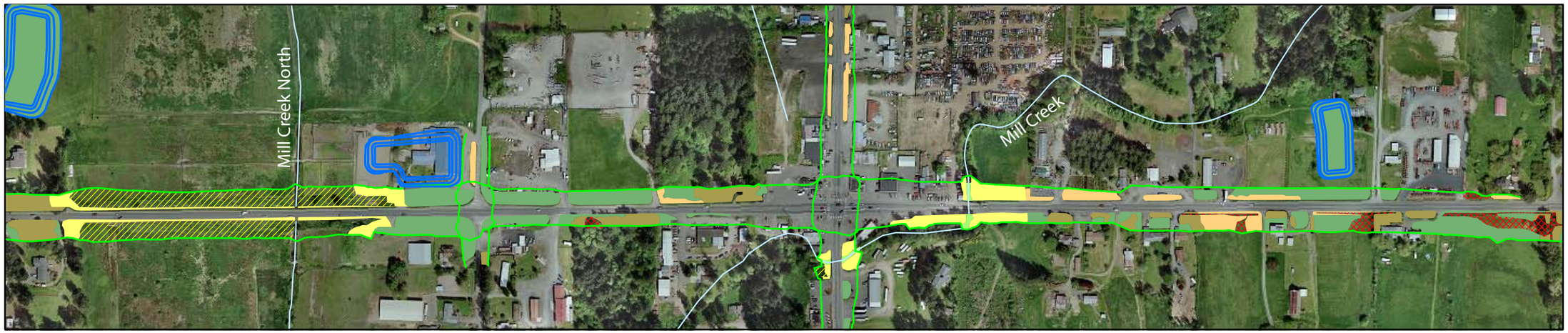
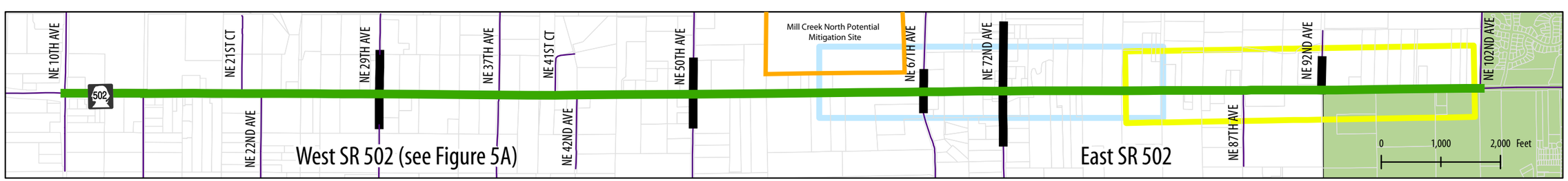
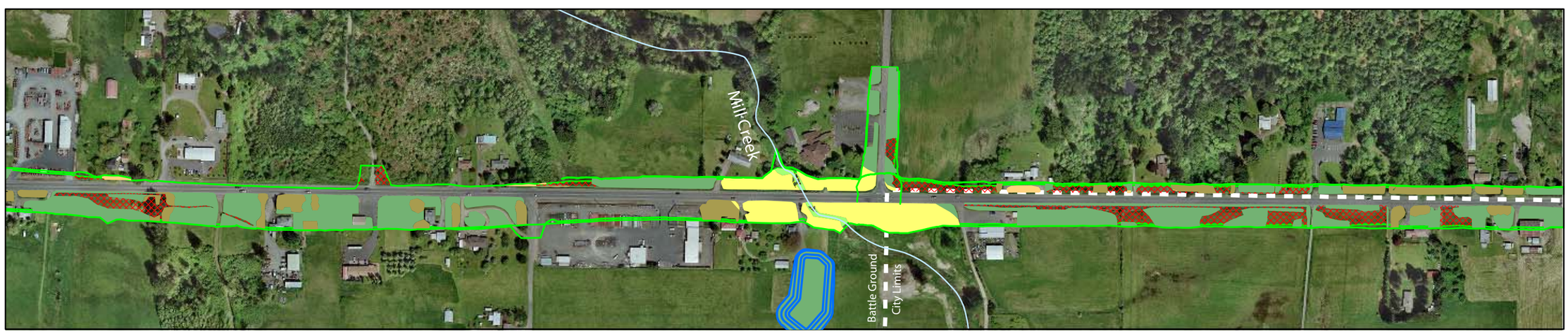
Figure 5B. Upland & Riparian Vegetation/Habitat Effects Map







N

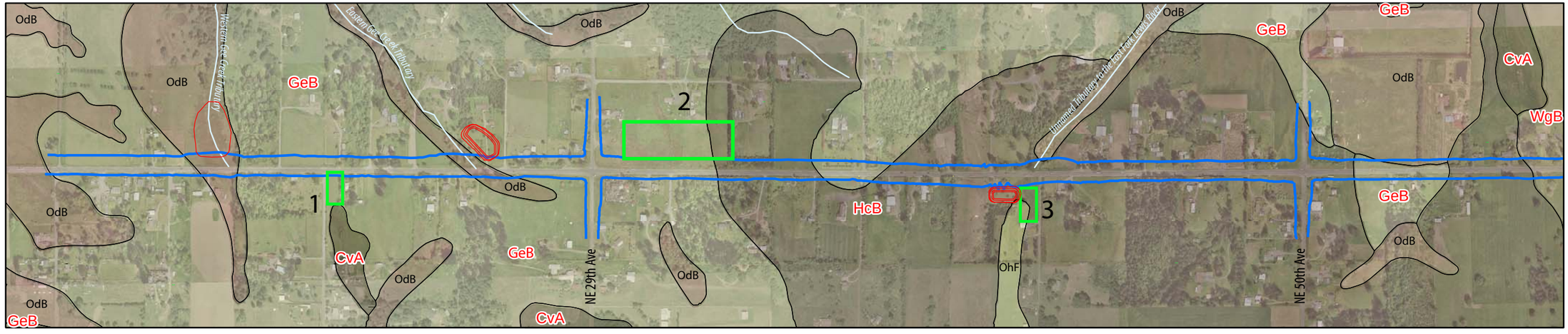
0 200 400
SCALE (feet)

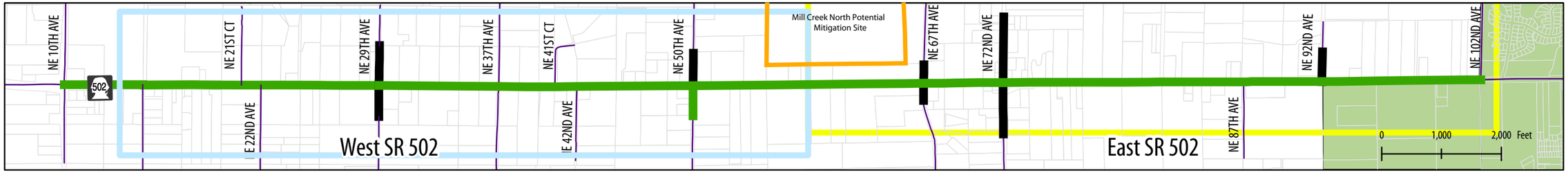
SR 502 CORRIDOR WIDENING
REDUCING CONGESTION • BUILDING FOR THE FUTURE
I-5 TO BATTLE GROUND

Road Widening Limits
Proposed Stormwater Treatment Wetland Detention Ponds
Upland Habitat
Wetland/In-Stream Habitat
Forested
Riparian Wetland
Grassland
Non-Wetland Below OHWM
Scrub/Shrub
Non-Riparian Wetland
Riparian Upland
Creeks/Rivers (1:24,000)
SR 502 Corridor Widening Project
Mill Creek North Potential Mitigation Site

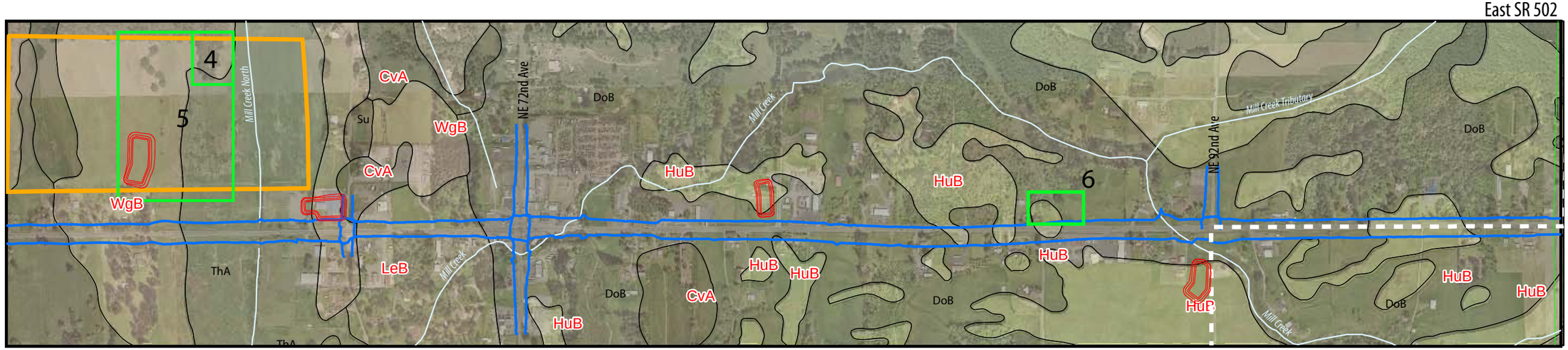
Figure 6: Potential Prairie Habitat & Prairie Indicator Soils

West SR 502





East SR 502



CvA: Cove silty clay loam, 0 to 3% slopes
DoB: Dollar loam, 0 to 5% slopes
GeB: Gee silt loam, 0 to 8% slopes
HcB: Hesson clay loam, 0 to 8% slopes
HoB: Hillsboro silt loam, 3 to 8% slopes
HoC: Hillsboro silt loam, 8 to 15% slopes
HuB: Hockinson loam, moderately well drained, 0 to 8% slopes
LeB: Lauren loam, 0 to 8% slopes
OdB: Odne silt loam, 0 to 5% slopes
OhF: Olequa silty clay loam, heavy variant, 20 to 45% slopes
Su: Semiahmoo muck, shallow variant
ThA: Tisch silt loam, 0 to 3 percent slopes
WgB: Washougal gravelly loam, 0 to 8% slopes

RED TEXT INDICATES PRAIRIE SOILS

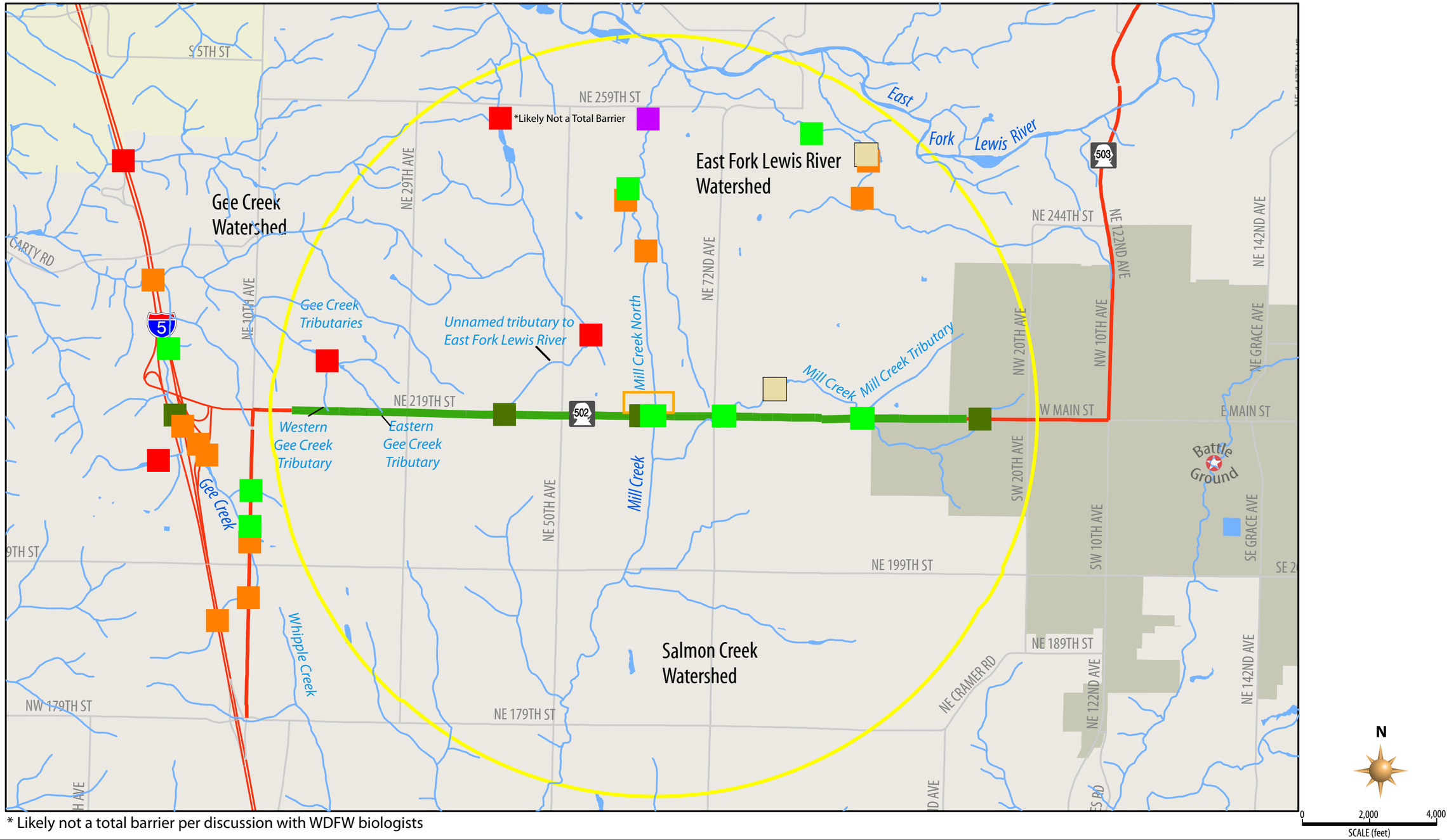
SR 502 CORRIDOR WIDENING
REDUCING CONGESTION • BUILDING FOR THE FUTURE
I-5 TO BATTLE GROUND

LEGEND
- Project Area
- Stormwater Ponds
- Mill Creek North Potential Mitigation Site
- Prairie Sample Areas 1-6
- Creeks/Rivers(1:24,000)
- SR 502 Corridor Widening Project

N

0 200 400
SCALE (feet)

Figure 7. Fish Passage



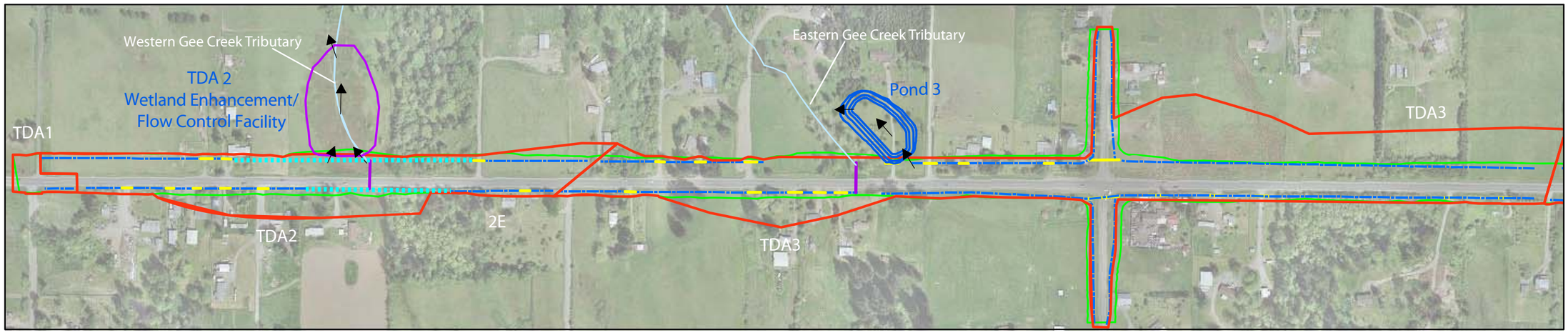
* Likely not a total barrier per discussion with WDFW biologists

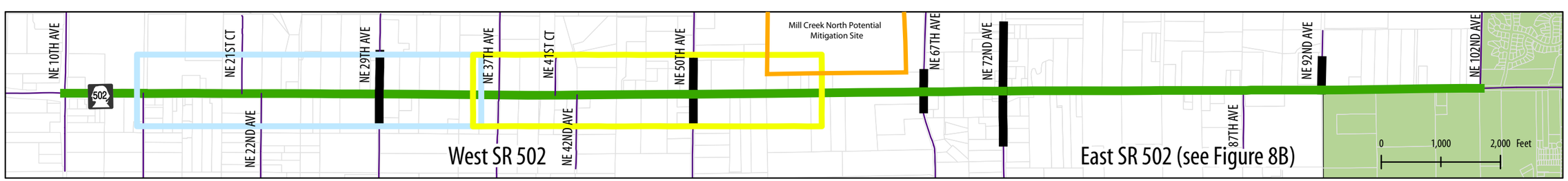
SR 502 CORRIDOR WIDENING
REDUCING CONGESTION • BUILDING FOR THE FUTURE
I-5 TO BATTLE GROUND

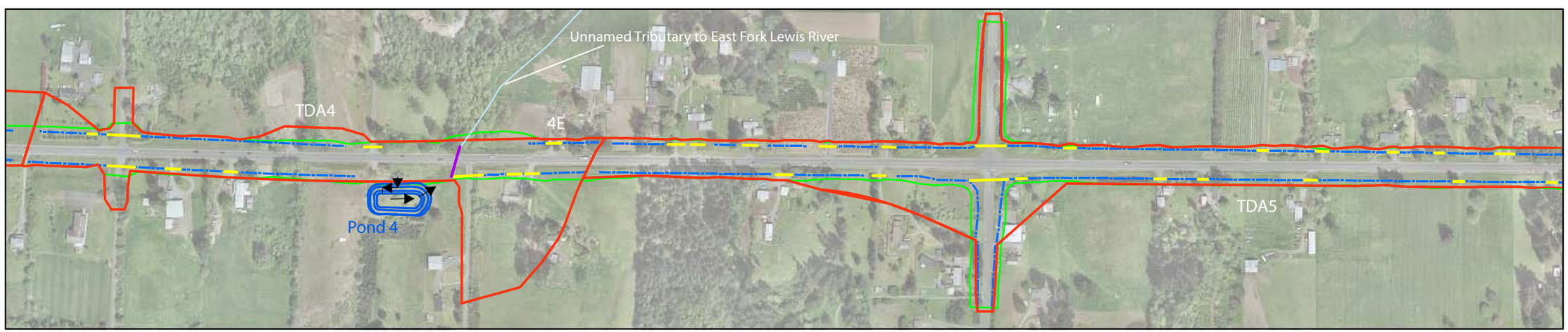
LEGEND

- Seconday Biological Study Area
- Non-Barrier
- Non-Fish Bearing
- Partial Barrier
- Fishway
- Total Barrier
- Unknown
- Creeks/Rivers (1:24,000)
- Waterbodies (1:24,000)
- Mill Creek North Potential Mitigation Site
- SR 502 Corridor Widening Project

Figure 8A. Stormwater Treatment







N

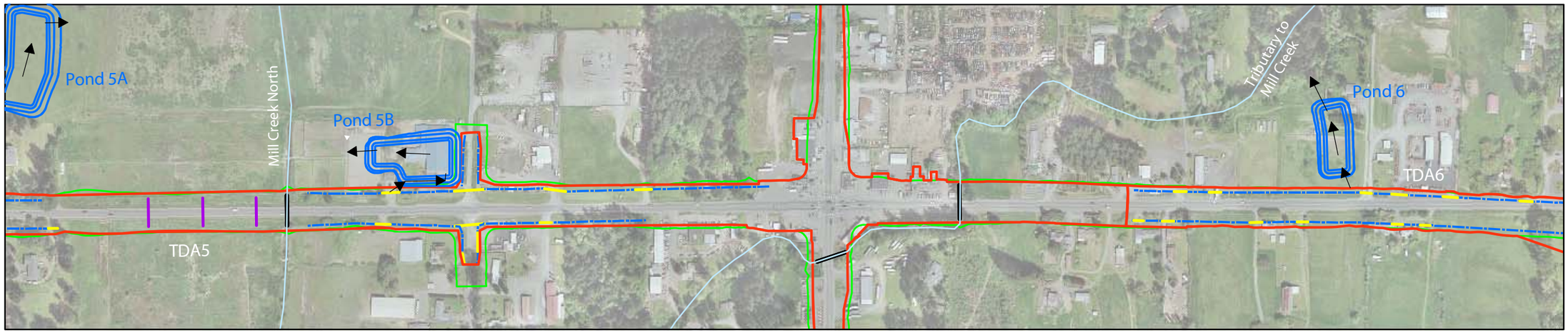
0 200 400
SCALE (feet)

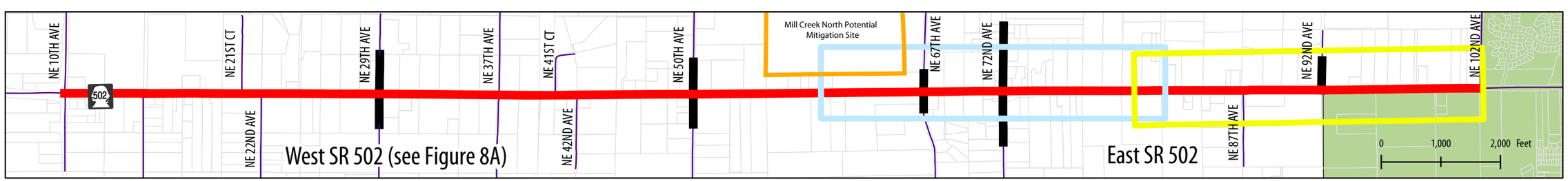
SR 502 CORRIDOR WIDENING
REDUCING CONGESTION • BUILDING FOR THE FUTURE
I-5 TO BATTLE GROUND

