis*

*Extripated

Source: Csuti, et al. 1999, O'Neil, et al. 2001

Birds of Prairie Habitat in Benton County

Common Name	Scientific Name
*Acorn Woodpecker	*Melanerpes formicivorus*
*American Crow	*Corvus brachyrhynchos*
*American Kestrel	*Falco sparverius*
*American Robin	*Turdus migratorius*
*Bald Eagle	*Haliaeetus leucocephalus*
*Barn Owl	*Tyto alba*
*Barn Swallow	*Hirundo restica*
*Black-capped Chickadee	*Parus atricapillus*
*Blue-winged Teal	*Anas discors*
*Brewer's Blackbird	*Euphagus cyanocephalus*
*Brown Creeper	*Certhia Americana*
*Brown Headed Cowbird	*Molothrus ater*
*California Quail	*Callipepla californica*
*Chipping Sparrow	*Spizella passerine*
*Cinnamon Teal	*Anas cyanoptera*
*Cliff Swallow	*Petrochelidon pyrrhonata*
*Common Nighthawk	*Chordeiles minor*
*Common Raven	*Corvus corax*
*Common Yellowthroat	*Geothlypis trichas*
*Cooper's Hawk	*Accipiter cooperii*
*Downy Woodpecker	*Picoides pubescens*
*European Starling	*Sturnus vulgaris*
*Great Blue Heron	*Ardea Herodias*
*Great Horned Owl	*Bubo virginianus*
*Hairy Woodpecker	*Picoides villosus*
*Horned Lark (Streaked)	*Eremophilia alpestris* var. *strigata*
*House Sparrow	*Passer domesticus*
*House Wren	*Troglodytes aedon*
*Killdeer	*Charadrius vociferus*
*Lazuli Bunting	*Passerina amoena*
*Mountain Quail	*Oreortyx pictus*
*Mourning Dove	*Zenaida macroura*
*Northern Flicker	*Colaptes auratus*
*Northern Harrier	*Circus cyaneus*
*Northern Rough-Winged Swallow	*Stelgidopteryx serripennis*
*Orange Crowned Warbler	*Vermivora celata*
*Peregrine Falcon	*Falco peregrinus*
*Red Winged Blackbird	*Agelaius phoeniceus*
*Red-breasted Sapsucker	*Sphyrapicus ruber*
*Red-tailed Hawk	*Buteo jamaicensis*
*Ring-necked Pheasant	*Phasianus colchicus*
*Rock Dove	*Columba livia*

Common Name	Scientific Name
*Rufous Hummingbird	*Selasphorus rufus*
*Savanna Sparrow	*Passerculus sandwichensis*
*Sharp-shinned Hawk	*Accipiter striatus*
*Short-eared Owl	*Asio flammeus*
*Song Sparrow	*Melospiza melodia*
*Tree Swallow	*Tachycineta bicolor*
*Turkey Vulture	*Cathartes aura*
*Vaux's Swift	*Chaetura vauxi*
*Vesper Sparrow	*Pooecetes gramineus*
*Violet-Green Swallow	*Tachycineta thalassina*
*Western Bluebird	*Sialia Mexicana*
*Western Kingbird	*Tyrannus verticalis*
*Western Meadowlark	*Sturnella neglecta*
*Western Scrub Jay	*Aphelocoma californica*
*Western Wood-Pewee	*Contopus sordidulus*
*White-breasted Nuthatch	*Sitta carolinesis*
*White-crowned Sparrow	*Zonotrichia leucophyrys*
*White-tailed Kite	*Elanus leucurus*
*Wild Turkey	*Meleagris gallopavo*
*Wilson's Snipe	*Gallinago Delicata*
Black Phoebe	*Sayornis nigricans*
Gadwall	*Anas strepera*
Golden-crowned Sparrow	*Zonotrichia atricapilla*
Great Egret	*Ardea alba*
Greater Yellowlegs	*Tringa melanoleuca*
Green-winged Teal	*Anas crecca*
Merlin	*Falco columbarius*
Northern Shoveler	*Anas clypeata*
Northern Shrike	*Lanius excubitor*
Rough-legged Hawk	*Buteo lagopus*
Ruby-crowned Kinglet	*Regulus calendula*

* Denoted bird breeds in Benton County

Source: Csuti, et al. 1997, Corvallis Audubon Society 2008, O'Neil, et al. 2001

Butterflies in Benton County

Common Name	Scientific Name
Acmon Blue	*Plebejus acmon*
American Lady	*Vanessa virginiensis*
Anise Swallowtail	*Papilio zelicaon zelicaon*
Arctic Skipper	*Carterocephalus palaemon nr. skada*
Boisduval's Blue	*Plebejus icarioides nr. fenderi*
Bramble Green Hairstreak	*Callophrys perplexa nr. perplexa*
Bremner's (Zerene) Fritillary	***Speyeria zerene nr. bremnerii*

Common Name	**Scientific Name**
Acmon Blue	*Plebejus acmon*
Brown Elfin	*Callophrys augustinus iroides*
Cabbage White	*Pieris rapae*
California Sister	*Adelpha californica*
California Tortoiseshell	*Nymphalis californica*
Callippe Fritillary	***Speyeria callippe ssp.*
Chalcedona Checkerspot	*Euphydryas chalcedona colon*
Checkered White	**Pontia protodice*
Clodius Parnassian	*Parnassius clodius claudianus*
Clouded Sulphur	**Colias philodice eriphyle*
Common Buckeye	**Junonia coenia*
Common Checkered Skipper	*Pyrgus communis ssp.*
Common Roadside Skipper	*Ambliscirtes vialis*
Common Wood Nymph	*Cercyonis pegala ariane*
Dreamy Duskywing	*Erynnis icelus*
Dun Skipper	*Euphyes vestris vestris*
Eastern Tailed Blue	*Cupido comyntas sissona*
Fender's (Boisduval's) Blue	*Plebejus icarioides fenderi*
Field Crescent	*Phyciodes pulchella nr. pulchella*
Golden Hairstreak	*Habrodais grunus herri*
Gray Hairstreak	*Strymon melinus atrofasciata*
Great Copper	***Lycaena xanthoides nigromaculata*
Great Purple Hairstreak	*Atlides halesus corcorani*
Great Spangled Fritillary	*Speyeria cybele pugetensis*
Green Comma	*Polygonia faunus rusticus*
Greenish Blue	***Plebejus saepiolus ssp.*
Hedgerow Hairstreak	*Satyrium saepium saepium*
Hoary Comma	*Polygonia gracilis zephyrus*
Hydaspe Fritillary	*Speyeria hydaspe ssp.*
Juba Skipper	*Hesperia juba*
Lorquin's Admiral	*Limenitis lorquini ilgae*
Margined White	*Pieris marginalis marginalis*
Milbert's Tortoiseshell	*Aglais milberti subpallida*
Monarch	*Danaus plexippus plexippus*
Mourning Cloak	*Nymphalis antiopa antiopa*
Mylitta Crescent	*Phyciodes mylitta mylitta*
Ochre Ringlet	*Coenonympha tullia eunomia*
Orange Sulphur	*Colias eurytheme*
Oreas Anglewing	*Polygonia oreas silenus*
Painted Lady	*Vanessa cardui*
Pale Tiger Swallowtail	*Papilio eurymedon*
Persius Duskywing	*Erynnis persius ssp.*
Pine White	*Neophasia menapia menapia*
Propertius Duskywing	*Erynnis propertius*

Common Name	**Scientific Name**
Acmon Blue	*Plebejus acmon*
Purplish Copper	*Lycaena helloides helloides*
Red Admirable (Admiral)	*Vanessa atalanta rubria*
Sachem	*Atalopedes campestris campestris*
Sara's Orangetip	*Anthocharis sara flora*
Satyr Anglewing	*Polygonia satyrus neomarsyas*
Silver-spotted Skipper	*Epargyreus clarus californicus*
Silvery Blue	*Glaucopsyche lygdamus incognitus*
Sonoran Skipper	*Polites sonora nr. siris*
Spring Azure	*Celastrina echo echo*
Sylvan Hairstreak	*Satyrium sylvinus nootka*
Tailed Copper	*Lycaena arota ssp.*
Taylor's (Edith's) Checkerspot	*Euphydryas editha taylori*
Two-banded Checkered Skipper	*Pyrgus ruralis ruralis*
West Coast Lady	*Vanessa annabella*
Western Meadow Fritillary	*Boloria epithore chermocki*
Western Tailed Blue	*Cupido amyntula amyntula*
Western Tiger Swallowtail	*Papilio rutulus rutulus*
Western White	**Pontia occidentalis occidentalis*
Woodland Skipper	*Ochlodes sylvanoides sylvanoides*

*A rare stray
**Probably extirpated from Benton County.
Source: D. Ross, Personal Communication 2009.