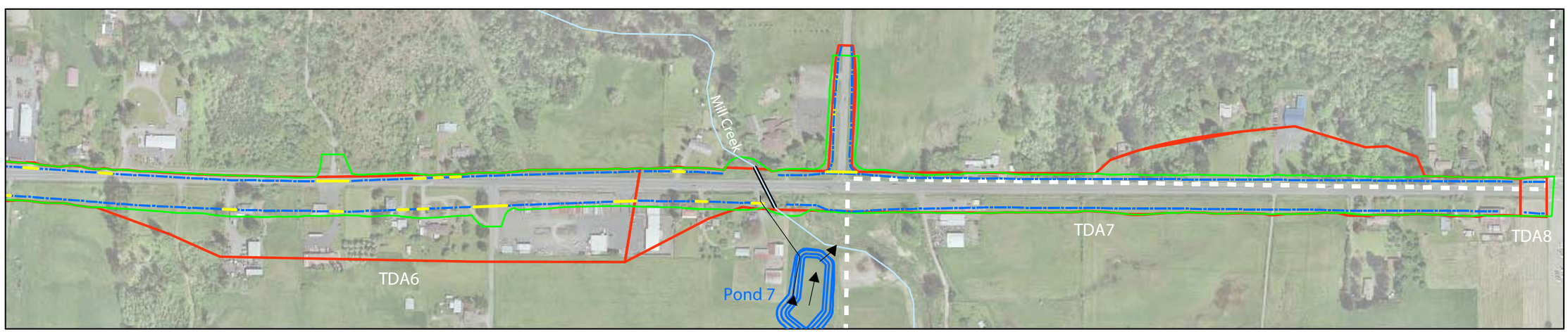
LEGEND

- Proposed Stormwater Treatment Wetland Detention Ponds
- Wetland Enhancement/ Flow Control Facility
- Replaced Non-Fish-Accessible Culvert
- TDA Boundary
- Extended Culvert
- New Ditch
- Media Filter Drain
- Proposed Inlet/Outfall Locations
- Road Widening Limits
- SR 502 Corridor Widening Project
- Creek/Rivers (1:24,000)
- Mill Creek North Potential Mitigation Site

Figure 8B. Stormwater Treatment







N

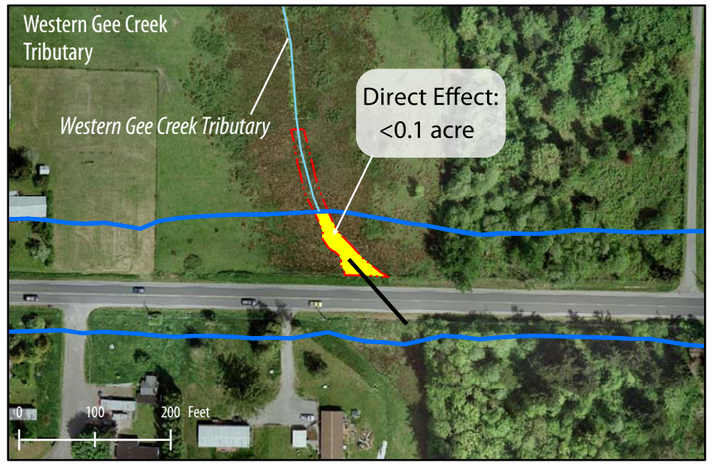
0 200 400
SCALE (feet)

SR 502 CORRIDOR WIDENING
REDUCING CONGESTION • BUILDING FOR THE FUTURE
I-5 TO BATTLE GROUND

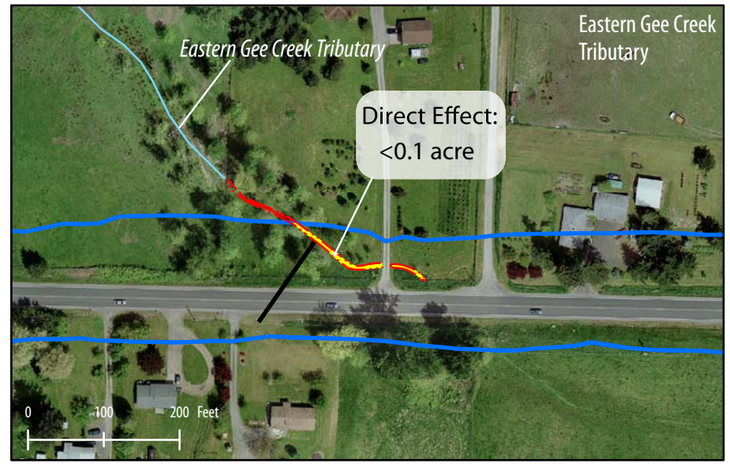
LEGEND

- Proposed Stormwater Treatment Wetland Detention Ponds
- TDA Boundary
- Replaced Non-Fish-Accessible Culvert
- Extended Culvert
- New Ditch
- Proposed Inlet/Outfall Locations
- Replaced Box Culvert
- Road Widening Limits
- Creeks/Rivers (1:24,000)
- SR 502 Corridor Widening Project
- Mill Creek North Potential Mitigation Site

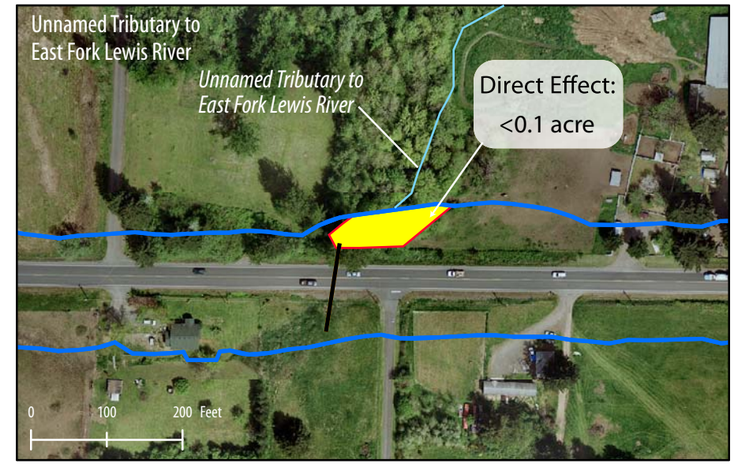
Figure 9. Effects Below OHWM in Fish-Bearing Streams



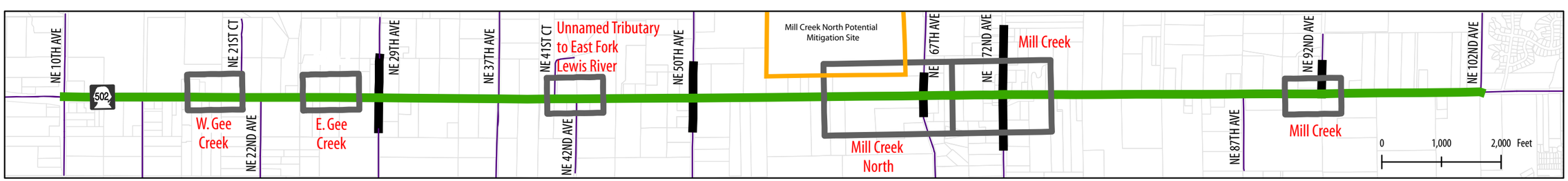
** No ESA Listed Fish Adjacent to Roadway*

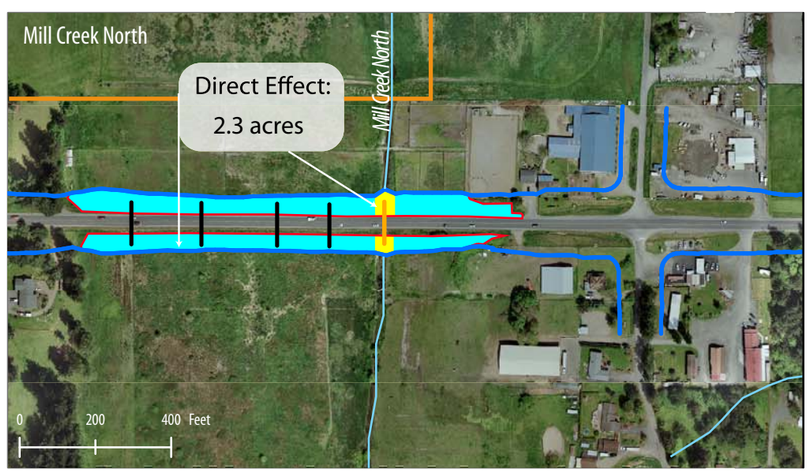


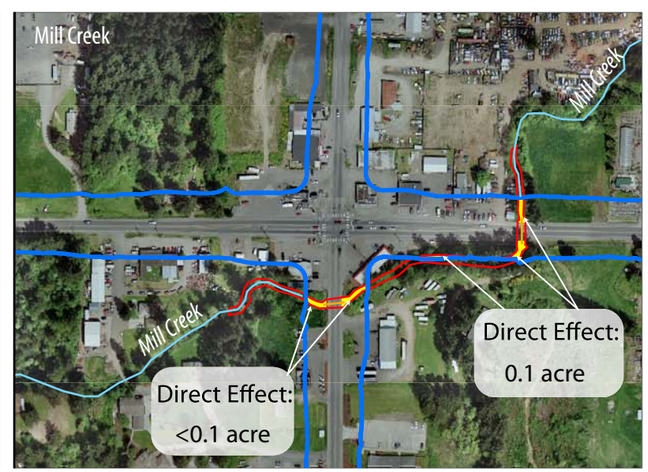
** No ESA Listed Fish Adjacent to Roadway*

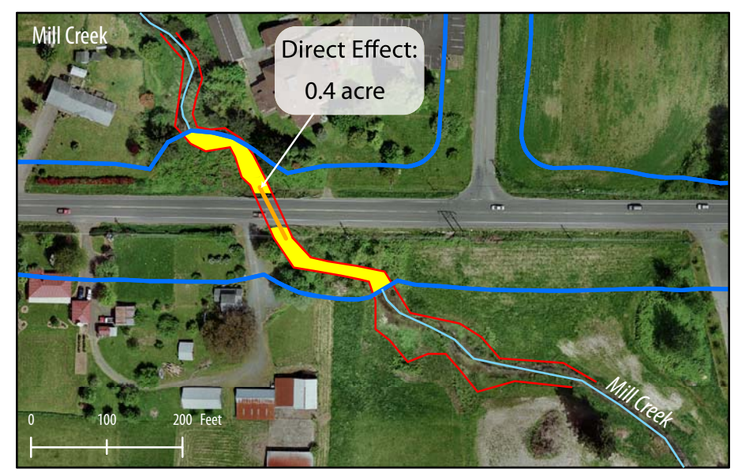


** No ESA Listed Fish Adjacent to Roadway*









N

SR 502 CORRIDOR WIDENING
REDUCING CONGESTION • BUILDING FOR THE FUTURE
I-5 TO BATTLE GROUND

LEGEND

- Roadway Widening Limits
- SR502 Corridor Widening Project
- Creeks/Rivers(1:24,000)

Ordinary High Water Mark/Wetland Boundary

- Photo Interpretation
- Surveyed

- Culvert Replacement/Extension
- Stream Channel Simplification
- Fill Placement in Seasonally Accessible Habitat
- Fish Passable Culvert Replacement/Extension
- Non-Fish Passable Culvert Replacement/Extension
- Mill Creek North Potential Mitigation Site

Appendix B

Wetland Summary Table

This page intentionally left blank.

Wetland	Wetland Classification		Ecology Rating				
	Cowardin Class	HGM Class	Category	Total Score	*Water Quality Score*	*Hydrologic Score*	*Habitat Score*
NA	PEM	RIV	II	58	4	32	22
NB	PFO	DEP	III	38	8	18	12
NC	PSS	DEP	IV	24	12	4	8
ND & NE	PEM, PFO	RIV	II	55	16	22	17
NF & SI	PEM, PFO	DEP	III	49	16	16	17
NG & NH	PFO	DEP	II	53	18	20	15
NGG	PEM	DEP	IV	27	16	4	7
NI & NJ	PEM, PFO	DEP	III	47	8	22	17
NK	PEM, PFO	DEP	III	47	12	18	17
NL	PEM	DEP	III	41	18	10	13
NN & SU	PEM	RIV	I	75	22	32	21
NO	PEM	DEP	IV	26	12	7	7
NQ	PEM	DEP	IV	19	8	4	7
NR	PSS	DEP	I	72	30	20	22
NS	PEM, PSS	DEP	II	57	22	16	19
NT	PEM, PFO	DEP	II	55	22	16	17
NU	PEM	DEP	III	49	18	16	15
NX	PEM, PFO	DEP	II	52	20	14	18
NY	PEM, PFO	DEP	III	44	24	4	16
NZ	PEM	DEP	IV	10	2	1	7

Wetland	Wetland Classification		Ecology Rating				
	Cowardin Class	HGM Class	Category	Total Score	*Water Quality Score*	*Hydrologic Score*	*Habitat Score*
NAA	PFO	DEP	II	66	26	16	24
NAB	PEM,PFO	DEP	IV	22	8	4	10
NAC	PFO	DEP	III	32	12	8	12
NAD	PFO	DEP	IV	28	12	4	12
NAE	PFO	DEP	III	33	11	8	14
NAF	PFO	DEP	III	41	18	10	13
NAG	PEM	DEP	III	45	18	16	11
SA	PEM,PFO	DEP	II	54	14	20	20
SB	PEM, PFO	DEP	III	49	16	18	15
SC	PEM	DEP	IV	27	6	12	9
SD	PEM	DEP	IV	17	6	4	7
SE & SF	PEM, PFO	DEP	III	34	4	18	12
SJ	PEM	DEP	IV	24	8	7	9
SKK	PEM	DEP	IV	24	8	7	9
SL							
SLL							
SN	PEM	DEP	III	31	4	18	9
SO	PFO	DEP	III	47	24	7	16
SP	PEM	DEP	III	40	16	10	14
SQ	PEM	DEP	IV	17	6	4	7
SR	PEM	DEP	IV	27	10	7	10
ST	PEM	DEP	IV	12	2	4	6
SV	PFO	DEP	III	47	20	14	13

Wetland	Wetland Classification		Ecology Rating				
	Cowardin Class	HGM Class	Category	Total Score	*Water Quality Score*	*Hydrologic Score*	*Habitat Score*
SVV	PEM	DEP	IV	24	2	12	10
SVW	PEM	DEP	IV	18	2	6	10
SX	PEM,PSS	DEP	II	51	12	20	19
SY	PEM	RIV	III	46	16	18	12
SZ	PEM	DEP	IV	22	2	12	8
SAA	PEM	DEP	III	40	14	14	12
SAB, NV, NW	PEM	RIV	IV	28	10	10	8
SAD	PEM	DEP	III	33	12	8	13
SAE	PEM	DEP	III	33	6	16	11
SAF & SAG	PFO, PSS, PEM	DEP	III	44	10	14	20
SAH	PEM	DEP	IV	20	8	4	8
SAI	PEM	DEP	IV	26	12	4	10
SAJ	PEM	DEP	IV	26	12	4	10
SAK	PEM	DEP	IV	30	12	8	10
SAM	PEM	DEP	IV	26	8	8	10
SAN	PEM	DEP	IV	16	4	5	7
SAO	PEM	DEP	IV	28	12	8	8
SAP	PEM	DEP	IV	27	16	4	7
SWD1 SWD2 SWD3 SWD4	PEM	DEP	IV	18	8	4	6

This page intentionally left blank.

Appendix C

Species Lists

This page intentionally left blank

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CRITICAL HABITAT; CANDIDATE SPECIES; AND SPECIES OF CONCERN IN CLARK COUNTY AS PREPARED BY THE U.S. FISH AND WILDLIFE SERVICE WESTERN WASHINGTON FISH AND WILDLIFE OFFICE

(Revised November 1, 2007)

LISTED

Bull trout (*Salvelinus confluentus*)

Gray wolf (*Canis lupus*)

Northern spotted owl (*Strix occidentalis caurina*)

Major concerns that should be addressed in your Biological Assessment of project impacts to listed species include:

1. Level of use of the project area by listed species.
2. Effect of the project on listed species' primary food stocks, prey species, and foraging areas in all areas influenced by the project.
3. Impacts from project activities and implementation (e.g., increased noise levels, increased human activity and/or access, loss or degradation of habitat) that may result in disturbance to listed species and/or their avoidance of the project area.

Castilleja levisecta (golden paintbrush) [historic]

Howellia aquatilis (water howellia)

Lomatium bradshawii (Bradshaw's lomatium)

Major concerns that should be addressed in your Biological Assessment of project impacts to listed plant species include:

1. Distribution of taxon in project vicinity.
2. Disturbance (trampling, uprooting, collecting, etc.) of individual plants and loss of habitat.
3. Changes in hydrology where taxon is found.

DESIGNATED

Critical habitat for bull trout

PROPOSED

None

CANDIDATE

(Brush Prairie) Mazama pocket gopher (*Thomomys mazama* ssp. *oregonus*)
Oregon spotted frog (*Rana pretiosa*)

SPECIES OF CONCERN

Aleutian Canada goose (*Branta canadensis leucopareia*)
Bald eagle (*Haliaeetus leucocephalus*)
California wolverine (*Gulo gulo luteus*)
Cascades frog (*Rana ascadae*)
Coastal cutthroat trout (*Oncorhynchus clarki clarki*) [southwest Washington DPS]
Larch Mountain salamander (*Plethodon larselli*)
Long-eared myotis (*Myotis evotis*)
Long-legged myotis (*Myotis volans*)
Northern goshawk (*Accipiter gentilis*)
Northwestern pond turtle (*Emys* (= *Clemmys*) *marmorata marmorata*)
Olive-sided flycatcher (*Contopus cooperi*)
Pacific lamprey (*Lampetra tridentata*)
Pacific Townsend=s big-eared bat (Corynorhinus townsendii townsendii)
Peregrine falcon (*Falco peregrinus*)
River lamprey (*Lampetra ayresi*)
Slender-billed white-breasted nuthatch (*Sitta carolinensis aculeata*)
Tailed frog (*Ascaphus truei*)
Van Dyke=s salamander (*Plethodon vandykei*)
Western gray squirrel (*Sciurus griseus griseus*)

Western toad (*Bufo boreas*)
Cimicifuga elata (tall bugbane)
Corydalis aquae-gelidae (Clackamas corydalis)
Lathyrus torreyi (Torrey's peavine) [historic]

Endangered Species Act Status of West Coast Salmon & Steelhead

(Updated Feb. 26, 2008)

Species[1]			*Endangered Species Act Listing Status*[2]	*ESA Listing Actions Under Review*
Sockeye Salmon (*Oncorhynchus nerka*)	1	Snake River	*Endangered*	
	2	Ozette Lake	*Threatened*	
	3	Baker River	*Not Warranted*	
	4	Okanogan River	*Not Warranted*	
	5	Lake Wenatchee	*Not Warranted*	
	6	Quinalt Lake	*Not Warranted*	
	7	Lake Pleasant	*Not Warranted*	
Chinook Salmon (*O. tshawytscha*)	8	Sacramento River Winter-run	*Endangered*	
	9	Upper Columbia River Spring-run	*Endangered*	
	10	Snake River Spring/Summer-run	*Threatened*	
	11	Snake River Fall-run	*Threatened*	
	12	Puget Sound	*Threatened*	
	13	Lower Columbia River	*Threatened*	
	14	Upper Willamette River	*Threatened*	
	15	Central Valley Spring-run	*Threatened*	
	16	California Coastal	*Threatened*	
	17	Central Valley Fall and Late Fall-run	***Species of Concern***	
	18	Upper Klamath-Trinity Rivers	*Not Warranted*	
	19	Oregon Coast	*Not Warranted*	
	20	Washington Coast	*Not Warranted*	
	21	Middle Columbia River spring-run	*Not Warranted*	
	22	Upper Columbia River summer/fall-run	*Not Warranted*	
	23	Southern Oregon and Northern California Coast	*Not Warranted*	
	24	Deschutes River summer/fall-run	*Not Warranted*	
Coho Salmon (*O. kisutch*)	25	Central California Coast	*Endangered*	
	26	Southern Oregon/Northern California	*Threatened*	
	27	Lower Columbia River	*Threatened*	• Critical habitat
	28	Oregon Coast[2]	*Threatened*	
	29	Southwest Washington	*Undetermined*	
	30	Puget Sound/Strait of Georgia	***Species of Concern***	
	31	Olympic Peninsula	*Not Warranted*	
Chum Salmon (*O. keta*)	32	Hood Canal Summer-run	*Threatened*	
	33	Columbia River	*Threatened*	
	34	Puget Sound/Strait of Georgia	*Not Warranted*	
	35	Pacific Coast	*Not Warranted*	
Steelhead (*O. mykiss*)	36	Southern California	*Endangered*	
	37	Upper Columbia River	*Endangered*	
	38	Central California Coast	*Threatened*	
	39	South Central California Coast	*Threatened*	
	40	Snake River Basin	*Threatened*	
	41	Lower Columbia River	*Threatened*	
	42	California Central Valley	*Threatened*	
	43	Upper Willamette River	*Threatened*	
	44	Middle Columbia River	*Threatened*	
	45	Northern California	*Threatened*	
	46	Oregon Coast	***Species of Concern***	
	47	Southwest Washington	*Not Warranted*	
	48	Olympic Peninsula	*Not Warranted*	
	49	Puget Sound	*Threatened*	• Critical habitat • Protective Regulations
	50	Klamath Mountains Province	*Not Warranted*	
Pink Salmon (*O. gorbuscha*)	51	Even-year	*Not Warranted*	
	52	Odd-year	*Not Warranted*	

1 The ESA defines a "species" to include any distinct population segment of any species of vertebrate fish or wildlife. For Pacific salmon, NOAA Fisheries considers an evolutionarily significant unit, or "ESU," a "species" under the ESA. For Pacific steelhead, NOAA Fisheries has delineated distinct population egments (DPSs) for consideration as "species" under the ESA

2 On Feb. 11, 2008, NOAA Fisheries published a final determination listing Oregon coast coho as threatened (73FR7816). This final rule also designated critical habitat and issued final protective regulations. The listing, critical habitat and protective regulations are effective on **May 12, 2008**.

This page intentionally left blank.

Appendix D

Prairie Plant Surveys

This page intentionally left blank.