Appendix D: Listed Non-Prairie Species in Benton County

Water howellia: Water howellia (*Howellia aquatilis*) was listed as threatened in 1994 under the federal ESA (USFWS 2008k). The species is not listed under Oregon's ESA (ODA 2007). No recovery plan has been prepared for this species. Critical habitat has not been designated for Water howellia.

Water howellia is a wetland plant. The species is extirpated from Oregon, with known populations in Washington, Idaho, Montana, and California. The most recently reported sightings in Oregon were in 1977. Historically, the species occurred along the Columbia River floodplain and the broad valley of the Willamette River (USFWS 2008k).

Northern Spotted Owl: The Northern Spotted Owl (*Strix occidentalis caurina*) was listed as threatened in 1990 under the federal ESA (USFWS 1990). The Northern Spotted Owl is listed as threatened under Oregon's ESA (ODFW 2008l). A final recovery plan was published in 2008 (USFWS 2008n); and critical habitat was designated in 1992 and revised in 2008 (USFWS 2008m).

Northern Spotted Owls live in forested habitats characterized by dense canopy closure of mature and old-growth trees, standing snags, live trees with broken tops, and abundant logs where they nest, roost, and feed (USFWS 2008l).

The Northern Spotted Owl potentially occurs in Benton, Clackamas, Clatsop, Columbia, Coos, Curry, Deschutes, Douglas, Hood River, Jackson, Jefferson, Josephine, Klamath, Lane, Lincoln, Linn, Marion, Multnomah, Polk, Tillamook, Wasco, Washington, and Yamhill Counties (USFWS 2008m).

Threats include timber harvesting of mature and old-growth trees, loss of habitat due to land conversions. Another threat, resulting from loss of adjacent habitat, is the invasion of the Barred Owl.

Marbled Murrelet: The California, Oregon, and Washington populations of the Marbled Murrelet (*Brachyramphus marmoratus*) were listed as threatened in 1992 under the federal ESA (USFWS 2008o). The Marbled Murrelet is listed as threatened under Oregon's ESA (ODFW 2008). A recovery plan was published in 1997 (USFWS 1997). Critical habitat was designated in 1996 (USFWS 1996), however the USFWS in 2008 proposed revising the area designated as critical habitat (2008q), and in 2009 requested additional comments on its proposed rule to re-designate critical habitat (USFWS 2009a).

The Marbled Murrelet is small, robin sized seabird feeding primarily on fish and invertebrates in marine waters and nesting up to 80 km (50 miles) inland in forest stands with old growth characteristics (USFWS 2008o). Marbled Murrelets favor large, un-fragmented stands of old growth for nesting.

Marbled Murrelet potentially occur Benton, Clatsop, Coos, Curry, Douglas, Lane, Lincoln, Polk, Tillamook, and Yamhill Counties (USFWS 2008o).

The primary cause for decline is loss of old growth nesting habitat resulting from commercial timber harvests, human caused fires, and land conversions activities (USFWS 2008o). Increased fragmentation allows avian predators to prey on the species, including eggs.

Oregon chub: The Oregon chub (*Oregonichthys crameri*) was listed as endangered in 1993 under the federal ESA (USFWS 1993). In May, 2009, the USFWS issues a proposed rule to reclassify the Oregon chub from endangered to threatened (2009c). Oregon has not listed this species as either threatened or endangered under its ESA. A recovery plan was published in 1998 (USFWS 1998b). Critical habitat has been proposed, but not yet designated for Oregon chub (USFWS 2009b).

Oregon chub is an aquatic species. They are found in off-channel habitat such as oxbows, beaver ponds, backwater sloughs, side channels, flooded marshes. These habitats have little or no water flow, and aquatic vegetation for hiding and spawning (USFWS 2008p). Oregon chub can be found in Benton, Marion, Lane, Linn, and Polk Counties. There are two Oregon Chub populations in Benton County: one at the William L. Finley National Wildlife Refuge and in another in the Bull Run Creek (Bangs et al. 2008). Neither of these populations is located on non-federal public lands, nor within the Fender's Blue Zones.

Threats to this species include habitat loss, fragmentation, alteration; non-native fish and amphibian species; chemical spills and runoff from herbicides and pesticides; water withdrawals, diversions, or fill and removal activities; sedimentation; and population fragmentation (USFWS 2008p).

Appendix E: Summary of Environmental Consequences by Alternative

Environmental Component	Covered Activity	Proposed Action Alternative	No Action Alternative
Climate	Building Construction Project	The burning of fossil fuels during construction will emit greenhouse gases into the environment. These emissions are anticipated to be short term and minor. The burning of fossil fuels for transportation, and operation of schools, fire stations, homes, accessory buildings, medical hardship buildings, additions to structures will emit greenhouse gases into the environment. These emissions are anticipated to minor, although on-going. Not all buildings will be constructed at once, therefore, these emissions will increase over the term of the Permit.	Impacts to climate from greenhouse gas emissions are anticipated to be similar to those under the Proposed Action alternative.
	Linear Projects	Use of motorized equipment during construction and maintenance activities will emit greenhouse gases into the atmosphere. These emissions are anticipated to be short-term and minor. As new, more fuel efficient equipment is used, fewer greenhouse gases will be emitted.	Impacts to climate from greenhouse gas emissions are anticipated to be similar to those under the Proposed Action alternative.
	Habitat Restoration, Enhancement, and Management Activities	Impacts to the climate from greenhouse gases emitted by motorized vehicles and prescribed burning would be minor. The amount of habitat to be burned in a given year, and the frequency of burns is low. Motorized equipment (including vehicles) used for mowing, mechanical brush removal, etc. may occur annually, but will only occur several weeks each year. Cattle used for habitat management purposes will emit methane, a greenhouse gas, however, the number of cattle to be used for such purposes on OSU property is not anticipated to be greater than the number of cattle that currently occupy the property.	Impacts to climate from greenhouse gas emissions from habitat restoration, enhancement, and management activities at parks/natural areas/open spaces are anticipated to be similar to those under the Proposed Action alternative. While the HCP conservation measures would not occur, impacts to Fender's blue butterfly habitat would require on-site mitigation. Since most mitigation would occur on private property, activities would

Environmental Component	Covered Activity	Proposed Action Alternative	No Action Alternative
			most likely be limited to mowing. Mowing would generate greenhouse gas emissions.
	Agricultural Activities	Impacts to the climate from greenhouse gas emissions are anticipated to be on-going, but minor. Only a small area (approximately 28.3 ha [70 acres]) is managed for agricultural purposes. This a very small amount of acreage compared to the amount of agricultural lands in Benton County.	Impacts to climate from greenhouse gas emissions are anticipated to be similar to those under the Proposed Action alternative.
	Emergency Activities	Impacts to the climate from greenhouse gas emissions are anticipated to be negligible from emergency activities.	Impacts to climate from greenhouse gas emissions are anticipated to be similar to those under the Proposed Action alternative.
Topography/Soils	Building Construction Project	Some topographic relief may be affected by construction projects depending on the slope of an individual lot. However, such impacts are expected to be minor. Soil compaction will occur from the use of heavy equipment during construction, and from buildings. Such impacts are anticipated to be minor.	Impacts to topography/soil are anticipated to be similar to those under the Proposed Action alternative.
	Linear Projects	Soil compaction will occur from the use of heavy equipment during construction and maintenance activities. Road maintenance activities are not anticipated compact soil as most equipment is driven on the road surface. Topographic impacts are not anticipated.	Impacts to topography/soil are anticipated to be similar to those under the Proposed Action alternative.