PRAIRIE PLANT SUMMARY TABLE

SCIENTIFIC NAME	**COMMON NAME**
Agrostis capillaris	Colonial bentgrass
Alopecurus geniculatus	Water foxtail
Anthoxanthum odoratum	Sweet vernalgrass
Camassia quamash	Common camas
Cardamine penduliflora	Willamette Valley bittercress
Carex obnupta	Slough sedge
Festuca arundinacea	Tall fescue
Festuca rubra	Red fescue
Holcus lanatus	Common velvet grass
Juncus effusus	Soft rush
Leucanthemum vulgare	Oxeye daisy
Lotus corniculatus	Bird's foot trefoil
Lupinus polyphyllus	Large leaved lupine
Mahonia nervosa	Oregon grape
Oemleria cerasiformis	Indian plum
Phalaris arundinacea	Reed canarygrass
Poa spp.	Bluegrass
Polygonum lapathifolium	Willow weed
Prunella vulgaris	Self-heal
Pteridium aquilinum	Bracken fern
Quercus garryana	Garry oak
Ranunculus repens	Creeping buttercup
Ranunculus sceleratus	Celery-leaved buttercup
Rosa spp.	Rose species
Rubus discolor	Himalayan blackberry
Rubus ursinus	Trailing blackberry
Symphoricarpos albus	Common snowberry
Taraxacum officinale	Common dandelion
Trillium parviflorum	Small-flowered trillium
Vaccinium parvfolium	Red huckleberry
Vicia spp.	Vetch

SR 502 CORRIDOR WIDENING PROJECT

PRAIRIE SAMPLE AREA 1

SITE VISIT: MAY 13, 2008

Area 1 is emergent wetland. The area is bordered on the north by SR 502, NE 22th Avenue to the west, and a residence to the east. The wetland extends to the south, outside of the survey area. The surface of the site is hummocky and depressional areas exhibit evidence of seasonal ponding such as water stained leaves and drainage patterns. No standing water was present during the May site visit. The following vegetation data was collected at five sample plots, which characterize the variability of the vegetation community of the site. This site was mowed repeatedly in the following months, and therefore, this is the sole data set for this plant survey.

PLOT 1:

HERBACEOUS: 100%

Jun. eff., 30%

Car. obn., 30%

Tar. off., 40%

PLOT 2:

HERBACEOUS: 100%

Pha. aru., 10%

Jun. eff., 10%

Car. obn., 20%

Tar. off., 40%

Poa spp., 20%

PLOT 3:

HERBACEOUS: 100%

Pha. aru., 5%

Jun. eff., 5%

Car. obn., 10%

Tar. off., 20%

Poa spp., 20%

Ran. rep., 15%.

Hol. lan., 25%

PLOT 4:

HERBACEOUS: 100%

Car. obn., 20%

Ran. rep., 25%.

Jun. eff., 10%

Poa spp. 15%

Hol. lan., 20%

PLOT 5:

HERBACEOUS: 100%

Car. obn., 20%

Tar. off., 20%

Poa spp., 20%

Ran. rep., 20%.

Hol. lan., 20%

SR 502 CORRIDOR WIDENING PROJECT
PRAIRIE SAMPLE AREA 2
SITE VISIT: MAY 13, 2008

Area 2 is emergent wetland. The area is bordered on the south by SR 502, NE 29th Avenue to the west, and pasture/open fields to the east. The wetland extends to the north, outside of the survey area. The surface of the site is hummocky and depressional areas exhibit evidence of seasonal ponding such as water stained leaves and drainage patterns. Some standing water was present during the May site visit in a swale in the middle of the site. Area 2 is extensively grazed. Oregon ash is sprouting in some areas of the wetland. The following vegetation data was collected at five sample plots, which characterize the variability of the vegetation community of the site.

PLOT 1:

HERBACEOUS: 100%

Jun. eff., 20%

Agr. cap., 30%

Car. obn., 10%

Cam. qua., 10%

Ran. rep., 20%.

Lot. cor., 10%

PLOT 2:

HERBACEOUS: 100%

Jun. eff., 5%

Car. obn., 20%

Agr. cap., 20%

Ran. rep., 15%.

Lot. cor., 20%

Cam. qua., 10%

Hol. lan., 20%

PLOT 3:

HERBACEOUS: 100%

Tar. off., 10%

Agr. cap., 20%

Ran. rep., 15%.

Hol. lan., 25%

Lot. Cor., 30%

PLOT 4:

HERBACEOUS: 100%

Ran. rep., 10%.

Jun. eff., 10%

Agr. cap., 15%

Hol. lan., 20%

Fes. aru., 5%

Cam. qua., 20%

Lot. cor., 20%

PLOT 5:

HERBACEOUS: 100%

Jun. eff., 15%

Car. obn., 20%

Agr. cap., 20%

Lot. cor., 25%

Hol. lan., 20%

SR 502 CORRIDOR WIDENING PROJECT

PRAIRIE SAMPLE AREA 3

SITE VISIT: MAY 13, 2008

Area 3 is emergent wetland with adjacent upland. The area is bordered on the north by SR 502, and is directly west of NE 42nd Avenue. Some woody vegetation is emerging in portions of the site (Douglas' spirea). The following vegetation data was collected at five sample plots, which characterize the variability of the vegetation community of the site.

SR 502 CORRIDOR WIDENING PROJECT

PRAIRIE SAMPLE AREA 4

SITE VISIT: MAY 13, 2008

Area 4 is upland oak woodland located adjacent to emergent wetland. The area is bordered on the south by SR 502, and is west of NE 67th Avenue. The smaller oak woodland located due west of Area 4 is highly disturbed by agriculture; therefore, this area was not sampled. The following vegetation data was collected at four sample plots, which characterize the variability of the vegetation community of the site. The plant community in this area is consistent across the site.

PLOT 1:

HERBACEOUS: 60%	SHRUBS: 40%	Trees: 30%
Fes. aru, 10%	*Oem. cer.*, 20%	*Que. gar., 100%*
Unknown pasture grass 60%	*Vac. par.*, 10%	
Vic. sp. *20%*	*Ros. sp.*, 10%	
Pru. Vul., 10%	*Sym. alb., 5%*	
	Rub.urs. 20%	

PLOT 2:

HERBACEOUS: 60%	SHRUBS: 40%	Trees: 30%
Fes. aru, 40%	*Oem. cer.*, 50%	*Que. gar., 100%*
Unknown pasture grass 20%	*Ros. sp.*, 10%	
Vic. sp. *30%*	*Sym. alb., 15%*	
Pru. Vul., 10%	*Rub.urs.* 25%	
Cam. qua., trace		

PLOT 3:

HERBACEOUS: 60%	SHRUBS: 40%	Trees: 30%
Fes. aru, 10%	*Ros.* sp., 30%	*Que. gar., 100%*
Unknown pasture grass 60%	*Sym. alb., 40%*	
Vic. sp. *20%*	*Rub.urs.* 30%	
Pru. Vul., 10%		

PLOT 4:

HERBACEOUS: 60%	SHRUBS: 40%	Trees: 30%
Fes. aru, 40%	*Oem. cer.*, 30%	*Que. gar., 100%*
Unknown pasture grass 55%	*Vac. par.*, 5%	
Pru. vul., 5%	*Ros.* sp., 10%	
	Sym. alb., 35%	
	Rub.urs. 20%	

SR 502 CORRIDOR WIDENING PROJECT

PRAIRIE SAMPLE AREA 5

SITE VISIT: MAY 13, 2008

Area 5 is riparian wetland associated with Mill Creek North. The area is bordered on the south by SR 502, and is west of NE 67th Avenue. Although this area is identified as potential historic prairie, access by property owners was not granted, and therefore, data plots were not sampled. This area is planted and harvested as soon as the area is dry enough to access. Later in the summer, pasture grasses and reed canarygrass are likely plants present on site.

SR 502 CORRIDOR WIDENING PROJECT

PRAIRIE SAMPLE AREA 6

SITE VISIT: MAY 14, 2008

Area 6 is emergent wetland, and forested wetland occurs to the west. The area is bordered on the south by SR 502, and is west of NE 92nd Avenue, across the street from Northwest Pipeline. The following vegetation data was collected at five sample plots, which characterize the variability of the vegetation community of the site.

PLOT 1:

HERBACEOUS: 100%

Jun. eff., 10%
Lot. cor., 10%
Pha. aru., 25%
Lup. pol., trace
Car. Pen., trace
Leu.vul., 5%
Ant. odo., 5%
Fes. rub., 10%
Ran. sce., 10%
Hol. lan., 20%
Pru. vul., 5%

PLOT 2:

HERBACEOUS: 100%

Jun. eff., 25%
Lot. cor., 5%
Pha. aru., 10%
Fes. rub., 20%
Ant. odo., 10%
Ran. sce., 10%
Hol. lan., 20%

PLOT 3:

HERBACEOUS: 100%

Lot. cor., 10%
Fes. rub., 20%
Lup. pol., 5%
Leu.vul., 5%

PLOT 3, cont.:

Ant. odo., 10%
Fes. rub., 20%
Ran. sce., 10%
Hol. lan., 10%
Pru. vul., 10%

PLOT 4:

HERBACEOUS: 100%

Jun. eff., 10%
Lot. cor., 10%
Pha. aru., 5%
Leu.vul., 5%
Ant. odo., 10%
Fes. rub., 30%
Ran. sce., 5%
Hol. lan., 20%
Pru. vul., 5%

PLOT 5:

HERBACEOUS: 100%

Lot. cor., 10%
Pha. aru., 10%
Fes. rub., 10%
Lup. pol., 10%
Leu.vul., 10%
Ant. odo., 10%
Fes. rub., 20%
Hol. lan., 20%

SR 502 CORRIDOR WIDENING PROJECT

PRAIRIE SAMPLE AREA 1

SITE VISIT: NO SITE VISIT POSSIBLE DUE TO DISTURBANCE

Area 1 is emergent wetland. This site was mowed repeatedly in during June and July. Please see the May 2008 data for information on this site.

SR 502 CORRIDOR WIDENING PROJECT
PRAIRIE SAMPLE AREA 2
SITE VISIT: JUNE 9, 2008

Area 2 is emergent wetland. The area is bordered on the south by SR 502, NE 29th Avenue to the west, and pasture/open fields to the east. The wetland extends to the north, outside of the survey area. The surface of the site is hummocky and depressional areas exhibit evidence of seasonal ponding such as water stained leaves and drainage patterns. No standing water was present during the June site visit, but it was very moist in the center swale. Area 2 is extensively grazed. Oregon ash is sprouting in some areas of the wetland. The following vegetation data was collected at five sample plots, which characterize the variability of the vegetation community of the site.

PLOT 1:
HERBACEOUS: 100%
Jun. eff., 20%
Agr. cap., 30%
Car. obn., 10%
Cam. qua., 10%
Ran. rep., 10%.
Lot. cor., 20%

PLOT 2:
HERBACEOUS: 100%
Jun. eff., 5%
Agr. cap., 30%
Ran. rep., 5%.
Lot. cor., 30%
Cam. qua., 10%
Hol. lan., 20%

PLOT 3:
HERBACEOUS: 100%
Tar. off., 5%
Agr. cap., 25%
Ran. rep., 10%.
Hol. lan., 30%
Lot. Cor., 20%
Jun. eff., 10%

PLOT 4:
HERBACEOUS: 100%
Ran. rep., 20%.
Agr. cap., 20%
Hol. lan., 20%
Cam. qua., trace
Lot. cor., 40%

PLOT 5:
HERBACEOUS: 100%
Jun. eff., 10%
Agr. cap., 30%
Lot. Cor., 10%
Hol. lan., 30%
Cam. qua., 20%

SR 502 CORRIDOR WIDENING PROJECT
PRAIRIE SAMPLE AREA 3
SITE VISIT: JUNE 9, 2008

Area 3 is emergent wetland with adjacent upland. The area is bordered on the north by SR 502, and is directly west of NE 42nd Avenue. Some woody vegetation is emerging in portions of the site (Douglas' spirea). The following vegetation data was collected at five sample plots, which characterize the variability of the dominant vegetation community of the site.

PLOT 1:

HERBACEOUS: 100%

Jun. eff., 5%
Lot. cor., 10%
Fes. rub., 5%
Pha. aru., 10%
Alo. gen., 10%
Lup. pol., 20%
Fes. rub., 20%
Hol. lan., 20%

PLOT 2:

HERBACEOUS: 100%

Car. obn., 10%
Lot. cor., 30%
Fes. rub., 10%
Hol. lan., 20%
Pte. aqu., 10%
Pha. aru., 10%
Lup. pol., 10%
Cam. qua., trace

PLOT 3:

HERBACEOUS: 100%

Jun. eff., 10%
Lot. cor., 20%
Fes. rub., 5%
Pha. aru., 30%
Alo. gen., 5%
Lup. pol., 20%
Pte. aqu., 10%

PLOT 4:

HERBACEOUS: 100%

Car. obn., 10%
Lot. cor., 20%
Fes. rub., 10%
Pte. aqu., 10%
Pha. aru., 20%
Alo. gen., 10%
Lup. pol., 20%

PLOT 5:

HERBACEOUS: 100%

Jun. eff., 10%
Lot. cor., 20%
Fes. rub., 10%
Pha. aru., 20%
Hol. lan., 20%
Pte. aqu., 10%
Fes. aru., 10%

SR 502 CORRIDOR WIDENING PROJECT

PRAIRIE SAMPLE AREA 4

SITE VISIT: JUNE 10, 2008

Area 4 is upland oak woodland located adjacent to emergent wetland. The area is bordered on the south by SR 502, and is west of NE 67th Avenue. The smaller oak woodland located due west of Area 4 is highly disturbed by agriculture; therefore, this area was not sampled. The following vegetation data was collected at four sample plots, which characterize the variability of the vegetation community of the site. The plant community in this area is consistent across the site.

PLOT 1:

HERBACEOUS: 60%	SHRUBS: 40%	Trees: 30%
Fes. aru, 20%	*Oem. cer.*, 30%	*Que. gar., 100%*
Unknown pasture grass 60%	*Vac. par.*, 5%	
Vic. sp. *10%*	*Sym. alb., 25%*	
Pru. Vul., 10%	*Rub.urs.* 40%	

PLOT 2:

HERBACEOUS: 60%	SHRUBS: 40%	Trees: 30%
Fes. aru, 20%	*Oem. cer.*, 40%	*Que. gar., 100%*
Unknown pasture grass 40%		
Vic. sp. *30%*	*Ros.* sp., 10%	
Pru. Vul., 10%	*Sym. alb., 25%*	
Cam. qua., trace	*Rub.urs.* 25%	

PLOT 3:

HERBACEOUS: 60%	SHRUBS: 40%	Trees: 30%
Fes. aru, 20%		*Que. gar., 100%*
Unknown pasture grass 50%	*Oem. Cer., 10%*	
Vic. sp. *20%*	*Ros. sp.*, 10%	
Pru. Vul., 10%	*Sym. alb., 40%*	
	Rub.urs. 40%	

PLOT 4:

HERBACEOUS: 60%	SHRUBS: 40%	Trees: 30%
Fes. aru, 40%	*Oem. cer.*, 30%	*Que. gar., 100%*
Unknown pasture grass 60%	*Vac. par.*, 5%	
	Ros. sp., 10%	
	Sym. alb., 35%	
	Rub.urs. 20%	

SR 502 CORRIDOR WIDENING PROJECT

PRAIRIE SAMPLE AREA 5

SITE VISIT: ACCESS WAS NOT GRANTED

Area 5 is riparian wetland associated with Mill Creek North. The area is bordered on the south by SR 502, and is west of NE 67th Avenue. Although this area is identified as potential historic prairie, access by property owners was not granted, and therefore, data plots were not sampled. This area is planted and harvested as soon as the area is dry enough to access. Later in the summer, pasture grasses and reed canarygrass are likely plants present on site.

SR 502 CORRIDOR WIDENING PROJECT

PRAIRIE SAMPLE AREA 6

SITE VISIT: JUNE 10, 2008

Area 6 is emergent wetland, and forested wetland occurs to the west. The area is bordered on the south by SR 502, and is west of NE 92nd Avenue, across the street from Northwest Pipeline. The following vegetation data was collected at five sample plots, which characterize the variability of the vegetation community of the site.

PLOT 1:

HERBACEOUS: 100%

Jun. eff., 5%
Lot. cor., 20%
Pha. aru., 20%
Lup. pol., 10%
Leu.vul., 10%
Ant. odo., 10%
Fes. rub., 5%
Hol. lan., 20%

PLOT 2:

HERBACEOUS: 100%

Jun. eff., 10%
Lot. cor., 25%
Pha. aru., 25%
Fes. rub., 10%
Ant. odo., 5%
Ran. sce., 5%
Hol. lan., 20%

PLOT 3:

HERBACEOUS: 100%

Lot. cor., 20%
Lup. pol.,10%
Leu.vul., 10%
Ant. odo., 10%
Fes. rub., 20%
Ran. sce., 10%
Hol. lan., 10%
Pru. vul., 10%

PLOT 4:

HERBACEOUS: 100%

Lot. cor., 20%
Pha. aru., 20%
Fes. rub., 5%
Lup. pol., 15%
Leu.vul., 10%
Ant. odo., 10%
Hol. lan., 10%
Pru. vul., 10%

PLOT 5:

HERBACEOUS: 100%

Jun. eff., 10%
Lot. cor., 10%
Pha. aru., 20%
Lup. pol., 5%
Leu.vul., 10%
Ant. odo., 10%
Fes. rub., 5%
Ran. sce., 10%
Hol. lan., 10%
Pru. vul., 10%

SR 502 CORRIDOR WIDENING PROJECT

PRAIRIE SAMPLE AREA 1

SITE VISIT: NO SITE VISIT POSSIBLE DUE TO DISTURBANCE

Area 1 is emergent wetland. The area is bordered on the north by SR 502, NE 22th Avenue to the west, and a residence to the east. The wetland extends to the south, outside of the survey area. The surface of the site is hummocky and depressional areas exhibit evidence of seasonal ponding such as water stained leaves and drainage patterns. No standing water was present during the July site visit. The following vegetation data was collected at five sample plots, which characterize the variability of the vegetation community of the site. This site was mowed repeatedly during June and July of 2008, and the May 2008 is therefore the sole data set for this plant survey.

SR 502 CORRIDOR WIDENING PROJECT

PRAIRIE SAMPLE AREA 2

SITE VISIT: JULY 2, 2008

Area 2 is emergent wetland. The area is bordered on the south by SR 502, NE 29th Avenue to the west, and pasture/open fields to the east. The wetland extends to the north, outside of the survey area. The surface of the site is hummocky and depressional areas exhibit evidence of seasonal ponding such as water stained leaves and drainage patterns. No standing water was observed onsite during this site visit. Area 2 is extensively grazed. Oregon ash is sprouting in some areas of the wetland. The following vegetation data was collected at five sample plots, which characterize the variability of the vegetation community of the site.

PLOT 1:

HERBACEOUS: 100%

Jun. eff., 10%

Agr. cap., 20%

Car. obn., 10%

Ran. rep., 20%.

Lot. Cor., 40%

PLOT 2:

HERBACEOUS: 100%

Agr. cap., 20%

Ran. rep., 20%.

Lot. Cor., 30%

Pol. lap., 30%

PLOT 3:

HERBACEOUS: 100%

Agr. cap., 25%

Ran. rep., 25%.

Hol. lan., 10%

Lot. Cor., 30%

Mah. ner., 10%

PLOT 4:

HERBACEOUS: 100%

Ran. rep., 25%.

Agr. cap., 30%

Hol. lan., 5%

Lot. cor., 40%

PLOT 5:

HERBACEOUS: 100%

Jun. eff., 25%

Car. obn., 30%

Agr. cap., 20%

Lot. Cor., 25%

SR 502 CORRIDOR WIDENING PROJECT
PRAIRIE SAMPLE AREA 3
SITE VISIT: JULY 3, 2008

Area 3 is emergent wetland with adjacent upland. The area is bordered on the north by SR 502, and is directly west of NE 42nd Avenue. Some woody vegetation is emerging in portions of the site (Douglas' spirea). The following vegetation data was collected at five sample plots, which characterize the variability of the vegetation community of the site.

PLOT 1:
HERBACEOUS: 100%
Lot. cor., 20%
Pte. aqu., 15%
Pha. aru., 30%
Lup. pol., 15%
Hol. lan., 20%

PLOT 2:
HERBACEOUS: 100%
Jun. eff., 5%
Car. obn., 5%
Lot. cor., 20%
Pte. aqu., 10%
Pha. aru., 30%
Lup. pol., 10%
Leu. vul., 20%

PLOT 3:
HERBACEOUS: 100%
Jun. eff., 10%
Lot. cor., 30%
Fes. rub., 5%
Pha. aru., 30%
Alo. gen., 5%
Lup. pol., 20%

PLOT 4:
HERBACEOUS: 100%
Car. obn., 5%
Lot. cor., 30%
Pte. aqu., 15%
Pha. aru., 30%
Leu. vul., 20%

PLOT 5:
HERBACEOUS: 100%
Lot. cor., 20%
Pha. aru., 30%
Lup. pol., 20%
Hol. lan., 5%
Pru. vul., 5%
Leu. vul., 20%

SR 502 CORRIDOR WIDENING PROJECT

PRAIRIE SAMPLE AREA 4

SITE VISIT: NO ACCESS GRANTED

Area 4 is upland oak woodland located adjacent to emergent wetland. The area is bordered on the south by SR 502, and is west of NE 67th Avenue. The smaller oak woodland located due west of Area 4 is highly disturbed by agriculture; therefore, this area was not sampled. Access was not granted by the landowner and, therefore, no site visit was made in July 2008.

SR 502 CORRIDOR WIDENING PROJECT

PRAIRIE SAMPLE AREA 5

SITE VISIT: NO ACCESS GRANTED

Area 5 is riparian wetland associated with Mill Creek North. The area is bordered on the south by SR 502, and is west of NE 67th Avenue. Although this area is identified as potential historic prairie, access by property owners was not granted, and therefore, data plots were not sampled. This area is planted and harvested as soon as the area is dry enough to access. Later in the summer, pasture grasses and reed canarygrass are likely plants present on site.

SR 502 CORRIDOR WIDENING PROJECT

PRAIRIE SAMPLE AREA 6

SITE VISIT: JULY 3, 2008

Area 6 is emergent wetland, and forested wetland occurs to the west. The area is bordered on the south by SR 502, and is west of NE 92nd Avenue, across the street from Northwest Pipeline. The following vegetation data was collected at five sample plots, which characterize the variability of the vegetation community of the site.

PLOT 1:

HERBACEOUS: 100%

Jun. eff., 10%
Lot. cor., 50%
Pha. aru., 35%
Fes. rub., 5%

PLOT 2:

HERBACEOUS: 100%

Lot. cor., 35%
Fes. rub., 5%
Ant. odo., 10%
Ran. sce., 5%
Hol. lan., 10%
Leu. vul., 30%
Lup. pol., 5%

PLOT 3:

HERBACEOUS: 100%

Lot. cor., 30%
Lup. pol., 20%
Leu.vul., 30%
Ant. odo., 10%
Hol. lan., 10%
Pru. vul., trace

PLOT 4:

HERBACEOUS: 100%

Lot. cor., 30%
Lup. pol., 10%
Leu.vul., 30%
Ant. odo., 10%
Hol. lan., 10%
Pru. vul., 10%

PLOT 5:

HERBACEOUS: 100%

Jun. eff., 10%
Lot. cor., 20%
Pha. aru., 20%
Leu.vul., 30%
Ant. odo., 5%
Hol. lan., 10%
Pru. vul., 5%

This page intentionally left blank.