Environmental Component	Covered Activity	Proposed Action Alternative	No Action Alternative
	Habitat Restoration, Enhancement, and Management Activities	Soil compaction will occur from the use of heavy equipment for activities such as mowing, racking. Topographic changes are not anticipated.	Impacts to topography/soil are anticipated to be similar to those under the Proposed Action alternative.
	Agricultural Activities	Topographic changes are not anticipated. No additional soil compaction or changes in soil features are anticipated.	Impacts to topography/soil are anticipated to be similar to those under the Proposed Action alternative.
	Emergency Activities	Impacts to topography/soil are anticipated to be minor. Soil compaction will occur in areas where emergency vehicles are needed, areas cleaned of hazardous material spills, and areas utilized by fire fighting equipment. Topography may be affected in areas where fire fighting activities occur and from hazardous material spill cleanups.	Impacts to topography/soil are anticipated to be similar to those under the Proposed Action alternative.
Vegetation	Building Construction Project	Up to 100.9 ha (249.5 ac) of vegetation would be permanently removed through the construction of buildings (homes, accessory buildings, etc.). Vegetation would be temporarily removed during installation of utilities and septic systems, and placement of medical hardship buildings (which are on site temporarily). Up to 4.4 ha (10.8 ac) of vegetation would be permanently removed through construction of two rural schools and two rural fire stations.	Impacts to vegetation are anticipated to be similar to those under the Proposed Action alternative.

Environmental Component	Covered Activity	Proposed Action Alternative	No Action Alternative
	Linear Projects	Vegetation loss would occur from road construction projects. Up to 24.8 ha (61.2 ac) would be impacted from road construction activities. Road maintenance activities are not anticipated to permanently impact vegetation, which is mostly non-native. Vegetation loss from water and wastewater activities would be both permanent (structures) and temporary (underground pipelines). Vegetation loss from telephone utility and construction activities would be temporary (underground cable). Vegetation loss from activities authorized within the County's ROW would be permanent (driveways) and temporary (underground utilities).	Impacts to vegetation are anticipated to be similar to those under the Proposed Action alternative.
	Habitat Restoration, Enhancement, and Management Activities	Vegetation would be lost using solarization and shade cloth, however, these techniques are used in areas heavily infested with invasive species. Impacts to vegetation from mowing, spraying, and burning would be short-term. The long-term effects would be beneficial.	Impacts to vegetation from habitat restoration, enhancement, and management activities at parks/natural areas/open spaces would not differ between the two alternatives. The HCP conservation measures would not occur. While short-term negative effects would be avoided, long-term beneficial effects would not occur.
	Agricultural Activities	No permanent impacts to non-crop vegetation would occur under this alternative.	No permanent impacts to vegetation would occur under this alternative.

Environmental Component	Covered Activity	Proposed Action Alternative	No Action Alternative
	Emergency Activities	The amount of vegetation to be affected is not known. Fire fighting activities would affect vegetation through the construction of fire lines. The fire itself would have a long-term benefit to vegetation in the area burned. Vegetation would be affected by cleanup of hazardous material spills. However, the impacts from the cleanup are anticipated to be smaller than the impacts from the spill itself. Vegetation from emergency vehicles responding to an accident would be minor, and would most likely occur within the County or ODOT's right-of-way. With the exception of the ROW Special Management Areas, the majority of vegetation within rights-of-way area is non-native.	Impacts to vegetation are anticipated to be similar to those under the Proposed Action alternative.
Wildlife and Fish	Building Construction Activities	Building construction activities would result in the direct and indirect loss of wildlife and its habitat. Most impacts are expected to be permanent, but minor. Total habitat loss should not exceed 100.9 ha (249.5 ac).	Impacts to wildlife and fish are anticipated to be similar to those under the Proposed Action alternative.
	Linear Projects	Linear Projects would result in the direct and indirect loss of wildlife and its habitat. Impacts are anticipated to be minor. A bridge construction project could have impacts on fish and/or fish habitat.	Impacts to wildlife and fish are anticipated to be similar to those under the Proposed Action alternative.