Appendix E

Environmental Baseline for Aquatic Habitats

This page intentionally left blank.

Water Quality

Refer to 303(d) List (http://www.ecy.wa.gov/programs/wq/303d/2002/2002-index.html)

Water Temperature:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Within the East Fork Lewis River watershed, water temperatures frequently exceed the 64° F (18° C) state standard, and have been occasionally documented in excess of 73.4° F (23° C) (LCFRB 2004b). The East Fork Lewis River had six reaches identified as exceeding state standards for water temperature on the 2004 Washington State 303(d) list of Impaired and Threatened Waterbodies (Ecology 2004). Elevated water temperatures have been identified as a major problem within the East Fork watershed, especially in tributaries that are lower in the watershed (Wade 2000). Within the East Fork Lewis River watershed, the baseline condition for water temperature is **not properly functioning.**

In large part, the Gee Creek watershed is degraded because of agricultural development within the watershed. Much of the Gee Creek watershed is ditched and lacks canopy cover because of deforestation for agriculture. Water temperatures are particularly high during August and September. The upper critical temperature for salmonids is generally in the 73-76° F range. Approximately 1.5 miles downstream of the project area, temperatures recorded in Gee Creek were above 64° F for 68 days and above 70° F for 4 days during summer 2004 temperature monitoring (JDW 2005). The creek also has numerous farm ponds, where water temperatures are significantly elevated. Within the Gee Creek watershed, the baseline condition for water temperature is **not properly functioning.**

Within the Salmon Creek watershed, development, septic systems, and agricultural activities have contributed significantly to increased water temperatures. One reach low in the Salmon Creek watershed (RM 2.058) was listed on the 2004 Ecology 303(d) list of Impaired and Threatened Waterbodies for chronic temperatures in excess of the state standard (Ecology 2004). A 2003 temperature study of the Salmon Creek watershed conducted by Clark County reported that temperatures exceeded the 64º F standard for protecting salmon and sensitive aquatic life at 12 of 15 study sites on at least 35 days, and that maximum temperatures at the seven warmest study sites exceeded 70º F each day for periods lasting from 1 to 6 weeks (Clark County 2003). Elevated water temperatures have been identified as the most serious limiting factor in terms of water quality within the watershed (Wade 2001). Within the Salmon Creek watershed, the baseline condition for water temperature is **not properly functioning.**

Within the biological study area, riparian vegetation is of poor quality along Mill Creek, Mill Creek North, and Gee Creek. The majority of the portions of the Gee Creek tributaries, the unnamed tributary to the East Fork Lewis River, Mill Creek North, the Mill Creek tributary, and Curtin Creek within the biological study area that are accessible to anadromous fish lack a riparian canopy. Riparian vegetation frequently consists of dense reed canarygrass or a sparse shrub layer. Along Mill Creek within the biological study area, the section that is north of SR

502 is moderately forested, and likely has buffered water temperatures. Sections of Mill Creek within the biological study area, however, lack a riparian canopy. Flows in all biological study area waterbodies tend to be very low to non-existent in the summer months. Where water exists during the summer, temperatures are elevated. Within the project biological study area, baseline conditions for water temperature are **not properly functioning**.

The project will: ☐ **Improve** ☐ **Maintain** ☐ **Degrade, or** ☒ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

The project will result in the removal of some riparian vegetation in association with culvert replacement and roadway widening activities. Some mature Douglas fir and black cottonwood will be removed from the areas that will be permanently impacted by culvert replacement or roadway fill. Proposed wetland mitigation and riparian restoration, including the restoration of approximately 3,000 to 5,000 linear feet of instream habitat near the headwaters of Curtin Creek will greatly offset any impacts to water temperature as a result of riparian vegetation removal. Additionally, potential restoration activities on Mill Creek North and potential channel realignment/ riparian enhancements on Mill Creek would further replace any lost function provided by impacted riparian habitat. The results of the proposed action will likely temporarily degrade the water temperature conditions within the biological study area. The results of the proposed action on water temperature will likely not be measurable at the watershed scale.

Sediment/Turbidity:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Within the East Fork Lewis River watershed, most sediment delivery in the lower portion of the river is from natural in-channel bed and bank erosion associated with channel migration and avulsions. Results of watershed modeling in 2004 indicated that 28 of 36 subwatersheds within the East Fork Lewis River subbasin were “moderately impaired” with respect to conditions that influence sediment supply (LCFRB 2004b). These impaired watersheds are predominantly located lower in the watershed, and increased sedimentation is attributed primarily to relatively high road densities within the watershed. Within the East Fork Lewis River watershed, the baseline condition for sediment/turbidity is **not properly functioning.**

While no specific data exists for the Gee Creek watershed, agriculture, development, and a lack of stormwater treatment have contributed to elevated turbidity and siltation throughout the watershed. Within the Gee Creek watershed, the baseline condition for sediment/turbidity is **not properly functioning.**

Within the Salmon Creek watershed, most stream systems receive excessive inputs of sediment, largely because of urbanization, agriculture, road density, and loss of riparian vegetation. Most stream channels within the watershed, including the upper reaches of Mill Creek, are largely silt-

covered with only minimal amounts of substrates suitable for spawning (Wade 2001). Within the Salmon Creek watershed, the baseline condition for sediment/turbidity is **not properly functioning.**

The ESA-listed fish-bearing waterbodies within the biological study area are low gradient low flow systems. Throughout the portions of the Gee Creek tributaries, the unnamed tributary to the East Fork Lewis River, Mill Creek North, the Mill Creek tributary, and Curtin Creek that are located within the biological study area, substrate consists almost exclusively of fine-grained sediments. The portion of Mill Creek that flows within the biological study area has somewhat less dominance of fine-grained sediments, although the predominant land uses within and upstream of the watershed deliver a significant amount of sediment to the system. Substrate embeddedness throughout the biological study area is consequently quite high, and turbidity is high during periods of input to the system. Within the project biological study area, baseline conditions for sediment and turbidity are **not properly functioning.**

The project will: ☐ **Improve** ☐ **Maintain** ☐ **Degrade, or** ☒ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

Installation and removal of temporary dewatering structures below the OHWM of biological study area waterbodies have the potential to increase sediment and turbidity temporarily within the biological study area. Potential impacts due to a temporary increase in sediment and turbidity will be minimized by appropriate BMPs and by conducting all work below the OHWM within the WDFW approved in-water work period (July 1–September 30). At the biological study area scale, the proposed action will likely temporarily degrade the baseline condition for sediment and turbidity. The proposed stormwater treatment system, in conjunction with proposed and potential wetland mitigation and riparian restoration activities, will likely improve sedimentation and turbidity conditions in the long term, although this improvement likely will not be significant enough to restore the baseline condition. At the watershed scale, the proposed action likely will not have measurable short- or long-term impacts on either sedimentation or turbidity.

Chemical Contamination/Nutrients:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Within the East Fork Lewis River watershed, three reaches are listed on the 2004 Ecology 303(d) list of Impaired and Threatened Waterbodies for elevated levels of fecal coliform (Ecology 2004). Agricultural activity and urbanization within the watershed likely contribute significant amounts of chemical contamination and excessive nutrient loads to the East Fork Lewis River and its tributaries. Within the East Fork Lewis River watershed, the baseline condition for chemical contamination/nutrients is determined to be **not properly functioning.**

The Gee Creek watershed has two reaches listed on the 2004 Ecology 303(d) list of Impaired and Threatened Waterbodies for elevated levels of fecal coliform (Ecology 2004). Clark County's

2004 Stream Health Report listed Gee Creek in poor health, due largely to runoff from agricultural use and development (Clark County 2004). The use by livestock of a significant number of artificially created ponds along the length of Gee Creek contributes to increased levels of bacteria, including fecal coliform. Within the Gee Creek watershed, the baseline condition for chemical contamination/nutrients is **not properly functioning.**

Within the Salmon Creek watershed, no reaches are identified on the 2004 Ecology 303(d) list of Impaired and Threatened Waterbodies for any water quality issues related to nutrient or chemical contamination. Tributaries that are higher in the watershed, such as Rock Creek, exhibit higher water quality conditions and are in relatively good health. Tributaries such as Cougar Creek, which is lower in the watershed and flows through heavily developed portions of Vancouver, exhibit poor water quality. Due to overall high levels of development and agriculture within the watershed, nutrient contamination is still seen as a primary limiting factor to salmon and steelhead reproduction and survival (Wade 2000). Within the Salmon Creek watershed, the baseline condition for chemical contamination/nutrients is **not properly functioning.**

Although no data is available for any of the streams within the biological study area, it is likely that chemical contamination and excessive nutrient loads are a problem. Due to the low gradient of the streams within the biological study area, and the combination of agricultural land uses and urbanization, it is likely that nutrient levels are elevated throughout the biological study area. Mill Creek, which flows through the biological study area, was identified as being in fair health. Although no stream reaches are specifically identified on Ecology's 303(d) list, this is likely because data was not collected for the tributaries that exist within the biological study area. Within the biological study area therefore, baseline conditions for chemical contamination/nutrients are **not properly functioning**.

The project will: ☐ **Improve** ☒ **Maintain** ☐ **Degrade, or** ☐ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

The proposed action includes a proposed stormwater management plan that will provide water quality treatment and flow control primarily through open conveyance in roadside ditches and culverts to media filter drains, a wetland/enhancement flow control facility, and approximately six newly constructed combined stormwater treatment wetland/detention ponds. In the vicinity of Dollars Corner and on 72nd Avenue, stormwater will be collected in catch basins and conveyed through a closed system via storm sewer to a combined stormwater treatment wetland/detention pond.

Although all stormwater from this new impervious surface will be treated and the overall concentration of pollutants in stormwater reduced, the project will increase the annual effluent loading of pollutants (zinc and copper in particular) within most TDAs and at the biological study area scale. Increased pollutant loads have the potential to decrease habitat suitability within biological study area waterbodies, although this potential has been minimized to the extent possible by the proposed stormwater treatment design. In addition to the constructed stormwater treatment, additional opportunity for stormwater infiltration and biological uptake of pollutants

will be provided by open conveyance in roadside ditches and from point of outfall from treatment facilities to a diffuse point of entry into the receiving waterbody, potentially further reducing the quantity and concentration of pollutants delivered to receiving waters.

Currently, no stormwater treatment is provided for impervious surface within the biological study area. Suspended and dissolved metals and other pollutants are being delivered directly to biological study area waterbodies. Given the baseline condition of receiving waterbodies and current lack of stormwater treatment within the biological study area, the increase in annual pollutant loading that will result from the proposed action is not likely to result in a measurable degradation of the baseline habitat condition at the biological study area scale, when compared to the reduction in pollutant concentrations outfalling to streams.

The project will likely have no measurable long-term impacts on chemical contamination or nutrient levels within the East Fork Lewis River, Gee Creek, or Salmon Creek watersheds. The results of the proposed action will maintain this indicator at each of the watershed scales.

Habitat Access

Physical Barriers:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Within the East Fork Lewis River watershed, there are no major barriers to fish migration along the mainstem of the East Fork of the Lewis River (WDFW 2007a, 2007b). However, partial and total barriers to fish passage are documented on several tributaries within the watershed. These barriers block access to more than 10 miles of habitat (LCFRB 2004b). The presence of these barriers that restrict fish passage at both high and low flows indicates that, within the East Fork Lewis River watershed, the baseline condition for physical barriers is **not properly functioning.**

Within the Gee Creek watershed, several culverts and dams represent both total and partial barriers to fish passage (WDFW 2007a). These documented barriers occur both on the main stem of Gee Creek and on tributaries. Beaver dams have also been identified on Gee Creek and its tributaries, which represent potential fish passage barriers (JDW 2005). Within the Gee Creek watershed, therefore, the baseline condition for physical barriers is **not properly functioning.**

Within the Salmon Creek watershed, fish passage is naturally blocked at RM 24.1 by Salmon Falls (LCFRB 2004a). Man-made barriers within the watershed include culverts, areas of shallow flow over agricultural land, and railroad and road crossings along some Columbia River tributaries (Wade 2001). These man-made barriers likely restrict fish passage at a range of flow conditions, and for this reason, the baseline condition for physical barriers within the Salmon Creek watershed is **not properly functioning.**

Within the biological study area, WDFW identifies two partial barriers to fish passage on Mill Creek North downstream of the biological study area. There is a documented total barrier to fish passage on the unnamed tributary to the East Fork Lewis River immediately north of NE 239th

Street, although WDFW biologists have indicated that they do not consider it to be a total barrier. Total and partial fish barriers have been documented on Gee Creek tributaries downstream of the biological study area. Within the biological study area, WDFW does not identify any specific barriers to fish passage on Gee Creek tributaries, as the tributaries are considered non fish-bearing within the biological study area due to downstream barriers. Fish passage on the unnamed tributary to the East Fork Lewis River attends at a point where the channel largely disappears in a residential field located just north of SR 502 (Figure 9). This location is not identified on WDFW's database of fish barriers, but WDFW biologists have confirmed that this is a total barrier to fish passage (WDFW 2007b). No documented barriers to fish passage have been identified in Mill Creek or points downstream along lower Salmon Creek. Due to the presence of man-made barriers that represent either total or partial barriers to fish passage during both high and low flow conditions within the project biological study area, baseline conditions for physical barriers are **not properly functioning**.

The project will: ☐ **Improve** ☒ **Maintain** ☐ **Degrade, or** ☐ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

The proposed action will replace three currently fish-passable culverts on Mill Creek and will either replace or extend another currently fish passable culvert on Mill Creek North. While these culverts are currently considered to be fish passable, their replacement and/or extension will likely result in improved fish mobility within and through the biological study area, although likely not enough to restore the baseline condition.

The portions of the biological study area waterbodies in which culverts will be replaced or extended are all in the uppermost portions of their respective sub-watersheds. Culvert replacement is not anticipated to open any new access to habitat for listed fish species at either the biological study area or watershed scale. For these reasons, it is anticipated that the proposed action will **maintain** this indicator at both scales.

Habitat Elements

Substrate:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Within the East Fork Lewis River watershed, sedimentation levels are naturally elevated due to avulsions and channel migrations (LCFRB 2004a). Basin-wide, watershed process modeling indicate that 28 of 36 sub-watersheds within the East Fork Lewis River watershed are "moderately impaired," with eight sub-watersheds listed as "functional" (LCFRB 2004a). The mainstem of the East Fork Lewis River has adequate spawning substrate, despite the naturally elevated sedimentation levels, but spawning habitat in most tributaries is generally of low- to moderate-quality Gravels and cobbles are largely lacking in tributaries, except in the upper reaches of the watershed (Rock Creek basin). The predominance of fine-grained sedimentation

indicates that, within the East Fork Lewis River watershed, the baseline condition for substrate is **not properly functioning.**

Within the Gee Creek watershed, past and present siltation has led to increased embeddedness of substrate and a predominance of fine-grained material. Portions of the mainstem of Gee Creek contain cobbles and gravel that are suitable for salmonid spawning habitat, but most tributaries are predominantly silt- and sand-dominant. Within the Gee Creek watershed, therefore, the baseline condition for substrate is **not properly functioning.**

Within the Salmon Creek watershed, sedimentation and compaction of spawning substrate is considered a major limiting factor to salmonid reproduction and survival (LCFRB 2004a). Fine sediments are dominant throughout the watershed due to stormwater runoff, development in riparian areas, stream-adjacent roads and trails, utility corridors, cattle-related impacts, and recreational activities (Wade 2001). The natural erodibility of soils within the watershed also contributes to the high potential for delivery of fine-grained sediments (LCFRB 2004a). Due to this predominance of fine-grained sediments, the baseline condition for substrate within the Salmon Creek watershed is **not properly functioning.**

Within the biological study area, Mill Creek is the only waterbody with any substrate that is suitable for salmonid spawning habitat. Substrate in the portion of Mill Creek that is within the biological study area generally consists of small to medium size cobbles and gravels, with only moderate embeddedness. Substrate within the Gee Creek tributaries consists almost entirely of silts and fine-grained sediments. Mill Creek North and the unnamed tributary to the East Fork lack a defined channel for much of their length within the biological study area, and substrate is uniformly fine-grained. Due to the predominance of fine-grained sediments and the overall lack of spawning gravels and cobbles, within the project biological study area, baseline conditions for substrate are **not properly functioning**.

The project will: ☐ **Improve** ☒ **Maintain** ☐ **Degrade, or** ☐ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

The project may increase sediment locally due to general construction activities, particularly during installation of temporary dewatering structures, which may have a temporary negative impact on substrate. Substrate within biological study area wetlands and waterbodies consists primarily of fine-grained silts and sands. Some suitable spawning gravel and cobble is present within Mill Creek, and Mill Creek is documented spawning habitat for coho salmon and steelhead. Stormwater treatment proposed as part of the proposed action will likely improve the overall sedimentation conditions within the biological study area in the long term, although not likely to the extent of reducing substrate embeddedness or restoring a dominance of larger substrate to biological study area waterbodies. No measurable long-term impacts on substrate are expected either within the project biological study area or at the watershed scale. For these reasons, it is anticipated that the proposed action will **maintain** this indicator.

Large Woody Debris:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Throughout the East Fork Lewis River watershed, recruitment of LWD is considered a concern due to the impacts of past forest fires and forest management within riparian areas (LCFRB 2004a). Surveys performed in the 1990s found that 92 percent of surveyed streams had less than 40 pieces of LWD per mile, and that 98 percent of streams surveyed had less than 80 pieces per mile (LCFRB 2004a). The low quantity of LWD, coupled with the low potential for recruitment, indicate that, within the East Fork Lewis River watershed, the baseline condition for LWD is **not properly functioning.**

No data is available about quantities of LWD within the Gee Creek watershed. However, very little riparian vegetation remains intact within the watershed, and the potential for recruitment of LWD is low. It is estimated based on field review and aerial photographic interpretation that due to the lack of riparian vegetation and extensive degree to which the mainstem and tributaries have been channelized and disturbed, the number of pieces of woody debris per mile is very likely below the proper functioning criteria of 80 pieces per mile. Within the Gee Creek watershed, therefore, the baseline condition for LWD is **not properly functioning.**

Within the Salmon Creek watershed, urban development, agriculture, and forest management practices have led to a significant reduction in the potential for recruitment of LWD. It is estimated based on field review and aerial photographic interpretation that due to the lack of riparian vegetation and extensive degree to which the mainstem and tributaries have been channelized and disturbed, the number of pieces of woody debris per mile is very likely below the proper functioning criteria of 80 pieces per mile. One stream system that may be meeting the proper functioning condition standard within the Salmon Creek watershed is the upper reaches of Rock Creek, which remains a viable source of potential LWD recruitment. However, at a watershed scale, the baseline condition for LWD is **not properly functioning.**

Within the biological study area, LWD is almost entirely lacking. The portion of Mill Creek that is within the biological study area has some LWD that meets the 24-inch diameter and 50 feet long criteria, primarily in the portion north of SR 502, where there is a forested riparian canopy for much of the length of the creek. Mill Creek North and the unnamed tributary to the East Fork Lewis River are devoid of LWD that meets these criteria, as are the Gee Creek tributaries. Riparian vegetation throughout the biological study area is largely dominated by emergent and shrub species. Where forested riparian habitat does exist, it is generally limited to small forested stands. Because of the fragmentation of riparian habitat associated with biological study area waterbodies, these small forested stands represent the only potential source of LWD recruitment. Within the project biological study area, therefore, baseline conditions for LWD are **not properly functioning**.

The project will: ☐ **Improve** ☐ **Maintain** ☐ **Degrade, or** ☒ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

The project will result in the removal of riparian vegetation within wetlands and waterways within the biological study area. Most of the riparian vegetation that will be impacted consists of emergent or scrub-shrub habitat. However, the impact to forested riparian areas along the unnamed tributary to the East Fork Lewis River and Mill Creek will result in the removal of mature Douglas fir and black cottonwood trees from those areas that will be permanently impacted by culvert replacement or roadway fill, and this represents a loss of potential future habitat for listed fish species.

Proposed wetland mitigation and riparian restoration, including the restoration of approximately 3,000 to 5,000 linear feet of instream habitat near the headwaters of Curtin Creek will greatly offset any impacts to water temperature as a result of riparian vegetation removal. Additionally, potential restoration activities on Mill Creek North and potential channel realignment/ riparian enhancements on Mill Creek would further replace any lost function provided by impacted riparian habitat. Mill Creek channel realignment/restoration activities would likely include removing a small amount of concrete bank armoring, realigning the stream channel, placement of LWD, and revegetating riparian areas with native plantings. At the biological study area scale, due to the removal of riparian vegetation, the indicator for LWD will be temporarily degraded, but will be maintained in the long term due to revegetation and restoration activities. The results of the proposed action on recruitment of LWD will not likely be noticeable at the watershed scale, and this indicator will be maintained at that scale.

Pool Frequency:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Throughout the lower East Fork Lewis River watershed, pool abundance and quality are a concern (LCFRB 2004a). A 2000 Limiting Factors Analysis identified specific concerns with the availability of pool habitat on the East Fork Lewis River mainstem between RM16.2 and RM32.7 (LCFRB 2004a). In the upper basin, a 1995 USFS watershed analysis identified 58 percent of surveyed streams as being substandard in pool frequency (USFS 1995). The low quantity of pools, coupled with the low potential for recruitment of woody debris within the watershed, indicate that, within the East Fork Lewis River watershed, the baseline condition for pool frequency is **not properly functioning.**

While no specific data is available for pool quantity within the Gee Creek watershed, estimates are that it does not meet the pool frequency standards for proper functioning condition. Additionally, very little mature riparian vegetation remains intact within the watershed, and the potential for recruitment of LWD is low. Within the Gee Creek watershed, therefore, the baseline condition for pool frequency is **not properly functioning.**

Within the Salmon Creek watershed, pool habitat is lacking in almost all of the stream systems due to alterations of flow regimes, channelization, and removal of mature riparian vegetation (LCFRB 2004a). Surveys conducted by the Clark County Conservation District (CCCD) showed

that only 10-15 percent of the Salmon Creek mainstem consisted of pool habitat, and that conditions in tributaries were the same or slightly worse (Wade 2001). Within the Salmon Creek watershed, therefore, the baseline condition for pool frequency is **not properly functioning.**

Within the biological study area, pool habitat is almost entirely lacking. Within Mill Creek, some shallow pool habitat is present within the biological study area, but these pools do not meet the minimum standard for proper functional condition. Within the project biological study area, therefore, baseline condition for pool frequency is **not properly functioning**.