Environmental Component	Covered Activity	Proposed Action Alternative	No Action Alternative
	Habitat Restoration, Enhancement, and Management Activities	Habitat restoration, enhancement, and management activities would result in the short-term direct and indirect loss of wildlife and its habitat. However, these activities over the long term would improve wildlife and fish habitat.	Impacts to wildlife and fish are anticipated to be similar to those under the Proposed Action alternative for activities at Parks/Natural Areas/Open Spaces. The HCP conservation measures would not occur. However, mitigation for impacts to Fender's blue butterfly habitat would occur on-site and wildlife, and potentially fish, would be affected by mitigation efforts.
	Agricultural Activities	No additional impacts to fish and wildlife are anticipated.	Impacts to wildlife and fish are anticipated to be similar to those under the Proposed Action alternative.
	Emergency Activities	Impacts to fish and wildlife are unknown, but likely to occur. The underlying activity would cause as much, if not greater harm to fish and wildlife.	Impacts to wildlife and fish are anticipated to be similar to those under the Proposed Action alternative.
Threatened and Endangered Species	Building Construction Activities	The construction of 1,280 homes, medical hardship dwellings, accessory buildings, agricultural buildings, and building additions in the Fender's Blue Zones would result in impacts to Fender's blue butterfly habitat in the amount of 346 m^2 (3,730 ft^2) Kincaid's lupine and 5,364 m^2 (57,740 ft^2) of native nectar species. Construction of two rural fire stations and two rural schools could would result in impacts to Fender's blue	Landowners would need to survey their property for Fender's blue butterfly or its habitat, and if present and impacts to the species or its habitat were unavoidable, obtain incidental take coverage only from the USFWS. The private landowners would mitigate for such impacts on-site. Such mitigation

Environmental Component	Covered Activity	Proposed Action Alternative	No Action Alternative
		butterfly habitat in the amount of 12.3 m^2 (116.5 ft^2) Kincaid's lupine and 222 m^2 (2,393 ft^2) of native nectar species. The County would first survey the property and make every effort to avoid impacts. Unavoidable impacts would be mitigated. Private landowners would receive take authorization from either the County (through a certificate of inclusion) or from the USFWS. These impacts would be mitigated at a 1:1 ratio at Benton County Fender's Blue Butterfly Conservation Areas – Fender's blue butterfly habitat on which conservation easements would be acquired (up to 20-24 ha [50-60 ac] of high quality prairie habitat) and protected in perpetuity. Butterfly habitat at these sites would be enhanced. Benton County residents would pay the cost of private landowner mitigation, where the landowner obtains take coverage from Benton County. The other six Covered Species do not have take authorization on private lands within the Fender's Blue Zone.	would be piecemeal, small, fragmented, and over the long-term, not likely to benefit the species. Landowners requiring an incidental take permit may be required to prepare a habitat conservation plan. Landowners would incur higher costs (surveying, mitigation) and time delays (can only survey during the butterfly's flight period). Mitigation for impacts on private lands would be paid for and conducted by the landowner, rather than by Benton County. For rural fire station and school construction activities, impacts would be the same under either alternative. However, take authorization requests and mitigation would be obtained on a project-by-project basis.

Environmental Component	Covered Activity	Proposed Action Alternative	No Action Alternative
	Linear Projects	The Linear Projects covered under the Proposed Action have the potential to affect Fender's blue butterfly habitat (Kincaid's lupine and native nectar species), Nelson's checkermallow, peacock larkspur, and Kincaid's lupine habitat not occupied by Fender's blue butterfly. These impacts would be mitigated based on a 1:1 ratio or 3:1 ratio.	Under the No Action alternative, these projects would still occur, however, take authorization from the USFWS (absent a federal nexus) would only be required for those projects impacting Fender's blue butterfly or its habitat (Kincaid's lupine or native nectar species). State and local Cooperators would be required to obtain authorization from the Oregon Department of Agriculture to impact the covered plant species located on lands owned or managed by the state or local Cooperators.
	Habitat Restoration, Enhancement, and Management Activities	Short-term negative effects to the Covered Species would occur as result of the covered habitat restoration, enhancement, and management activities. However, the overall long-term effects would be beneficial by preserving prairie habitat for the Covered Species. No mitigation is required for habitat restoration, enhancement, and management activities.	The County would not be required to enhance the 20-24 ha (50-60 ac) high quality prairie habitat supporting Fender's blue butterfly acquired through conservation easements. Mitigation for impacts to Fender's blue butterfly from private landowner, Benton County, and Cooperator's impacts would occur on-site.

Environmental Component	Covered Activity	Proposed Action Alternative	No Action Alternative
	Agricultural Activities	Agricultural activities are likely to impact 10 Nelson's checkermallow plants. The City would mitigate for these impacts at their Lancaster property at a 3:1 ratio for pre-mitigation or a 5:1 ratio for concurrent mitigation.	Under this alternative, the City would seek authorization from the Oregon Department of Agriculture to impact the species. No request for take authorization from USFWS would be required (no federal nexus).
	Emergency Activities	The County and Cooperators are seeking take authorization for all Covered Species for emergency activities. Mitigation to occur at PCAs based on 3:1 ratio for pre-mitigation or a 5:1 ratio for concurrent mitigation.	Under this alternative, the Cooperators would seek "after-the-fact" take authorization for any impacts to Fender's blue butterfly or its habitat from emergency activities. Take authorization for impacts to the other Covered Species is not required from USFWS, absent a federal nexus. State and local Cooperators would be required to obtain authorization from the Oregon Department of Agriculture to impact the covered plant species located on lands owned or managed by the state or local Cooperators.

Environmental Component	Covered Activity	Proposed Action Alternative	No Action Alternative
Water Resources	Building Construction Project	Additional water resources would be needed to accommodate the increase in growth of the Fender's Blue Zones. Impacts to water resources is expected to multiply over the Permit term as more and more people move into the Fender's Blue Zone. Water quality could be affected by increased erosion and sedimentation through storm-water runoff.	Impacts to water resources are anticipated to be similar to those under the Proposed Action alternative.
	Linear Projects	No impacts to water quantity are anticipated. Impacts to water quality are anticipated to be minor.	Impacts to water resources are anticipated to be similar to those under the Proposed Action alternative.
	Habitat Restoration, Enhancement, and Management Activities	No impacts to water quantity are anticipated. Impacts to water quality are anticipated to be minor.	Impacts to water resources are anticipated to be similar to those under the Proposed Action alternative.
	Agricultural Activities	No new impacts to water quantity or water quality are anticipated.	Impacts to water resources are anticipated to be similar to those under the Proposed Action alternative.
	Emergency Activities	Impacts to water quantity and water quality are not known, and would depend on where the emergency activity takes place. Some minor impacts to water quantity and quality are anticipated.	Impacts to water resources are anticipated to be similar to those under the Proposed Action alternative.

Environmental Component	Covered Activity	Proposed Action Alternative	No Action Alternative
Cultural and Archaeological Resources	Building Construction Project	Building construction projects have the potential to impact archaeological resources.	Impacts to cultural and archaeological resources are anticipated to be similar to those under the Proposed Action alternative.
	Linear Projects	Linear Projects have the potential to impact archaeological resources. A cultural resource survey should be conducted prior to undertaking these activities.	Impacts to cultural and archaeological resources are anticipated to be similar to those under the Proposed Action alternative.
	Habitat Restoration, Enhancement, and Management Activities	Habitat restoration, enhancement and management activities have the potential to impact archaeological resources. A cultural resource survey should be conducted prior to undertaking these activities.	Impacts to cultural and archaeological resources are anticipated to be similar to those under the Proposed Action alternative.
	Agricultural Activities	No impacts to archaeological resources are anticipated from these activities. Agricultural activities have been on-going for over 70 years at Owens Farm.	Impacts to cultural and archaeological resources are anticipated to be similar to those under the Proposed Action alternative.
	Emergency Activities	Emergency activities have the potential to impact archaeological resources.	Impacts to cultural and archaeological resources are anticipated to be similar to those under the Proposed Action alternative.