The project will: ☐ **Improve** ☒ **Maintain** ☐ **Degrade, or** ☐ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

The project may increase sediment locally during installation of temporary dewatering structures, but this is not likely to have any measurable long-term impacts on pool frequency within either the project biological study area or the watershed. For this reason, it is anticipated that the proposed action will **maintain** this indicator.

Pool Quality:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

As mentioned above, pool abundance and quality are a concern throughout the East Fork Lewis River watershed (LCFRB 2004a). Riparian vegetation has been reduced in quantity and quality throughout the watershed as a result of development and agricultural and forest management practices. A relative abundance of fine-grained sediments has also reduced the overall volume and quality of existing pools. For these reasons, within the East Fork Lewis River watershed, the baseline condition for pool quality is **not properly functioning.**

No data is available for pool quality within the Gee Creek watershed, but estimates are that it does not meet the pool quality standards for proper functioning condition. Riparian vegetation has been reduced in quantity and quality throughout the watershed as a result of development and agricultural and forest management practices. What little deep pool habitat does exist is likely burdened by elevated water temperatures due to a lack of riparian cover. A relative abundance of fine-grained sediments has also reduced the overall volume and quality of existing pools. Within the Gee Creek watershed, therefore, the baseline condition for pool quality is **not properly functioning.**

Within the Salmon Creek watershed, pool habitat is also largely lacking and, where present, is likely of low quality, due to alterations of flow regimes, channelization, and removal of mature riparian vegetation (LCFRB 2004a). Especially in the lower reaches of the watershed, riparian vegetation has been reduced drastically in quantity and quality, and streambed substrates are predominantly fine-grained. Within the Salmon Creek watershed, therefore, the baseline condition for pool quality is **not properly functioning.**

Within the biological study area, pool habitat is almost entirely lacking. Within Mill Creek, some shallow pool habitat is present within the biological study area, but these pools do not meet the minimum standard for proper functional condition. Additionally, emergent and shrub species largely dominate riparian vegetation throughout the biological study area and provide little shade. Water temperatures are elevated throughout the biological study area. Within the project biological study area, therefore, baseline conditions for pool quality are **not properly functioning**.

The project will: ☐ **Improve** ☒ **Maintain** ☐ **Degrade, or** ☐ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

The project may increase sediment locally during installation of temporary dewatering structures. This is not likely to have any measurable long-term impacts on pool quality within either the project biological study area or the watershed. For this reason, it is anticipated that the proposed action will **maintain** this indicator.

Off-Channel Habitat:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Off-channel fish habitat is lacking throughout much of the East Fork Lewis River watershed (LCFRB 2004a). In the lower portion of the watershed, draining of wetlands and/or channelization have reduced historically available side-channel habitat (LCFRB2004a). In the upper watershed, off-channel habitat is scarce and, where present, is generally available only during periods of high flow (LCFRB 2004a). For these reasons, within the East Fork Lewis River watershed, the baseline condition for off-channel habitat is **functioning at risk.**

Off-channel habitat within the Gee Creek watershed is scarce, and does not meet the minimum standards for proper functioning condition. Development and agricultural practices have significantly altered wetlands and side-channel habitat, although some wetlands and low velocity side channels still occur within the watershed. Within the Gee Creek watershed, therefore, the baseline condition for off-channel habitat is **functioning at risk.**

Within the Salmon Creek watershed, much off-channel habitat has been significantly altered, drained, and channelized (LCFRB 2004a). Especially in the lower reaches of the watershed, what was once a network of braided channels has in many cases been reduced to a single, relatively higher energy drainage channel. Side-channel habitat has also been degraded or eliminated in many Salmon Creek tributaries (LCFRB 2004a). Within the Salmon Creek watershed, therefore, the baseline condition for off-channel habitat is **functioning at risk.**

Within the biological study area, off-channel habitat exists within wetlands associated with the unnamed tributary to the East Fork Lewis River, Mill Creek North, and Mill Creek. Most of these wetlands are inundated only seasonally and accessible likely only during periods of high

flow. The Mill Creek tributary represents potential off-channel habitat during periods of high winter flow. Within the project biological study area, therefore, baseline conditions for off-channel habitat are **functioning at risk**.

The project will: ☐ **Improve** ☒ **Maintain** ☐ **Degrade, or** ☐ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

The project will not result in any direct removal of any off-channel fish habitat, but may affect water quality and quantity conditions temporarily within some of the off-channel wetland habitat. Fish habitat in general is of low quality within off-channel wetland habitat in the biological study area, and is accessible likely only during periods of high winter flows. The project is not anticipated to have a measurable effect on off-channel habitat at either the watershed or the project biological study area scale. For this reason, it is anticipated that the proposed action will **maintain** this indicator.

Refugia:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Habitat refugia exist sparingly within the East Fork Lewis River watershed (LCFRB 2004a). Within the watershed, refugia generally consist of small, localized sections of off-channel habitat located within state or city parks or are parts of established mitigation or restoration projects. In the lower portion of the watershed, very little habitat is preserved and adequately buffered from development. In the upper watershed, off-channel habitat that serves as refugia is scarce and, where present, is generally available only during periods of high flow (LCFRB 2004a). In general, within the East Fork Lewis River watershed, the baseline condition for refugia is **functioning at risk.**

Refugia within the Gee Creek watershed are scarce. As with the East Fork Lewis River watershed, refugia within the Gee Creek watershed exist largely in the form of wetlands and side-channel habitat within city and County parks or protected as part of an established mitigation or restoration site. Generally, these types of sites are not buffered adequately to be able to sustain viable populations or subpopulations of listed fish species. Within the Gee Creek watershed, therefore, the baseline condition for refugia is **functioning at risk.**

Within the Salmon Creek watershed as well, refugia are largely wetlands and side-channel habitat that is located within city and County parks or protected as part of an established mitigation or restoration site. Generally, these types of sites are not buffered adequately to be able to sustain viable populations or subpopulations of listed fish species. The upper reaches of Salmon Creek and Rock Creek, while providing higher quality habitat, are generally not protected or buffered enough to function as refugia for populations of listed species. Within the Salmon Creek watershed, therefore, the baseline condition for refugia is **functioning at risk.**

Wetlands associated with the unnamed tributary to the East Fork Lewis River, Mill Creek North, and Mill Creek within the biological study area provide low-quality, seasonally accessible off-channel habitat, and may serve as refugia for listed fish species. None of these areas is protected or buffered adequately to be able to sustain viable populations or subpopulations of listed fish species. Within the biological study area, therefore, baseline conditions for refugia are **not properly functioning.**

The project will: ☐ **Improve** ☒ **Maintain** ☐ **Degrade, or** ☐ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

Within the biological study area, the project will result in approximately 2.6 acres of permanent impact below the OHWM of ESA-listed fish-accessible waterbodies which represent potential unprotected refugia.

Proposed wetland mitigation and riparian restoration, including the restoration of approximately 3,000 to 5,000 linear feet of instream habitat near the headwaters of Curtin Creek will greatly offset any impacts to water temperature resulting from riparian vegetation removal. Additionally, potential restoration activities on Mill Creek North and potential channel realignment/ riparian enhancements on Mill Creek would further replace any lost function provided by impacted riparian habitat. Mill Creek channel realignment/restoration activities would likely include removing a small amount of concrete bank armoring, realigning the stream channel, placement of LWD, and revegetating riparian areas with native plantings, which would greatly improve the quality of potential refugia for ESA-listed fish species. It is not anticipated, however, that these proposed improvements will restore the condition of the indicator to proper functioning condition. For this reason, it is anticipated that the proposed action will **maintain** this indicator.

Channel Conditions & Dynamics

Width/Depth Ratio:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Information is not available at the watershed scale regarding width/depth ratio in the East Fork Lewis River, Gee Creek, or Salmon Creek watersheds. Proper functioning condition is defined as a width/depth ratio of less than 10. While the mainstem of each of these waterbodies is likely close to meeting this requirement, because of channelization and isolation from the floodplain many of their tributaries likely do not. Lacking any specific information, it is presumed that at the watershed scale for the East Fork Lewis River, Gee Creek, and Salmon Creek watersheds, this indicator is **functioning at risk**.

The Gee Creek tributaries and the unnamed tributary to the East Fork Lewis River lack well-defined channels for most of their lengths within the biological study area. As a result, their width/depth ratios are significantly larger than 12. Mill Creek North has an artificial deeply

incised channel, which is connected to a larger floodplain wetland. The portion of Mill Creek that flows within the biological study area is confined to an incised channel, although flows are flashy, and water depths are highly variable. For these reasons, the baseline condition for width/depth ratio within the biological study area is **functioning at risk.**

The project will: ☐ **Improve** ☒ **Maintain** ☐ **Degrade, or** ☐ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

The planned mitigation at the Sunset Oaks mitigation, and the potential mitigation/restoration activities in Mill Creek North will restore the width/depth ratios of those two waterbodies to some degree, although not to the extent of restoring the baseline condition. The results of the proposed action on channel width/depth ratio will not likely be measurable at either the watershed or project biological study area scale, and the proposed action will **maintain** this indicator.

Streambank Condition:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Within the East Fork Lewis River watershed, bank stability is a major concern, especially along the lower mainstem, which has seen significant alteration due to agricultural, residential, and mining development (LCFRB 2004b). Current rates of channel adjustment are thought to be altered from their historic rates due to confinement of the river by levees and removal of riparian forest within the watershed (LCFRB 2004a). Bank stability problems in East Fork tributaries include streambank erosion on Mason Creek, cattle-related impacts on Rock Creek, and chronic mass wasting sites on upper Rock Creek and upper Lockwood Creek (Wade 2001). Within the East Fork Lewis River watershed, the baseline condition for streambank condition is **functioning at risk.**

Within the Gee Creek watershed, streambank stabilization has occurred along much of the mainstem and tributaries in order to protect urban and rural development (LCFRB 2004a). Bank hardening has protected many of the banks from erosion but in some cases has exacerbated erosion in adjacent areas (LCFRB 2004a). Within the Gee Creek watershed, the baseline condition for streambank condition is **functioning at risk.**

Within the Salmon Creek watershed, a recent avulsion on Salmon Creek has created an upstream migrating headcut between I-5 and 182nd Avenue. As a result, a 800- to 900-foot long section of the bank is actively eroding. There are also several documented bank stability problems on Salmon Creek tributaries (LCFRB 2004a). Within the Salmon Creek watershed, the baseline condition for streambank condition is **functioning at risk.**

The creeks and waterways within the biological study area are low gradient low flow systems. Throughout the portions of the Gee Creek tributaries, the unnamed tributary to the East Fork

Lewis River, and Mill Creek North within the biological study area, riparian vegetation consists primarily of emergent or scrub-shrub vegetation. The Gee Creek tributaries and the unnamed tributary to the East Fork Lewis River lack defined banks for much of their lengths within the biological study area. Mill Creek North is confined to an artificial, incised channel, which is actively eroding. Portions of the banks of Mill Creek are also actively eroding, predominantly in areas where riparian vegetation is lacking in the southern portion of the biological study area. Within the project biological study area, baseline conditions for streambank condition are **functioning at risk.**

The project will: ☐ **Improve** ☒ **Maintain** ☐ **Degrade, or** ☐ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

The proposed action will impact riparian vegetation on the banks of waterways within the biological study area, which could lead to a temporary increase in streambank instability. Most of the riparian habitat that will be impacted is dominated by invasive vegetation such as reed canarygrass and Himalayan blackberry, although some forested riparian habitat will also be impacted. The riparian and streambank habitat that will be impacted is limited to those areas that will be permanently impacted by the culvert replacement and placement of roadway fill. Any temporarily impacted areas will be promptly revegetated with native vegetation after construction, resulting in a long-term increase in bank stability. Additionally the TESC plan will greatly minimize the potential for any impacts to overall streambank condition at the biological study area scale.

Proposed wetland mitigation and riparian restoration, including the restoration of approximately 3,000 to 5,000 linear feet of instream habitat near the headwaters of Curtin Creek will greatly benefit streambank condition within Curtin Creek. Additionally, potential restoration activities on Mill Creek North and potential channel realignment/ riparian enhancements on Mill Creek would greatly improve the local streambank condition in those locations.

The results of the proposed action will likely measurably improve streambank stability within the biological study area, although likely not enough to restore the indicator to its proper functioning condition. At the watershed scale, the effects of the action will likely not be measurable. Therefore, the proposed action will **maintain** this indicator at both the biological study area and watershed scales.

Floodplain Connectivity:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Floodplain connectivity has been drastically reduced within the East Fork Lewis River watershed (LCFRB 2004a). In the lower portion of the watershed, over 50 percent of historic off-channel habitat and wetlands have been disconnected from the river as the mainstem has been

channelized (LCFRB2004a). For these reasons, within the East Fork Lewis River watershed, the baseline condition for floodplain connectivity is **not properly functioning.**

Floodplain connectivity has also been significantly reduced in the Gee Creek watershed. The mainstem of Gee Creek has been largely channelized as it flows through residential, agricultural, and industrial portions of Clark County. Within the Gee Creek watershed, therefore, the baseline condition for floodplain connectivity is **not properly functioning.**

Floodplain connectivity has also been significantly reduced within the Salmon Creek watershed. Salmon Creek and many of its tributaries have been extensively diked, drained, or rerouted. Especially in the lower reaches of the watershed, what was once a network of braided channels has in many cases been reduced to a single, relatively higher energy drainage channel. Within the Salmon Creek watershed, therefore, the baseline condition for floodplain connectivity is **not properly functioning.**

Within the biological study area, urban and agricultural development has resulted in significant draining and channelization of biological study area wetlands and waterways. Some off-channel habitat exists within wetlands associated with Mill Creek, Mill Creek North, and the unnamed tributary to the East Fork Lewis River, though many of these wetlands are inundated only seasonally. Mill Creek has been confined to an incised channel for much of its length within the biological study area, except within the vicinity of its confluence with Mill Creek North, where a narrow band of shallow floodplain exists. During high rainfall events, both Mill Creek and Mill Creek North are hydrologically connected to this floodplain. Within the project biological study area, therefore, baseline conditions for floodplain connectivity are **functioning at risk**.

The project will: ☐ **Improve** ☒ **Maintain** ☐ **Degrade, or** ☐ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

Proposed wetland mitigation and riparian restoration, including the restoration of approximately 3,000 to 5,000 linear feet of instream habitat near the headwaters of Curtin Creek will improve floodplain connectivity within Curtin Creek. Additionally, potential restoration activities on Mill Creek North and potential channel realignment/ riparian enhancements on Mill Creek would further improve floodplain connectivity within those waterbodies. Although these restoration activities will likely improve floodplain connectivity within the biological study area measurably, they will not likely restore the indicator to its proper functioning condition. At the watershed scale, the effects of the action will not likely be measureable. Therefore, the proposed action will **maintain** this indicator at both the biological study area and watershed scales.

Flow/Hydrology

Change in Peak/Base Flows:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Hydrology in the East Fork Lewis River watershed is predominantly the result of direct precipitation, with significant influence of rain-on-snow events in the upper watershed influencing peak flows. Peak stream flows are generated by rain events in fall, winter, and spring, and are augmented by snowmelt in the spring and early summer (LCFRB 2004a). Results of a 1999 instream flow study on the East Fork Lewis River and 13 tributaries indicated that, at certain times of the year, instream flows may be below optimal for fish at various life stages (LCFRB 2004a). Flows for Chinook spawning, which starts in October, were only 25 percent of the optimal flow in October, but reached 80 percent of optimal flow by November 1. Flows necessary for Chinook and juvenile steelhead rearing were only about 30 percent of optimal in August and September (Caldwell 1999). A 1995 USFS assessment indicated that many basins within the watershed have seen significant increases in the drainage network due to creation of roads and ditches and this has likely led to increases in peak flows (USFS 1995). For these reasons, within the East Fork Lewis River watershed, the baseline condition for peak/base flows is **functioning at risk.**

Within the Gee Creek watershed, peak and base flow conditions are typical of urban streams that have been extensively ditched and channelized. Gee Creek and its tributaries have been significantly ditched or otherwise disconnected from their historic floodplains, and compared to historic conditions, the amount of impervious surface within the basin has been significantly increased. Within the Gee Creek watershed, therefore, the baseline condition for peak/base flows is **not properly functioning.**

Peak and base flow conditions have also been significantly altered within the Salmon Creek watershed. Flows within Salmon Creek are largely tied to direct precipitation and there is little snowmelt influence within the watershed (LCFRB 2004a). Watershed development and water withdrawals have likely reduced streamflows significantly below historic levels. Mean monthly flows in Salmon Creek fell below 12 cubic feet per second (cfs) in 5 of the 10 years on record. Mill Creek was a perennial stream throughout its length before 1960; it now dries up by mid-July (Wade 2001). Instream flow analysis within Salmon Creek and several tributaries in 1999 indicated that fall flows were significantly below optimum conditions for salmonid spawning and rearing (Caldwell et. al. 1999). Within the Salmon Creek watershed, therefore, the baseline condition for peak/base flows is **not properly functioning.**

Within the biological study area, urban and agricultural development has significantly altered peak and base flow conditions. Biological study area waterways have been ditched extensively and/or isolated from their floodplains and a significant number of historic biological study area wetlands have been drained. Additionally, increases in road and impervious surface density have further impaired peak and base flow conditions throughout the biological study area. Within the project biological study area, therefore, baseline conditions for peak/base flows are **not properly functioning**.

The project will: ☐ **Improve** ☒ **Maintain** ☐ **Degrade, or** ☐ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

The proposed action includes a proposed stormwater management plan that will provide flow control primarily through open conveyance in roadside ditches and culverts to up to 10 newly constructed combined stormwater treatment wetland/detention ponds. In the vicinity of Dollars Corner and on 72nd Avenue, stormwater will be collected in catch basins and conveyed through a closed system via storm sewer to a combined stormwater treatment wetland/detention pond. Treated stormwater will outfall from the combined stormwater treatment/wetland detention ponds via an 18-inch outfall pipe, which will be constructed above the OHWM of any receiving waterbody.

The proposed stormwater treatment/flow control system will likely result in long-term improvements to the peak/base flow conditions within the biological study area. However, these improvements will not likely be significant enough to restore the indicator to proper functioning condition. At the watershed scale, the effects of the proposed action will not likely be measurable. Therefore, it is anticipated that the proposed action will **maintain** this indicator at both the biological study area and watershed scales.

Increase in Drainage Network:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

The drainage network at both the project biological study area and watershed scales is **not properly functioning**. There have been significant increases in the drainage network throughout the biological study area and within the biological study area watersheds due to road building and urban development.

The project will: ☐ **Improve** ☒ **Maintain** ☐ **Degrade, or** ☐ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

The proposed action includes a proposed stormwater management plan that will provide water quality treatment and flow control primarily through open conveyance in roadside ditches and culverts to media filter drains, a wetland/enhancement flow control facility, and approximately six newly constructed combined stormwater treatment wetland/detention ponds. In the vicinity of Dollars Corner and on 72nd Avenue, stormwater will be collected in catch basins and conveyed through a closed system via storm sewer to a combined stormwater treatment wetland/detention pond.

Given the baseline conditions of the watersheds and the biological study area, the current road density within the watersheds and biological study area, and the proposed stormwater treatment and flow control BMPs, the increased quantity of impervious surface is not likely to result in any measurable increase in drainage network within the biological study area or at the watershed scale. Therefore, it is anticipated that the proposed action will **maintain** this indicator at both the biological study area and watershed scales.

Watershed Conditions

Road Density & Location:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Road density and location within the East Fork Lewis River watershed are significantly outside the realm of proper functioning condition. While no specific data regarding road density is available at the watershed scale, a 1995 USFS assessment indicated that many basins within the watershed have seen significant increases in the drainage network due to creation of roads and ditches, likely leading to increases in peak flows (USFS 1995). Additionally, the East Fork Lewis River and a number of tributaries have roads that are located in the valley bottoms. For these reasons, within the East Fork Lewis River watershed, the baseline condition for road density and location is **not properly functioning.**

Within the Gee Creek watershed, road density is also quite high. Although no specific data is available regarding road density within the Gee Creek watershed, Gee Creek and the majority of its tributaries flow through urbanized portions of Clark County where road density is very high. Within the Gee Creek watershed, therefore, the baseline condition for road density and location is **not properly functioning.**

Road density and location are also well beyond the limits of proper functioning condition within the Salmon Creek watershed. Within the Lake River basin (which includes Salmon Creek, Burnt Bridge Creek, and Whipple Creek), road density has been measured at 9.7 mi/mi^2. Within the Salmon Creek watershed, therefore, the baseline condition for road density and location is **not properly functioning.**

Within the biological study area, with SR 502 and the network of roadways that cross it, road density is quite high. The number of places where roads cross waterbodies is also significant. Within the biological study area, it is determined that the baseline condition for road density and location is **not properly functioning**.

The project will: ☐ **Improve** ☒ **Maintain** ☐ **Degrade, or** ☐ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

The project will not result in any increase in road density or location, as the proposed action consists of widening an existing roadway. The results of the proposed action will have no measurable long-term impacts on road density or location, either within the project biological study area or at the watershed scale. Therefore, it is anticipated that the proposed action will **maintain** this indicator at both the biological study area and watershed scales.

Disturbance History:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Levels of disturbance within the East Fork Lewis River, Gee Creek, and Salmon Creek watersheds are likely outside the realm of proper functioning condition. There is no specific data regarding equivalent clearcut area (ECA) or late succession old-growth (LSOG) retention, but overall levels of urban, agricultural and industrial development are high within the watersheds. Logging activity has historically been high, and there are very few LSOG tracts remaining in the watersheds. Disturbance is distributed fairly uniformly within the watersheds, but sensitive habitats have been significantly altered from their historic conditions. For these reasons, within the East Fork Lewis River, Gee Creek, and Salmon Creek watersheds, the baseline conditions for disturbance history are **not properly functioning.**

Disturbance levels within the biological study area are also above the threshold for proper functioning condition. As part of the existing SR 502 corridor and its associated roadways and infrastructure, much of the project biological study area is developed. Much of the residential and agricultural developments have permanently altered the vegetation composition within the biological study area, removing mature forested vegetation, draining wetlands, channelizing creeks and other waterbodies, and adding impervious surface. There is no LSOG present within the biological study area. The indicator for disturbance history within the project biological study area is **not properly functioning**.

The project will: ☐ **Improve** ☒ **Maintain** ☐ **Degrade, or** ☐ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

The level of disturbance associated with the proposed action is consistent with the current level of disturbance associated with the SR 502 corridor. No measurable additional disturbance-related effects will result from the proposed action, either within the project biological study area or at the watershed scale. Therefore, it is anticipated that the proposed action will **maintain** this indicator at both the biological study area and watershed scales.

Riparian Reserves:

Briefly describe the current condition of this indicator at both the watershed scale and the project biological study area scale:

Riparian conditions within the East Fork Lewis River watershed have been substantially impacted by residential, agricultural, and mining development (LCFRB 2004a). Most of the mainstem has lost substantial amounts of riparian forest, much of it converted to lawns (LCFRB 2004a). Most tributaries throughout the watershed also have poor riparian conditions (Wade 2000). For these reasons, within the East Fork Lewis River watershed, the baseline condition for riparian reserves is **not properly functioning.**

Within the Gee Creek watershed, riparian conditions are also significantly disturbed. Although data is not available regarding riparian conditions within the Gee Creek watershed, Gee Creek and the majority of its tributaries flow through urbanized portions of Clark County, where riparian vegetation is largely lacking, or consists solely of invasive species such as Himalayan

blackberry and reed canarygrass. Within the Gee Creek watershed, therefore, the baseline condition for riparian reserves is **not properly functioning.**

Riparian conditions within the Salmon Creek watershed are poor (LCFRB 2004a). Development, agriculture, fill placement, and diking have eliminated most riparian vegetation along Lake River basin streams and tributaries, including Salmon Creek (LCFRB 2004a). Within the Salmon Creek watershed, therefore, the baseline condition for road density and location is **not properly functioning.**

Within the biological study area, the riparian reserve system is **functioning at risk**. Riparian vegetation has been altered significantly from the mosaic forest that likely historically covered the majority of the biological study area. Some forested riparian habitat exists along a section of Mill Creek. Elsewhere, riparian habitat consists largely of scrub-shrub and/or emergent vegetation, and most riparian vegetation along Mill Creek North, the unnamed tributary to the East Fork Lewis River, and the Gee Creek tributaries is dominated by reed canarygrass and/or Himalayan blackberry.

The project will: ☐ **Improve** ☐ **Maintain** ☐ **Degrade, or** ☒ **Temporarily degrade this indicator**

Briefly describe how, at both the watershed scale and the project biological study area scale:

The project will result in the removal of riparian vegetation along biological study area waterbodies. Most of the riparian vegetation that will be impacted consists of scrub-shrub habitat, but the impact to forested habitat along Mill Creek will result in the removal of mature Douglas fir and black cottonwood trees that currently provide shading and a potential source of LWD recruitment.

Proposed wetland mitigation and riparian restoration, including the restoration of approximately 3,000 to 5,000 linear feet of instream habitat near the headwaters of Curtin Creek will greatly offset any impacts to water temperature as a result of riparian vegetation removal. Additionally, potential restoration activities on Mill Creek North and potential channel realignment/ riparian enhancements on Mill Creek would further improve riparian conditions within those waterbodies. Mill Creek channel realignment/restoration activities would likely include removing a small amount of concrete bank armoring, realigning the stream channel, placement of LWD, and revegetating riparian areas with native plantings. The proposed action will likely temporarily degrade the riparian condition at the biological study area scale. Planned and potential restoration activities will likely result in a long-term improvement in riparian condition within the biological study area, though the improvement will not likely restore the indicator to proper functioning condition, so the indicator will be maintained in the long-term. The effects to riparian habitat will not be measurable at the watershed scale.

References

Caldwell, B. 1999. East Fork Lewis River fish habitat analysis using the instream flow incremental methodology and toe-width method for WRIA 27. Publication #99-151. Washington State Department of Ecology. Olympia, WA.

Caldwell, B., J. Shedd, H. Beecher. 1999 Washougal River fish habitat analysis using the instream flow incremental methodology and toe-width method for WRIAs 25, 26, 28, and 29. Washington State Department of Ecology. Olympia, WA.

City of Battle Ground. 2004. Battle Ground Comprehensive and Transportation Plan. Battle Ground, WA.

Clark County. 2004. Clark County Stream Health A comprehensive overview of the condition of Clark County's streams, rivers, and lakes. Clark County Public Works, Clean Water Program. Vancouver, WA.

Clark County. Adopted September 2004, revised December 2005. 20-Year Comprehensive Growth Management Plan 2003–2023. Vancouver, WA.

Clark County. 2003. Salmon Creek Watershed: Summer 2003 Stream Temperature. Clark County Public Works, Clean Water Program. Vancouver, WA.

JD White, a division of Berger/Abam Engineers Inc. (JDW). 2005. Biological Assessment – I-5/SR 502 Interchange Project. Clark County, Washington. March 2005.

Lower Columbia Fish Recovery Board (LCFRB). 2004a. Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan, Volume I—Regional Plan.

Lower Columbia Fish Recovery Board (LCFRB). 2004b. Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan, Volume II—Subbasin Plans.

US Forest Service (USFS). 1995. Lower Lewis River Watershed Analysis.

Wade, Gary. 2000. Salmon and Steelhead Limiting Factors Analysis – Water Resource Inventory Area (WRIA) 27.

Wade, Gary. 2001. Salmon and Steelhead Limiting Factors Analysis – Water Resource Inventory Area (WRIA) 28.

Washington Department of Ecology (Ecology). 2004. 2004 Final List of Threatened and Impaired Waterbodies – Section 303(d) List. Olympia, WA.

Washington Department of Fish and Wildlife (WDFW). 2007a. SalmonScape online database. Accessed at http://wdfw.wa.gov/mapping/salmonscape/index.html on October 29, 2007.

Washington Department of Fish and Wildlife (WDFW). 2007 b. Personal communication with Anne Friesz, November 8, 2007

Appendix F

Clark County Riparian Habitat Evaluation Forms

This page intentionally left blank.

CLARK COUNTY HABITAT CONSERVATION ORDINANCE
RIPARIAN HABITAT FIELD RATING FORM

Date: **12/21/07**

Investigator(s): **ES and TR**

Stream: **East Gee Creek Tributary north of SR502, between NE 23rd Court & NE 29th Ave.**

Legal: _____

Parcel #: _____

Stream Type: **Ns**

Reach #: _____

Land Use Designations

Zoning: _____

Shorelines: _____

Other: _____

Base Riparian Zone Width: **75 feet**

(Note: Complete 1 field rating form for each reach)

FISH HABITAT FUNCTIONS

Streamflow Influence

1 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

2 – Associated Wetlands	
Present	***+2***
Absent	+0

3 – Springs or Seeps	
Absent	***0***
Intermittent	1
Semi-Permanent	2
Permanent	3

4 – Hydrology (excess flows, erosion, scour, etc.)	
Present	-2
Absent	***+0***

Influence on water Temperature & Dissolved Oxygen

5 – Canopy Cover (%)	
0-33%	1
34-66%	***2***
67-100%	3

6 – Riffles (%)	
0%	***0***
1-16%	1
17-33%	2
34-50+%	3

Control of Sedimentation

7	10-33% Cover	34-66% Cover	67-100% Cover
0-33% Slope	1	2	***3***
33-66% Slope	0	1	2
67-100% Slope	0	1	2

8 – Vegetated Banks	
0-33%	***-2***
34-66%	1
67-100%	3

Dissolved Oxygen Measurements (optional): _____

Control of Stream Pollution

9 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

10 – Associated Wetlands	
Present	***+2***
Absent	+0

Contribution to Food Web

11 – Canopy Cover (%)	
0-33%	1
34-66%	***2***
67-100%	3

12 – Dominant Tree Species	
67-100%	***dec. 1***
67-100%	con. 1
33-66% mixed	3

13 – LWD (Pieces per BFW)	
0	***0***
1	1
2	2
3	3

***NOTE: Assessment criteria and scoring were based on conditions likely to be encountered. Users of this methodology may be required to exercise their best professional judgment as a result of unique site conditions.**

Stream Structural Diversity

Streams <10m (33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	***0***
0.1	1
0.2	2
>+0.3	3

Streams 10-20+m(33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	0
0.1-0.2	1
0.3-0.4	2
>+0.4	3

15 – Pools (%)	Gradient (%) <2%	2-5%	>5%
>55%	3	3	3
41-54%	2	3	3
31-40%	1	2	3
10-30%	0	1	2
<10%	***0***	0	1

16 – Riffles (%)	Gradient (%) <2%	2-5%	>5%
1-16%	***1***	1	0
17-33%	2	2	1
34-50%	2	3	2

17 – Off Channel Habitat	
Present	3
Absent	***0***

18 – Fines (%)	Gradient (%) <2%	2-5%	>5%
0-10%	2	2	2
11-44%	1	-3	-4
45-100%	***0***	-4	-5

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

Structural/Biological Complexity

Plant Species Diversity

19 – Native Woody Plant Species (#)	
0	0
1-3	***1***
4-6	2
7+	3

Vertical Diversity

20 – Multiple Canopy Layers	
1	***1***
2	2
3+	3

Snags

21 – Snags/Acre (20"+dbh, 6' high)	
0	***0***
1	1
2-3	2
4+	3

Downed Material

22 – Downed Logs/Acre (12"+ diam, 20'+ long)	
1	**1**
2-3	2
4+	3

Non-Native Plants

23 – Non-native Plant Species	
<10%	1
10-33%	-1
34-66%	***-2***
67-100%	-4

Connectivity with Other Ecosystems

24 – Riparian Corridor Connected to Other PHS Polygons or Points?	
No	***+0***
Yes	+2

Abundant Food Sources

25 – Native Woody Plant Species (#)	
1-3	***1***
4-6	2
7+	3
Specify:	

Available Water

26 – Hydrological Characteristics	
Intermittent	***1***
Semi-permanent	2
Permanent	3

Moist and Moderate Microclimate

27 – Temperature Microclimate Difference?	
Yes	***+2***
No	+0
Method:	

General Observations and Wildlife Occurrences

The main intermittent tributary collects runoff from a roadside ditch and culverts along the north side of SR502. A small side channel which intersects the main channel conveys water from the south through a culvert under SR502. The narrow, shallow main channel is approximately 3 feet wide and 4-6 inches deep. The channel winds through the low area of a landscaped yard. The riparian vegetation is predominantly grasses and herbaceous weeds with an overstory of mature Oregon ash. A few small ornamental shrubs have been planted in the riparian area.

EVALUATION SUMMARY

FISH HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Stream Flow Influence		
1 – Vegetative Cover	3	**3**
2 – Associated Wetlands	2	**2**
3 – Springs or Seeps	3	**0**
4 – Altered Hydrology	0	**0**
Influence on Water Temperature & D.O.		
5 – Canopy Cover	3	**2**
6 – Riffles	3	**0**
Ccontrol of Sedimentation		
7 – Slope/Vegetative Cover	3	**3**
8 – Vegetated Banks	3	**-2**
Control of Stream Pollution		
9 – Vegetative Cover	3	**3**
10 – Associated Wetlands	2	**2**
Contribution to Food Web		
11 – Canopy Cover	3	**2**
12 – Dominant Tree Species	3	**1**
13 – Large Woody Debris	3	**0**
Structural Stream Diversity		
14 – Large Wood Debris	3	**0**
15 – Pools	3	**0**
16 – Riffles	3	**1**
17 – Off-channel Habitat	3	**0**
18 – Fines	2	**0**
HABITAT SUBTOTAL (HS):	***48***	***17***

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Structural Complexity		
19 – Native Woody Plant Species	3	**1**
20 – Multiple Canopy Layers	3	**1**
21 – Snags	3	**0**
22 – Downed Logs	3	**1**
Connectivity		
23 – Non-native Plant Species	1	**-2**
24 – Connection to Other PHS	2	**0**
Abundant Food Sources		
25 – Native Woody Plant Species	3	**1**
Available Water		
26 – Hydrological Characteristics	3	**1**
Moist & Mild Microclimate		
27 – Temperature/Micro. Difference	2	**2**
WILDLIFE SUBTOTAL (WS)	***23***	***5***
Total: WS X% of Riparian Area that is Vegetated	23	**3.35**
TOTAL SCORE +1 for Type 1 waters (FISH+WILDLIFE FUNCTIONS):	***72***	***20.35***

CLARK COUNTY HABITAT CONSERVATION ORDINANCE
RIPARIAN HABITAT FIELD RATING FORM

Date: **12/21/07**

Investigator(s): **ES and TR**

Stream: **E.F. Tributary — north of SR502 and NE 42nd Avenue**

Legal: _____

Parcel #: _____

Stream Type: **Ns**

Reach #: _____

Land Use Designations

Zoning: _____

Shorelines: _____

Other: _____

Base Riparian Zone Width: **75 feet**

(Note: Complete 1 field rating form for each reach)

FISH HABITAT FUNCTIONS

Streamflow Influence

1 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

2 – Associated Wetlands	
Present	***+2***
Absent	+0

3 – Springs or Seeps	
Absent	***0***
Intermittent	1
Semi-Permanent	2
Permanent	3

4 – Hydrology (excess flows, erosion, scour, etc.)	
Present	-2
Absent	***+0***

Influence on water Temperature & Dissolved Oxygen

5 – Canopy Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

6 – Riffles (%)	
0%	0
1-16%	***1***
17-33%	2
34-50+%	3

Control of Sedimentation

7	10-33% Cover	34-66% Cover	67-100% Cover
0-33% Slope	1	2	***3***
33-66% Slope	0	1	2
67-100% Slope	0	1	2

8 – Vegetated Banks	
0-33%	-2
34-66%	***1***
67-100%	3

Dissolved Oxygen Measurements (optional): _____

Control of Stream Pollution

9 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

10 – Associated Wetlands	
Present	***+2***
Absent	+0

Contribution to Food Web

11 – Canopy Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

12 – Dominant Tree Species	
67-100%	***dec. 1***
67-100%	con. 1
33-66% mixed	3

13 – LWD (Pieces per BFW)	
0	0
1	1
2	***2***
3	3

***NOTE: Assessment criteria and scoring were based on conditions likely to be encountered. Users of this methodology may be required to exercise their best professional judgment as a result of unique site conditions.**

Stream Structural Diversity

Streams <10m (33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	***0***
0.1	1
0.2	2
>+0.3	3

Streams 10-20+m(33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	0
0.1-0.2	1
0.3-0.4	2
>+0.4	3

15 – Pools (%)	Gradient (%) <2%	2-5%	>5%
>55%	3	3	3
41-54%	2	3	3
31-40%	1	2	3
10-30%	0	1	2
<10%	***0***	0	1

16 – Riffles (%)	Gradient (%) <2%	2-5%	>5%
1-16%	***1***	1	0
17-33%	2	2	1
34-50%	2	3	2

17 – Off Channel Habitat	
Present	3
Absent	***0***

18 – Fines (%)	Gradient (%) <2%	2-5%	>5%
0-10%	2	2	2
11-44%	1	-3	-4
45-100%	***0***	-4	-5

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

Structural/Biological Complexity

Plant Species Diversity

19 – Native Woody Plant Species (#)	
0	0
1-3	1
4-6	2
7+	***3***

Vertical Diversity

20 – Multiple Canopy Layers	
1	1
2	***2***
3+	3

Snags

21 – Snags/Acre (20"+dbh, 6' high)	
0	***0***
1	1
2-3	2
4+	3

Downed Material

22 – Downed Logs/Acre (12"+ diam, 20'+ long)	
1	***1***
2-3	2
4+	3

Non-Native Plants

23 – Non-native Plant Species	
<10%	1
10-33%	***-1***
34-66%	-2
67-100%	-4

Connectivity with Other Ecosystems

24 – Riparian Corridor Connected to Other PHS Polygons or Points?	
No	***+0***
Yes	+2

Abundant Food Sources

25 – Native Woody Plant Species (#)	
1-3	1
4-6	2
7+	***3***
Specify:	

Available Water

26 – Hydrological Characteristics	
Intermittent	***1***
Semi-permanent	2
Permanent	3

Moist and Moderate Microclimate

27 – Temperature Microclimate Difference?	
Yes	***+2***
No	+0
Method:	

General Observations and Wildlife Occurrences

The intermittent tributary collects runoff a culvert that conveys water under SR502 to the north. The tributary mainly follows the eastern edge of a remnant riparian forested area bordered by a heavily trampled pasture to the east, and rural residences to the north and west. Habitat within the well vegetated riparian forest is a mosaic of upland and wetland. Vegetation in the forest is predominantly native shrubs and trees including Oregon ash, black cottonwood, Scouler's willow, Pacific willow, clustered rose, Nootka rose, red-osier dogwood, snowberry, and beaked-hazelnut. The narrow stream channel varies from 2-4 feet wide and about 6 inches deep. The channel substrate is silty soil.

EVALUATION SUMMARY

FISH HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Stream Flow Influence		
1 – Vegetative Cover	3	**3**
2 – Associated Wetlands	2	**2**
3 – Springs or Seeps	3	**0**
4 – Altered Hydrology	0	**0**
Influence on Water Temperature & D.O.		
5 – Canopy Cover	3	**3**
6 – Riffles	3	**1**
Ccontrol of Sedimentation		
7 – Slope/Vegetative Cover	3	**3**
8 – Vegetated Banks	3	**1**
Control of Stream Pollution		
9 – Vegetative Cover	3	**3**
10 – Associated Wetlands	2	**2**
Contribution to Food Web		
11 – Canopy Cover	3	**3**
12 – Dominant Tree Species	3	**1**
13 – Large Woody Debris	3	**2**
Structural Stream Diversity		
14 – Large Wood Debris	3	**0**
15 – Pools	3	**0**
16 – Riffles	3	**1**
17 – Off-channel Habitat	3	**0**
18 – Fines	2	**0**
HABITAT SUBTOTAL (HS):	***48***	***25***

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Structural Complexity		
19 – Native Woody Plant Species	3	**3**
20 – Multiple Canopy Layers	3	**2**
21 – Snags	3	**0**
22 – Downed Logs	3	**1**
Connectivity		
23 – Non-native Plant Species	1	**-1**
24 – Connection to Other PHS	2	**0**
Abundant Food Sources		
25 – Native Woody Plant Species	3	**3**
Available Water		
26 – Hydrological Characteristics	3	**1**
Moist & Mild Microclimate		
27 – Temperature/Micro. Difference	2	**2**
WILDLIFE SUBTOTAL (WS)	***23***	***11***
Total: WS X% of Riparian Area that is Vegetated	23	**7.37**
TOTAL SCORE +1 for Type 1 waters (FISH+WILDLIFE FUNCTIONS):	***72***	***32.37***

CLARK COUNTY HABITAT CONSERVATION ORDINANCE
RIPARIAN HABITAT FIELD RATING FORM

Date: **12/21/07**

Investigator(s): **ES and TR**

Stream: **West Gee Creek Tributary/wetland north of SR502 & west of NE 21st Court**

Legal: _____

Parcel #: _____

Stream Type: **Ns**

Reach #: _____

Land Use Designations

Zoning: _____

Shorelines: _____

Other: _____

Base Riparian Zone Width: **75 feet**

(Note: Complete 1 field rating form for each reach)

FISH HABITAT FUNCTIONS

Streamflow Influence

1 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

2 – Associated Wetlands	
Present	***+2***
Absent	+0

3 – Springs or Seeps	
Absent	***0***
Intermittent	1
Semi-Permanent	2
Permanent	3

4 – Hydrology (excess flows, erosion, scour, etc.)	
Present	-2
Absent	***+0***

Influence on water Temperature & Dissolved Oxygen

5 – Canopy Cover (%)	
0-33%	***1***
34-66%	2
67-100%	3

6 – Riffles (%)	
0%	***0***
1-16%	1
17-33%	2
34-50+%	3

Control of Sedimentation

7	10-33% Cover	34-66% Cover	67-100% Cover
0-33% Slope	1	2	***3***
33-66% Slope	0	1	2
67-100% Slope	0	1	2

8 – Vegetated Banks	
0-33%	***-2***
34-66%	1
67-100%	3

Dissolved Oxygen Measurements (optional): _____

Control of Stream Pollution

9 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

10 – Associated Wetlands	
Present	***+2***
Absent	+0

Contribution to Food Web

11 – Canopy Cover (%)	
0-33%	***1***
34-66%	2
67-100%	3

12 – Dominant Tree Species	
67-100%	***dec. 1***
67-100%	con. 1
33-66% mixed	3

13 – LWD (Pieces per BFW)	
0	***0***
1	1
2	2
3	3

***NOTE: Assessment criteria and scoring were based on conditions likely to be encountered. Users of this methodology may be required to exercise their best professional judgment as a result of unique site conditions.**

Stream Structural Diversity

Streams <10m (33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	***0***
0.1	1
0.2	2
>+0.3	3

Streams 10-20+m(33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	0
0.1-0.2	1
0.3-0.4	2
>+0.4	3

15 – Pools (%)	Gradient (%) <2%	2-5%	>5%
>55%	3	3	3
41-54%	2	3	3
31-40%	1	2	3
10-30%	0	1	2
<10%	***0***	0	1

16 – Riffles (%)	Gradient (%) <2%	2-5%	>5%
1-16%	***1***	1	0
17-33%	2	2	1
34-50%	2	3	2

17 – Off Channel Habitat	
Present	3
Absent	***0***

18 – Fines (%)	Gradient (%) <2%	2-5%	>5%
0-10%	2	2	2
11-44%	1	-3	-4
45-100%	***0***	-4	-5

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

Structural/Biological Complexity

Plant Species Diversity

19 – Native Woody Plant Species (#)	
0	0
1-3	***1***
4-6	2
7+	3

Vertical Diversity

20 – Multiple Canopy Layers	
1	***1***
2	2
3+	3

Snags

21 – Snags/Acre (20"+dbh, 6' high)	
0	***0***
1	1
2-3	2
4+	3

Downed Material

22 – Downed Logs/Acre (12"+ diam, 20'+ long)	
1	**1**
2-3	2
4+	3

Non-Native Plants

23 – Non-native Plant Species	
<10%	1
10-33%	***-1***
34-66%	-2
67-100%	-4

Connectivity with Other Ecosystems

24 – Riparian Corridor Connected to Other PHS Polygons or Points?	
No	***+0***
Yes	+2

Abundant Food Sources

25 – Native Woody Plant Species (#)	
1-3	***1***
4-6	2
7+	3
Specify:	

Available Water

26 – Hydrological Characteristics	
Intermittent	***1***
Semi-permanent	2
Permanent	3

Moist and Moderate Microclimate

27 – Temperature Microclimate Difference?	
Yes	+2
No	***+0***
Method:	

General Observations and Wildlife Occurrences

The intermittent tributary collects runoff from a roadside ditch along the north side of SR502, and from the area immediately south of SR502. A culvert conveys water under the roadway to the drainageway in the wetland pasture north of SR502. The drainageway follows the lowest topography of the pasture north of SR502. The drainageway is slightly incised approximately 6-8 inches and the banks are variably well defined and have been trampled by cattle. The terrain slope gently upslope to the west and east. Within the project corridor, herbaceous hydrophytic vegetation is dominant in the riparian area, with the exception of a few patches of native rose and scattered Oregon ash.