Environmental Component	Covered Activity	Proposed Action Alternative	No Action Alternative
Socio-Economic/ Environmental Justice	Building Construction Project	No Environmental Justice issues. New jobs in construction could be generated. The addition of 1,280 new buildings would increase property taxes providing additional revenues to the city and County.	Socio-economic impacts are anticipated to be similar to those under the Proposed Action alternative. No environmental justice issues.
	Linear Projects	No Environmental Justice issues. New jobs in the design and construction could be generated for road construction projects. New jobs could be generated for work authorized within the County's right-of-way.	Socio-economic impacts are anticipated to be similar to those under the Proposed Action alternative. No environmental justice issues.
	Habitat Restoration, Enhancement, and Management Activities	No Environmental Justice issues. A few jobs could be generated from these activities. Consultants would be hired to conduct monitoring, plant augmentation, mowing, prescribed burning, spraying activities.	Socio-economic impacts are anticipated to be similar to those under the Proposed Action alternative. No environmental justice issues.
	Agricultural Activities	No Environmental Justice issues. No new socio-economic impacts are anticipated.	Socio-economic impacts are anticipated to be similar to those under the Proposed Action alternative. No environmental justice issues.
	Emergency Activities	No Environmental Justice issues. The nature of the activity makes it difficult to predict the amount of impacts from this activity. However, as population increases, the need for additional emergency activities is anticipated. These impacts are anticipated to be minor.	Socio-economic impacts are anticipated to be similar to those under the Proposed Action alternative. No environmental justice issues.

Environmental Component	Covered Activity	Proposed Action Alternative	No Action Alternative
Air Quality	Building Construction Project	Motorized equipment used for building construction will emit pollutants into the air. These emissions are anticipated to be short term (less than two years) and minor. Emissions from the construction of new homes, buildings, school, and fire stations are anticipated to be on-going, and will increase during the Permit term. These impacts are anticipated to be minor. Air pollutants from motor vehicles (personal cars/trucks, school buses, fire trucks) are expected to increase as the population increases. However, annual emissions could decrease, despite the increase in the number of vehicles on the road, from the use of more energy efficient vehicles.	Impacts to air quality are anticipated to be similar to those under the Proposed Action alternative.
	Linear Projects	Motorized equipment used for construction of all Linear Projects would emit pollutants into the air. These impacts are anticipated to be short-term (< 2 years) and minor.	Impacts to air quality are anticipated to be similar to those under the Proposed Action alternative.
	Habitat Restoration, Enhancement, and Management Activities	Motorized equipment and burning would emit pollutants into the air. These impacts, while on-going (throughout the Permit term), are expected to be short term (< one month) in duration, and minor.	Impacts to air quality from habitat restoration, enhancement, and management activities are expected to be less under the No Action alternative. Since mitigation activities are not required under this alternative, less land would be burned.

Environmental Component	Covered Activity	Proposed Action Alternative	No Action Alternative
	Agricultural Activities	No additional impacts to air quality are anticipated from this activity. The level of service is estimated to remain the same through the Permit term, although as old equipment is replaced, cleaner burning equipment may be acquired lessening the impacts to air quality.	Impacts to air quality are anticipated to be similar to those under the Proposed Action alternative.
	Emergency Activities	No significant impacts to air quality are anticipated from emergency activities than those impacts already occurring.	Impacts to air quality are anticipated to be similar to those under the Proposed Action alternative.
Transportation	Building Construction Project	Minor Impacts to transportation system from increased number of vehicles using the County's road system as a result of new home construction and two new rural fire stations and two new rural schools. As the number of vehicles on the road increases, so does road deterioration.	Impacts to transportation are anticipated to be similar to those under the Proposed Action alternative.

Environmental Component	Covered Activity	Proposed Action Alternative	No Action Alternative
	Linear Projects	Road construction and maintenance projects will improve the transportation system. Work authorized within the County's rights-of-way is anticipated to have negligible effects on the County's transportation system through possible lane closures while work is being accomplished. Water and wastewater management may add additional vehicles to transportation network during construction, operations, and maintenance of the system. However, these impacts are anticipated to be negligible. Utility construction and maintenance activities will have negligible impacts on the County's transportation system.	Impacts to transportation are anticipated to be similar to those under the Proposed Action alternative.
	Habitat Restoration, Enhancement, and Management Activities	No anticipated impacts.	Impacts to transportation are anticipated to be similar to those under the Proposed Action alternative.
	Agricultural Activities	No anticipated impacts.	Impacts to transportation are anticipated to be similar to those under the Proposed Action alternative.
	Emergency Activities	Negligible impacts to transportation system occurring with potential road closures following an accident.	Impacts to transportation are anticipated to be similar to those under the Proposed Action alternative.