EVALUATION SUMMARY

FISH HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Stream Flow Influence		
1 – Vegetative Cover	3	**3**
2 – Associated Wetlands	2	**2**
3 – Springs or Seeps	3	**0**
4 – Altered Hydrology	0	**0**
Influence on Water Temperature & D.O.		
5 – Canopy Cover	3	**1**
6 – Riffles	3	**0**
Ccontrol of Sedimentation		
7 – Slope/Vegetative Cover	3	**3**
8 – Vegetated Banks	3	**-2**
Control of Stream Pollution		
9 – Vegetative Cover	3	**3**
10 – Associated Wetlands	2	**2**
Contribution to Food Web		
11 – Canopy Cover	3	**1**
12 – Dominant Tree Species	3	**1**
13 – Large Woody Debris	3	**0**
Structural Stream Diversity		
14 – Large Wood Debris	3	**0**
15 – Pools	3	**0**
16 – Riffles	3	**1**
17 – Off-channel Habitat	3	**0**
18 – Fines	2	**0**
HABITAT SUBTOTAL (HS):	***48***	***15***

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Structural Complexity		
19 – Native Woody Plant Species	3	**1**
20 – Multiple Canopy Layers	3	**1**
21 – Snags	3	**0**
22 – Downed Logs	3	**1**
Connectivity		
23 – Non-native Plant Species	1	**-1**
24 – Connection to Other PHS	2	**0**
Abundant Food Sources		
25 – Native Woody Plant Species	3	**1**
Available Water		
26 – Hydrological Characteristics	3	**1**
Moist & Mild Microclimate		
27 – Temperature/Micro. Difference	2	**0**
WILDLIFE SUBTOTAL (WS)	***23***	***4***
Total: WS X% of Riparian Area that is Vegetated	23	**2.67**
TOTAL SCORE +1 for Type 1 waters (FISH+WILDLIFE FUNCTIONS):	***72***	***17.68***

CLARK COUNTY HABITAT CONSERVATION ORDINANCE
RIPARIAN HABITAT FIELD RATING FORM

Date: **10/15/2007**

Investigator(s): **TR and JP**

Stream: **Mill creek, east of NE 72nd Ave and north of SR502**

Legal: _____

Parcel #: _____

Stream Type: F

Reach #: **Segment east of NE 72nd, north of SR502.**

Land Use Designations

Zoning: _____

Shorelines: _____

Other: _____

Base Riparian Zone Width: **200**

(Note: Complete 1 field rating form for each reach)

FISH HABITAT FUNCTIONS

Streamflow Influence

1 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

2 – Associated Wetlands	
Present	+2
Absent	***+0***

3 – Springs or Seeps	
Absent	***0***
Intermittent	1
Semi-Permanent	2
Permanent	3

4 – Hydrology (excess flows, erosion, scour, etc.)	
Present	-2
Absent	***+0***

Influence on water Temperature & Dissolved Oxygen

5 – Canopy Cover (%)	
0-33%	1
34-66%	***2***
67-100%	3

6 – Riffles (%)	
0%	0
1-16%	1
17-33%	2
34-50+%	***3***

Control of Sedimentation

7	10-33% Cover	34-66% Cover	67-100% Cover
0-33% Slope	1	2	3
33-66% Slope	0	1	***2***
67-100% Slope	0	1	2

8 – Vegetated Banks	
0-33%	-2
34-66%	1
67-100%	***3***

Dissolved Oxygen Measurements (optional): _____

Control of Stream Pollution

9 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

10 – Associated Wetlands	
Present	+2
Absent	***+0***

Contribution to Food Web

11 – Canopy Cover (%)	
0-33%	1
34-66%	***2***
67-100%	3

12 – Dominant Tree Species	
67-100%	dec. 1
67-100%	con. 1
33-66% mixed	***3***

13 – LWD (Pieces per BFW)	
0	***0***
1	1
2	2
3	3

***NOTE: Assessment criteria and scoring were based on conditions likely to be encountered. Users of this methodology may be required to exercise their best professional judgment as a result of unique site conditions.**

Stream Structural Diversity

Strreams <10m (33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	***0***
0.1	1
0.2	2
>+0.3	3

Streams 10-20+m(33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	0
0.1-0.2	1
0.3-0.4	2
>+0.4	3

15 – Pools (%)	Gradient (%) <2%	2-5%	>5%
>55%	3	3	3
41-54%	2	3	3
31-40%	1	2	3
10-30%	***0***	1	2
<10%	0	0	1

16 – Riffles (%)	Gradient (%) <2%	2-5%	>5%
1-16%	1	1	0
17-33%	***2***	2	1
34-50%	2	3	2

17 – Off Channel Habitat	
Present	3
Absent	***0***

18 – Fines (%)	Gradient (%) <2%	2-5%	>5%
0-10%	***2***	2	2
11-44%	1	-3	-4
45-100%	0	-4	-5

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

Structural/Biological Complexity

Plant Species Diversity

19 – Native Woody Plant Species (#)	
0	0
1-3	1
4-6	***2***
7+	*3*

Vertical Diversity

20 – Multiple Canopy Layers	
1	1
2	2
3+	***3***

Snags

21 – Snags/Acre (20"+dbh, 6' high)	
0	0
1	***1***
2-3	2
4+	3

Downed Material

22 – Downed Logs/Acre (12"+ diam, 20'+ long)	
1	***1***
2-3	2
4+	3

Non-Native Plants

23 – Non-native Plant Species	
<10%	1
10-33%	***-1***
34-66%	-2
67-100%	-4

Connectivity with Other Ecosystems

24 – Riparian Corridor Connected to Other PHS Polygons or Points?	
No	***+0***
Yes	+2

Abundant Food Sources

25 – Native Woody Plant Species (#)	
1-3	1
4-6	***2***
7+	3
Specify:	

Available Water

26 – Hydrological Characteristics	
Intermittent	1
Semi-permanent	2
Permanent	***3***

Moist and Moderate Microclimate

27 – Temperature Microclimate Difference?	
Yes	***+2***
No	+0
Method:	

General Observations and Wildlife Occurrences

Banks are gradual for most of reach on east side, steeper for west side, and then continue to be gradual in riparian area. Reach begins at SR502, and extends approximately 200 feet to the north, upstream. Double culvert under SR502,after reach, has cement ground and appears to affect/restrict high flows downstream .

EVALUATION SUMMARY

FISH HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Stream Flow Influence		
1 – Vegetative Cover	3	**3**
2 – Associated Wetlands	2	**0**
3 – Springs or Seeps	3	**0**
4 – Altered Hydrology	0	**0**
Influence on Water Temperature & D.O.		
5 – Canopy Cover	3	**2**
6 – Riffles	3	**3**
Ccontrol of Sedimentation		
7 – Slope/Vegetative Cover	3	**2**
8 – Vegetated Banks	3	**3**
Control of Stream Pollution		
9 – Vegetative Cover	3	**3**
10 – Associated Wetlands	2	**0**
Contribution to Food Web		
11 – Canopy Cover	3	**2**
12 – Dominant Tree Species	3	**3**
13 – Large Woody Debris	3	**0**
Structural Stream Diversity		
14 – Large Wood Debris	3	**0**
15 – Pools	3	**0**
16 – Riffles	3	**2**
17 – Off-channel Habitat	3	**0**
18 – Fines	2	**2**
HABITAT SUBTOTAL (HS):	***48***	***25***

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Structural Complexity		
19 – Native Woody Plant Species	3	**2**
20 – Multiple Canopy Layers	3	**3**
21 – Snags	3	**1**
22 – Downed Logs	3	**1**
Connectivity		
23 – Non-native Plant Species	1	**-1**
24 – Connection to Other PHS	2	**0**
Abundant Food Sources		
25 – Native Woody Plant Species	3	**2**
Available Water		
26 – Hydrological Characteristics	3	**3**
Moist & Mild Microclimate		
27 – Temperature/Micro. Difference	2	**2**
WILDLIFE SUBTOTAL (WS)	***23***	***13***
Total: WS X% of Riparian Area that is Vegetated	23	**8.71**
TOTAL SCORE +1 for Type 1 waters (FISH+WILDLIFE FUNCTIONS):	***72***	***33.71***

CLARK COUNTY HABITAT CONSERVATION ORDINANCE
RIPARIAN HABITAT FIELD RATING FORM

Date: **10/15/2007**

Investigator(s): **JP and TR**

Stream: **Mill Creek, east of NE 72nd Ave and south of SR502**

Legal: _____

Parcel #: _____

Stream Type: F

Reach #: **Segment east of NE 72nd, between 72nd and SR502.**

Land Use Designations

Zoning: _____

Shorelines: _____

Other: _____

Base Riparian Zone Width: **200**

(Note: Complete 1 field rating form for each reach)

FISH HABITAT FUNCTIONS

Streamflow Influence

1 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

2 – Associated Wetlands	
Present	+2
Absent	***+0***

3 – Springs or Seeps	
Absent	***0***
Intermittent	1
Semi-Permanent	2
Permanent	3

4 – Hydrology (excess flows, erosion, scour, etc.)	
Present	***-2***
Absent	+0

Influence on water Temperature & Dissolved Oxygen

5 – Canopy Cover (%)	
0-33%	1
34-66%	***2***
67-100%	3

6 – Riffles (%)	
0%	0
1-16%	1
17-33%	2
34-50+%	***3***

Control of Sedimentation

7	10-33% Cover	34-66% Cover	67-100% Cover
0-33% Slope	1	2	***3***
33-66% Slope	0	1	2
67-100% Slope	0	1	2

8 – Vegetated Banks	
0-33%	-2
34-66%	1
67-100%	***3***

Dissolved Oxygen Measurements (optional): _____

Control of Stream Pollution

9 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

10 – Associated Wetlands	
Present	+2
Absent	***+0***

Contribution to Food Web

11 – Canopy Cover (%)	
0-33%	1
34-66%	***2***
67-100%	3

12 – Dominant Tree Species	
67-100%	dec. 1
67-100%	con. 1
33-66% mixed	***3***

13 – LWD (Pieces per BFW)	
0	***0***
1	1
2	2
3	3

***NOTE: Assessment criteria and scoring were based on conditions likely to be encountered. Users of this methodology may be required to exercise their best professional judgment as a result of unique site conditions.**

Stream Structural Diversity

Streams <10m (33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	***0***
0.1	1
0.2	2
>+0.3	3

Streams 10-20+m(33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	0
0.1-0.2	1
0.3-0.4	2
>+0.4	3

15 – Pools (%)	Gradient (%) <2%	2-5%	>5%
>55%	3	3	3
41-54%	2	3	3
31-40%	1	2	3
10-30%	***0***	1	2
<10%	0	0	1

16 – Riffles (%)	Gradient (%) <2%	2-5%	>5%
1-16%	1	1	0
17-33%	2	2	1
34-50%	***2***	3	2

17 – Off Channel Habitat	
Present	3
Absent	***0***

18 – Fines (%)	Gradient (%) <2%	2-5%	>5%
0-10%	***2***	2	2
11-44%	1	-3	-4
45-100%	0	-4	-5

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

Structural/Biological Complexity

Plant Species Diversity

19 – Native Woody Plant Species (#)	
0	0
1-3	1
4-6	***2***
7+	***3***

Vertical Diversity

20 – Multiple Canopy Layers	
1	1
2	2
3+	***3***

Snags

21 – Snags/Acre (20"+dbh, 6' high)	
0	0
1	***1***
2-3	2
4+	3

Downed Material

22 – Downed Logs/Acre (12"+ diam, 20'+ long)	
1	***1***
2-3	2
4+	3

Non-Native Plants

23 – Non-native Plant Species	
<10%	1
10-33%	***-1***
34-66%	-2
67-100%	-4

Connectivity with Other Ecosystems

24 – Riparian Corridor Connected to Other PHS Polygons or Points?	
No	***+0***
Yes	+2

Abundant Food Sources

25 – Native Woody Plant Species (#)	
1-3	1
4-6	***2***
7+	3
Specify:	

Available Water

26 – Hydrological Characteristics	
Intermittent	1
Semi-permanent	2
Permanent	***3***

Moist and Moderate Microclimate

27 – Temperature Microclimate Difference?	
Yes	***+2***
No	+0
Method:	

General Observations and Wildlife Occurrences

Banks are gradual for most of reach and continue to be gradual in riparian area. Some stretches of the bank are sparsely vegetated. Reach exists between two culverts: one under NE 72nd, one under SR502. Bottom of NE 72nd culvert is natural materials, but the culvert appears to affect/restrict high flows downstream. Also, a portion of bank exists under culvert at the time of the visit, but it was unvegetated. Double culvert under SR502 has cement ground, and also appears to restrict flows. Some undercut banks (2-3' feet high) present.

EVALUATION SUMMARY

FISH HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Stream Flow Influence		
1 – Vegetative Cover	3	**3**
2 – Associated Wetlands	2	**0**
3 – Springs or Seeps	3	**0**
4 – Altered Hydrology	0	**-2**
Influence on Water Temperature & D.O.		
5 – Canopy Cover	3	**2**
6 – Riffles	3	**3**
Ccontrol of Sedimentation		
7 – Slope/Vegetative Cover	3	**3**
8 – Vegetated Banks	3	**3**
Control of Stream Pollution		
9 – Vegetative Cover	3	**3**
10 – Associated Wetlands	2	**0**
Contribution to Food Web		
11 – Canopy Cover	3	**2**
12 – Dominant Tree Species	3	**1**
13 – Large Woody Debris	3	**0**
Structural Stream Diversity		
14 – Large Wood Debris	3	**0**
15 – Pools	3	**1**
16 – Riffles	3	**2**
17 – Off-channel Habitat	3	**0**
18 – Fines	2	**2**
HABITAT SUBTOTAL (HS):	***48***	***23***

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Structural Complexity		
19 – Native Woody Plant Species	3	**2**
20 – Multiple Canopy Layers	3	**3**
21 – Snags	3	**1**
22 – Downed Logs	3	**1**
Connectivity		
23 – Non-native Plant Species	1	**-1**
24 – Connection to Other PHS	2	**0**
Abundant Food Sources		
25 – Native Woody Plant Species	3	**2**
Available Water		
26 – Hydrological Characteristics	3	**3**
Moist & Mild Microclimate		
27 – Temperature/Micro. Difference	2	**2**
WILDLIFE SUBTOTAL (WS)	***23***	***23***
Total: WS X% of Riparian Area that is Vegetated	23	**8.1**
TOTAL SCORE +1 for Type 1 waters (FISH+WILDLIFE FUNCTIONS):	***72***	***31.1***

CLARK COUNTY HABITAT CONSERVATION ORDINANCE
RIPARIAN HABITAT FIELD RATING FORM

Date: **10/15/2007**

Investigator(s): **TR and JP**

Stream: **Mill Creek North, west of NE 67th Ave and north of SR 502**

Legal: _____

Parcel #: _____

Stream Type: F

Reach #: **Segment north of SR502.**

Land Use Designations

Zoning: _____

Shorelines: _____

Other: _____

Base Riparian Zone Width: **200**

(Note: Complete 1 field rating form for each reach)

FISH HABITAT FUNCTIONS

Streamflow Influence

1 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

2 – Associated Wetlands	
Present	***+2***
Absent	+0

3 – Springs or Seeps	
Absent	***0***
Intermittent	1
Semi-Permanent	2
Permanent	3

4 – Hydrology (excess flows, erosion, scour, etc.)	
Present	-2
Absent	***+0***

Influence on water Temperature & Dissolved Oxygen

5 – Canopy Cover (%)	
0-33%	***1***
34-66%	2
67-100%	3

6 – Riffles (%)	
0%	0
1-16%	1
17-33%	***2***
34-50+%	3

Control of Sedimentation

7	10-33% Cover	34-66% Cover	67-100% Cover
0-33% Slope	1	2	***3***
33-66% Slope	0	1	2
67-100% Slope	0	1	2

8 – Vegetated Banks	
0-33%	-2
34-66%	1
67-100%	***3***

Dissolved Oxygen Measurements (optional): _____

Control of Stream Pollution

9 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

10 – Associated Wetlands	
Present	***+2***
Absent	+0

Contribution to Food Web

11 – Canopy Cover (%)	
0-33%	***1***
34-66%	2
67-100%	3

12 – Dominant Tree Species	
67-100%	dec. **1**
67-100%	con. 1
33-66% mixed	3

13 – LWD (Pieces per BFW)	
0	***0***
1	1
2	2
3	3

***NOTE: Assessment criteria and scoring were based on conditions likely to be encountered. Users of this methodology may be required to exercise their best professional judgment as a result of unique site conditions.**

Stream Structural Diversity

Strreams <10m (33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	***0***
0.1	1
0.2	2
>+0.3	3

Streams 10-20+m(33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	0
0.1-0.2	1
0.3-0.4	2
>+0.4	3

15 – Pools (%)	Gradient (%) <2%	2-5%	>5%
>55%	3	3	3
41-54%	2	3	3
31-40%	1	2	3
10-30%	***0***	1	2
<10%	0	0	1

16 – Riffles (%)	Gradient (%) <2%	2-5%	>5%
1-16%	1	1	0
17-33%	***2***	2	1
34-50%	2	3	2

17 – Off Channel Habitat
Present **3**
Absent *0*

18 – Fines (%)	Gradient (%) <2%	2-5%	>5%
0-10%	2	2	2
11-44%	***1***	-3	-4
45-100%	0	-4	-5

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

Structural/Biological Complexity

Plant Species Diversity

19 – Native Woody Plant Species (#)	
0	***0***
1-3	1
4-6	2
7+	*3*

Vertical Diversity

20 – Multiple Canopy Layers	
1	***1***
2	2
3+	3

Snags

21 – Snags/Acre (20"+dbh, 6' high)	
0	***0***
1	1
2-3	2
4+	3

Downed Material

22 – Downed Logs/Acre (12"+ diam, 20'+ long)	
1	**1**
2-3	2
4+	3

Non-Native Plants

23 – Non-native Plant Species	
<10%	1
10-33%	-1
34-66%	-2
67-100%	***-4***

Connectivity with Other Ecosystems

24 – Riparian Corridor Connected to Other PHS Polygons or Points?	
No	*+0*
Yes	**+2**

Abundant Food Sources

25 – Native Woody Plant Species (#)	
1-3	1
4-6	2
7+	3
Specify:	

Available Water

26 – Hydrological Characteristics	
Intermittent	1
Semi-permanent	2
Permanent	***3***

Moist and Moderate Microclimate

27 – Temperature Microclimate Difference?	
Yes	+2
No	***+0***
Method:	

General Observations and Wildlife Occurrences

Banks are gradual for entire reach and continue to be gradual in riparian area. Reach begins at SR502, and extends approximately 200 feet to the north, upstream. Large 10-foot wide culvert under SR502, after reach, probably has no natural substrate, and appears to affect/restrict high flows downstream. Sides of culvert reinforced by sandbags, apparently to restrict flooding. Reach dominated by reed canarygrass. Riparian area immediately bordered by maintained meadow with horses.

EVALUATION SUMMARY

FISH HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Stream Flow Influence		
1 – Vegetative Cover	3	**3**
2 – Associated Wetlands	2	**2**
3 – Springs or Seeps	3	**0**
4 – Altered Hydrology	0	**0**
Influence on Water Temperature & D.O.		
5 – Canopy Cover	3	**1**
6 – Riffles	3	**2**
Ccontrol of Sedimentation		
7 – Slope/Vegetative Cover	3	**3**
8 – Vegetated Banks	3	**3**
Control of Stream Pollution		
9 – Vegetative Cover	3	**3**
10 – Associated Wetlands	2	**2**
Contribution to Food Web		
11 – Canopy Cover	3	**1**
12 – Dominant Tree Species	3	**1**
13 – Large Woody Debris	3	**0**
Structural Stream Diversity		
14 – Large Wood Debris	3	**0**
15 – Pools	3	**0**
16 – Riffles	3	**2**
17 – Off-channel Habitat	3	**3**
18 – Fines	2	**1**
HABITAT SUBTOTAL (HS):	***48***	***27***

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Structural Complexity		
19 – Native Woody Plant Species	3	**0**
20 – Multiple Canopy Layers	3	**1**
21 – Snags	3	**0**
22 – Downed Logs	3	**1**
Connectivity		
23 – Non-native Plant Species	1	**-4**
24 – Connection to Other PHS	2	**2**
Abundant Food Sources		
25 – Native Woody Plant Species	3	**0**
Available Water		
26 – Hydrological Characteristics	3	**3**
Moist & Mild Microclimate		
27 – Temperature/Micro. Difference	2	**0**
WILDLIFE SUBTOTAL (WS)	***23***	***3***
Total: WS X% of Riparian Area that is Vegetated	23	**2.01**
TOTAL SCORE +1 for Type 1 waters (FISH+WILDLIFE FUNCTIONS):	***72***	***29.01***

CLARK COUNTY HABITAT CONSERVATION ORDINANCE
RIPARIAN HABITAT FIELD RATING FORM

Date: **10/15/2007**

Investigator(s): **TR and JP**

Stream: **Mill Creek North, west of NE 67th Ave and south of SR 502**

Legal: _____

Parcel #: _____

Stream Type: F

Reach #: **Segment south of SR502.**

Land Use Designations

Zoning: _____

Shorelines: _____

Other: _____

Base Riparian Zone Width: **200**

(Note: Complete 1 field rating form for each reach)

FISH HABITAT FUNCTIONS

Streamflow Influence

1 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

2 – Associated Wetlands	
Present	***+2***
Absent	+0

3 – Springs or Seeps	
Absent	***0***
Intermittent	1
Semi-Permanent	2
Permanent	3

4 – Hydrology (excess flows, erosion, scour, etc.)	
Present	***-2***
Absent	+0

Influence on water Temperature & Dissolved Oxygen

5 – Canopy Cover (%)	
0-33%	***1***
34-66%	2
67-100%	3

6 – Riffles (%)	
0%	0
1-16%	1
17-33%	***2***
34-50+%	3

Control of Sedimentation

7	10-33% Cover	34-66% Cover	67-100% Cover
0-33% Slope	1	2	***3***
33-66% Slope	0	1	2
67-100% Slope	0	1	2

8 – Vegetated Banks	
0-33%	-2
34-66%	1
67-100%	***3***

Dissolved Oxygen Measurements (optional): _____

Control of Stream Pollution

9 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

10 – Associated Wetlands	
Present	***+2***
Absent	+0

Contribution to Food Web

11 – Canopy Cover (%)	
0-33%	***1***
34-66%	2
67-100%	3

12 – Dominant Tree Species	
67-100%	dec. **1**
67-100%	con. 1
33-66% mixed	3

13 – LWD (Pieces per BFW)	
0	***0***
1	1
2	2
3	3

***NOTE: Assessment criteria and scoring were based on conditions likely to be encountered. Users of this methodology may be required to exercise their best professional judgment as a result of unique site conditions.**

Stream Structural Diversity

Strreams <10m (33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	***0***
0.1	1
0.2	2
>+0.3	3

Streams 10-20+m(33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	0
0.1-0.2	1
0.3-0.4	2
>+0.4	3

15 – Pools (%)	Gradient (%) <2%	2-5%	>5%
>55%	3	3	3
41-54%	2	3	3
31-40%	1	2	3
10-30%	***0***	1	2
<10%	0	0	1

16 – Riffles (%)	Gradient (%) <2%	2-5%	>5%
1-16%	1	1	0
17-33%	***2***	2	1
34-50%	2	3	2

17 – Off Channel Habitat
Present **3**
Absent *0*

18 – Fines (%)	Gradient (%) <2%	2-5%	>5%
0-10%	2	2	2
11-44%	***1***	-3	-4
45-100%	0	-4	-5

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

Structural/Biological Complexity

Plant Species Diversity

19 – Native Woody Plant Species (#)	
0	0
1-3	***1***
4-6	2
7+	***3***

Vertical Diversity

20 – Multiple Canopy Layers	
1	1
2	***2***
3+	3

Snags

21 – Snags/Acre (20"+dbh, 6' high)	
0	***0***
1	1
2-3	2
4+	3

Downed Material

22 – Downed Logs/Acre (12"+ diam, 20'+ long)	
1	1
2-3	2
4+	3

Non-Native Plants

23 – Non-native Plant Species	
<10%	1
10-33%	***-1***
34-66%	-2
67-100%	-4

Connectivity with Other Ecosystems

24 – Riparian Corridor Connected to Other PHS Polygons or Points?	
No	*+0*
Yes	**+2**

Abundant Food Sources

25 – Native Woody Plant Species (#)	
1-3	***1***
4-6	2
7+	3
Specify:	

Available Water

26 – Hydrological Characteristics	
Intermittent	1
Semi-permanent	2
Permanent	***3***

Moist and Moderate Microclimate

27 – Temperature Microclimate Difference?	
Yes	+2
No	***+0***
Method:	

General Observations and Wildlife Occurrences

Banks are gradual for entire reach and continue to be gradual in riparian area. Reach begins at SR502, and extends approximately 200 feet to the south, downstream. Large 10-foot wide culvert under SR502 (with sandbags on banks immediately before culvert), before reach, probably has no natural substrate, and appears to affect/cause high flows in reach. Reach has more vegetative diversity than reach north of SR502. Riparian area immediately bordered by maintained meadow.

EVALUATION SUMMARY

FISH HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Stream Flow Influence		
1 – Vegetative Cover	3	**3**
2 – Associated Wetlands	2	**2**
3 – Springs or Seeps	3	**0**
4 – Altered Hydrology	0	**-2**
Influence on Water Temperature & D.O.		
5 – Canopy Cover	3	**1**
6 – Riffles	3	**2**
Ccontrol of Sedimentation		
7 – Slope/Vegetative Cover	3	**3**
8 – Vegetated Banks	3	**3**
Control of Stream Pollution		
9 – Vegetative Cover	3	**3**
10 – Associated Wetlands	2	**2**
Contribution to Food Web		
11 – Canopy Cover	3	**1**
12 – Dominant Tree Species	3	**1**
13 – Large Woody Debris	3	**0**
Structural Stream Diversity		
14 – Large Wood Debris	3	**0**
15 – Pools	3	**0**
16 – Riffles	3	**2**
17 – Off-channel Habitat	3	**3**
18 – Fines	2	**1**
HABITAT SUBTOTAL (HS):	***48***	***25***

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Structural Complexity		
19 – Native Woody Plant Species	3	**1**
20 – Multiple Canopy Layers	3	**2**
21 – Snags	3	**0**
22 – Downed Logs	3	**1**
Connectivity		
23 – Non-native Plant Species	1	**-1**
24 – Connection to Other PHS	2	**2**
Abundant Food Sources		
25 – Native Woody Plant Species	3	**1**
Available Water		
26 – Hydrological Characteristics	3	**3**
Moist & Mild Microclimate		
27 – Temperature/Micro. Difference	2	**0**
WILDLIFE SUBTOTAL (WS)	***23***	***9***
Total: WS X% of Riparian Area that is Vegetated	23	**6.03**
TOTAL SCORE +1 for Type 1 waters (FISH+WILDLIFE FUNCTIONS):	***72***	***31.03***

CLARK COUNTY HABITAT CONSERVATION ORDINANCE
RIPARIAN HABITAT FIELD RATING FORM

Date: **10/15/2007**

Investigator(s): **TR and JP**

Stream: **Mill Creek, west of NE 92nd and north of SR 502**

Legal: _____

Parcel #: _____

Stream Type: F

Reach #: **Upstream segment located north of SR502 for about 200' feet.**

Land Use Designations

Zoning: _____

Shorelines: _____

Other: _____

Base Riparian Zone Width: **200**

(Note: Complete 1 field rating form for each reach)

FISH HABITAT FUNCTIONS

Streamflow Influence

1 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

2 – Associated Wetlands	
Present	***+2***
Absent	+0

3 – Springs or Seeps	
Absent	***0***
Intermittent	1
Semi-Permanent	2
Permanent	3

4 – Hydrology (excess flows, erosion, scour, etc.)	
Present	-2
Absent	***+0***

Influence on water Temperature & Dissolved Oxygen

5 – Canopy Cover (%)	
0-33%	***1***
34-66%	2
67-100%	3

6 – Riffles (%)	
0%	0
1-16%	***1***
17-33%	2
34-50+%	3

Control of Sedimentation

7	10-33% Cover	34-66% Cover	67-100% Cover
0-33% Slope	1	2	3
33-66% Slope	0	1	***2***
67-100% Slope	0	1	2

8 – Vegetated Banks	
0-33%	-2
34-66%	1
67-100%	***3***

Dissolved Oxygen Measurements (optional): _____

Control of Stream Pollution

9 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

10 – Associated Wetlands	
Present	***+2***
Absent	+0

Contribution to Food Web

11 – Canopy Cover (%)	
0-33%	***1***
34-66%	2
67-100%	3

12 – Dominant Tree Species	
67-100%	dec. 1
67-100%	con. 1
33-66% mixed	***3***

13 – LWD (Pieces per BFW)	
0	***0***
1	1
2	2
3	3

***NOTE: Assessment criteria and scoring were based on conditions likely to be encountered. Users of this methodology may be required to exercise their best professional judgment as a result of unique site conditions.**

Stream Structural Diversity

Streams <10m (33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	***0***
0.1	1
0.2	2
>+0.3	3

Streams 10-20+m(33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	0
0.1-0.2	1
0.3-0.4	2
>+0.4	3

15 – Pools (%)	Gradient (%) <2%	2-5%	>5%
>55%	3	3	3
41-54%	2	3	3
31-40%	1	2	3
10-30%	***0***	1	2
<10%	0	0	1

16 – Riffles (%)	Gradient (%) <2%	2-5%	>5%
1-16%	***1***	1	0
17-33%	2	2	1
34-50%	2	3	2

17 – Off Channel Habitat	
Present	***3***
Absent	0

18 – Fines (%)	Gradient (%) <2%	2-5%	>5%
0-10%	2	2	2
11-44%	1	-3	-4
45-100%	***0***	-4	-5

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

Structural/Biological Complexity

Plant Species Diversity

19 – Native Woody Plant Species (#)	
0	0
1-3	1
4-6	***2***
7+	3

Vertical Diversity

20 – Multiple Canopy Layers	
1	1
2	***2***
3+	3

Snags

21 – Snags/Acre (20"+dbh, 6' high)	
0	***0***
1	1
2-3	2
4+	3

Downed Material

22 – Downed Logs/Acre (12"+ diam, 20'+ long)	
1	***1***
2-3	2
4+	3

Non-Native Plants

23 – Non-native Plant Species	
<10%	1
10-33%	-1
34-66%	-2
67-100%	***-4***

Connectivity with Other Ecosystems

24 – Riparian Corridor Connected to Other PHS Polygons or Points?	
No	***+0***
Yes	+2

Abundant Food Sources

25 – Native Woody Plant Species (#)	
1-3	1
4-6	***2***
7+	3
Specify:	

Available Water

26 – Hydrological Characteristics	
Intermittent	1
Semi-permanent	2
Permanent	***3***

Moist and Moderate Microclimate

27 – Temperature Microclimate Difference?	
Yes	+2
No	***+0***
Method:	

General Observations and Wildlife Occurrences

Banks are steep, 1-2 feet in some places, and ground levels off for most of riparian area. East side of the stream is directly adjacent to a developed lot and parking lot. Reach followed by a 6-foot metal double culvert that goes under SR502. Debris in the form of a 2-foot cement tube in creek channel. Riparian area dominated in most places with reed canarygrass (*Phalaris arundinacea*) and Himalayan blackberry (*Rubus discolor*).

EVALUATION SUMMARY

FISH HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Stream Flow Influence		
1 – Vegetative Cover	3	**3**
2 – Associated Wetlands	2	**2**
3 – Springs or Seeps	3	**0**
4 – Altered Hydrology	0	**0**
Influence on Water Temperature & D.O.		
5 – Canopy Cover	3	**1**
6 – Riffles	3	**1**
Ccontrol of Sedimentation		
7 – Slope/Vegetative Cover	3	**2**
8 – Vegetated Banks	3	**3**
Control of Stream Pollution		
9 – Vegetative Cover	3	**3**
10 – Associated Wetlands	2	**2**
Contribution to Food Web		
11 – Canopy Cover	3	**1**
12 – Dominant Tree Species	3	**3**
13 – Large Woody Debris	3	**0**
Structural Stream Diversity		
14 – Large Wood Debris	3	**0**
15 – Pools	3	**0**
16 – Riffles	3	**1**
17 – Off-channel Habitat	3	**3**
18 – Fines	2	**0**
HABITAT SUBTOTAL (HS):	***48***	***25***

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Structural Complexity		
19 – Native Woody Plant Species	3	**2**
20 – Multiple Canopy Layers	3	**2**
21 – Snags	3	**0**
22 – Downed Logs	3	**1**
Connectivity		
23 – Non-native Plant Species	1	**-4**
24 – Connection to Other PHS	2	**0**
Abundant Food Sources		
25 – Native Woody Plant Species	3	**2**
Available Water		
26 – Hydrological Characteristics	3	**3**
Moist & Mild Microclimate		
27 – Temperature/Micro. Difference	2	**0**
WILDLIFE SUBTOTAL (WS)	***23***	***6***
Total: WS X% of Riparian Area that is Vegetated	23	**4.02**
TOTAL SCORE +1 for Type 1 waters (FISH+WILDLIFE FUNCTIONS):	***72***	***29.02***

CLARK COUNTY HABITAT CONSERVATION ORDINANCE
RIPARIAN HABITAT FIELD RATING FORM

Date: **10/15/2007**

Investigator(s): **JP and TR**

Stream: **Mill Creek, west of NE 92nd Ave and south of SR 502**

Legal: _____

Parcel #: _____

Stream Type: F

Reach #: **Downstream segment located south of SR502 for about 300' feet.**

Land Use Designations

Zoning: _____

Shorelines: _____

Other: _____

Base Riparian Zone Width: **200**

(Note: Complete 1 field rating form for each reach)

FISH HABITAT FUNCTIONS

Streamflow Influence

1 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

2 – Associated Wetlands	
Present	***+2***
Absent	+0

3 – Springs or Seeps	
Absent	***0***
Intermittent	1
Semi-Permanent	2
Permanent	3

4 – Hydrology (excess flows, erosion, scour, etc.)	
Present	***-2***
Absent	+0

Influence on water Temperature & Dissolved Oxygen

5 – Canopy Cover (%)	
0-33%	***1***
34-66%	2
67-100%	3

6 – Riffles (%)	
0%	0
1-16%	1
17-33%	2
34-50+%	***3***

Control of Sedimentation

7	10-33% Cover	34-66% Cover	67-100% Cover
0-33% Slope	***1***	2	3
33-66% Slope	0	1	2
67-100% Slope	0	1	2

8 – Vegetated Banks	
0-33%	-2
34-66%	1
67-100%	***3***

Dissolved Oxygen Measurements (optional): _____

Control of Stream Pollution

9 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

10 – Associated Wetlands	
Present	***+2***
Absent	+0

Contribution to Food Web

11 – Canopy Cover (%)	
0-33%	***1***
34-66%	2
67-100%	3

12 – Dominant Tree Species	
67-100%	dec. ***1***
67-100%	con. 1
33-66% mixed	3

13 – LWD (Pieces per BFW)	
0	***0***
1	1
2	2
3	3

***NOTE: Assessment criteria and scoring were based on conditions likely to be encountered. Users of this methodology may be required to exercise their best professional judgment as a result of unique site conditions.**

Stream Structural Diversity

Streams <10m (33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	***0***
0.1	1
0.2	2
>+0.3	3

Streams 10-20+m(33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	0
0.1-0.2	1
0.3-0.4	2
>+0.4	3

15 – Pools (%)	Gradient (%) <2%	2-5%	>5%
>55%	3	3	3
41-54%	2	3	3
31-40%	1	2	3
10-30%	***0***	1	2
<10%	0	0	1

16 – Riffles (%)	Gradient (%) <2%	2-5%	>5%
1-16%	1	1	0
17-33%	2	2	1
34-50%	***2***	3	2

17 – Off Channel Habitat	
Present	3
Absent	***0***

18 – Fines (%)	Gradient (%) <2%	2-5%	>5%
0-10%	2	2	2
11-44%	***1***	-3	-4
45-100%	0	-4	-5

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

Structural/Biological Complexity

Plant Species Diversity

19 – Native Woody Plant Species (#)	
0	0
1-3	1
4-6	***2***
7+	***3***

Vertical Diversity

20 – Multiple Canopy Layers	
1	1
2	***2***
3+	3

Snags

21 – Snags/Acre (20"+dbh, 6' high)	
0	***0***
1	1
2-3	2
4+	3

Downed Material

22 – Downed Logs/Acre (12"+ diam, 20'+ long)	
1	1
2-3	***2***
4+	3

Non-Native Plants

23 – Non-native Plant Species	
<10%	1
10-33%	-1
34-66%	***-2***
67-100%	-4

Connectivity with Other Ecosystems

24 – Riparian Corridor Connected to Other PHS Polygons or Points?	
No	***+0***
Yes	+2

Abundant Food Sources

25 – Native Woody Plant Species (#)	
1-3	1
4-6	2
7+	***3***
Specify:	

Available Water

26 – Hydrological Characteristics	
Intermittent	1
Semi-permanent	2
Permanent	***3***

Moist and Moderate Microclimate

27 – Temperature Microclimate Difference?	
Yes	+2
No	***+0***
Method:	

General Observations and Wildlife Occurrences

Banks are gradual for most of reach and continue to be gradual in riparian area. Portion of reach closest to SR502 (northern portion) has canopy; southern portion is almost entirely emergent. Drainage culvert located in southern portion, creating a wider riparian area for a portion of the reach on the south side of the creek. Reach has more vegetative diversity than reach north of SR502, but less consistent canopy.

EVALUATION SUMMARY

FISH HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Stream Flow Influence		
1 – Vegetative Cover	3	**3**
2 – Associated Wetlands	2	**2**
3 – Springs or Seeps	3	**0**
4 – Altered Hydrology	0	**-2**
Influence on Water Temperature & D.O.		
5 – Canopy Cover	3	**1**
6 – Riffles	3	**3**
Ccontrol of Sedimentation		
7 – Slope/Vegetative Cover	3	**1**
8 – Vegetated Banks	3	**3**
Control of Stream Pollution		
9 – Vegetative Cover	3	**3**
10 – Associated Wetlands	2	**2**
Contribution to Food Web		
11 – Canopy Cover	3	**1**
12 – Dominant Tree Species	3	**1**
13 – Large Woody Debris	3	**0**
Structural Stream Diversity		
14 – Large Wood Debris	3	**0**
15 – Pools	3	**0**
16 – Riffles	3	**2**
17 – Off-channel Habitat	3	**0**
18 – Fines	2	**1**
HABITAT SUBTOTAL (HS):	***48***	***21***

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Structural Complexity		
19 – Native Woody Plant Species	3	**2**
20 – Multiple Canopy Layers	3	**2**
21 – Snags	3	**0**
22 – Downed Logs	3	**2**
Connectivity		
23 – Non-native Plant Species	1	**-2**
24 – Connection to Other PHS	2	**0**
Abundant Food Sources		
25 – Native Woody Plant Species	3	**3**
Available Water		
26 – Hydrological Characteristics	3	**3**
Moist & Mild Microclimate		
27 – Temperature/Micro. Difference	2	**0**
WILDLIFE SUBTOTAL (WS)	***23***	***10***
Total: WS X% of Riparian Area that is Vegetated	23	**6.7**
TOTAL SCORE +1 for Type 1 waters (FISH+WILDLIFE FUNCTIONS):	***72***	***27.7***

CLARK COUNTY HABITAT CONSERVATION ORDINANCE
RIPARIAN HABITAT FIELD RATING FORM

Date: **10/15/2007**

Investigator(s): **TR and JP**

Stream: **Mill Creek, west of NE 72nd and south of SR 502**

Legal: _____

Parcel #: _____

Stream Type: F

Reach #: **Segment west of NE 72nd and south of SR502 for approximately 200 feet.**

Land Use Designations

Zoning: _____

Shorelines: _____

Other: _____

Base Riparian Zone Width: **200**

(Note: Complete 1 field rating form for each reach)

FISH HABITAT FUNCTIONS

Streamflow Influence

1 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

2 – Associated Wetlands	
Present	+2
Absent	***+0***

3 – Springs or Seeps	
Absent	***0***
Intermittent	1
Semi-Permanent	2
Permanent	3

4 – Hydrology (excess flows, erosion, scour, etc.)	
Present	***-2***
Absent	+0

Influence on water Temperature & Dissolved Oxygen

5 – Canopy Cover (%)	
0-33%	1
34-66%	***2***
67-100%	3

6 – Riffles (%)	
0%	0
1-16%	1
17-33%	2
34-50+%	***3***

Control of Sedimentation

7	10-33% Cover	34-66% Cover	67-100% Cover
0-33% Slope	1	2	***3***
33-66% Slope	0	1	2
67-100% Slope	0	1	2

8 – Vegetated Banks	
0-33%	-2
34-66%	1
67-100%	***3***

Dissolved Oxygen Measurements (optional): _____

Control of Stream Pollution

9 – Vegetative Cover (%)	
0-33%	1
34-66%	2
67-100%	***3***

10 – Associated Wetlands	
Present	+2
Absent	***+0***

Contribution to Food Web

11 – Canopy Cover (%)	
0-33%	1
34-66%	***2***
67-100%	3

12 – Dominant Tree Species	
67-100%	dec. ***1***
67-100%	con. 1
33-66% mixed	3

13 – LWD (Pieces per BFW)	
0	***0***
1	1
2	2
3	3

***NOTE: Assessment criteria and scoring were based on conditions likely to be encountered. Users of this methodology may be required to exercise their best professional judgment as a result of unique site conditions.**

Stream Structural Diversity

Streams <10m (33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	***0***
0.1	1
0.2	2
>+0.3	3

Streams 10-20+m(33ft) wide

14 – LWD (Key Pieces per BFW)	
0.0	0
0.1-0.2	1
0.3-0.4	2
>+0.4	3

15 – Pools (%)	Gradient (%) <2%	2-5%	>5%
>55%	3	3	3
41-54%	2	3	3
31-40%	***1***	2	3
10-30%	0	1	2
<10%	0	0	1

16 – Riffles (%)	Gradient (%) <2%	2-5%	>5%
1-16%	1	1	0
17-33%	2	2	1
34-50%	***2***	3	2

17 – Off Channel Habitat	
Present	3
Absent	***0***

18 – Fines (%)	Gradient (%) <2%	2-5%	>5%
0-10%	***2***	2	2
11-44%	1	-3	-4
45-100%	0	-4	-5

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

Structural/Biological Complexity

Plant Species Diversity

19 – Native Woody Plant Species (#)	
0	0
1-3	1
4-6	***2***
7+	***3***

Vertical Diversity

20 – Multiple Canopy Layers	
1	1
2	2
3+	***3***

Snags

21 – Snags/Acre (20"+dbh, 6' high)	
0	0
1	***1***
2-3	2
4+	3

Downed Material

22 – Downed Logs/Acre (12"+ diam, 20'+ long)	
1	***1***
2-3	2
4+	3

Non-Native Plants

23 – Non-native Plant Species	
<10%	1
10-33%	***-1***
34-66%	-2
67-100%	-4

Connectivity with Other Ecosystems

24 – Riparian Corridor Connected to Other PHS Polygons or Points?	
No	*+0*
Yes	**+2**

Abundant Food Sources

25 – Native Woody Plant Species (#)	
1-3	1
4-6	***2***
7+	3
Specify:	

Available Water

26 – Hydrological Characteristics	
Intermittent	1
Semi-permanent	2
Permanent	***3***

Moist and Moderate Microclimate

27 – Temperature Microclimate Difference?	
Yes	***+2***
No	+0
Method:	

General Observations and Wildlife Occurrences

Banks are gradual for most of reach and continue to be gradual in riparian area. Some stretches of the bank are sparsely vegetated. Reach ends upstream at a 10-foot wide culvert which goes underneath NE 72nd. Bottom of culvert is natural materials, but the culvert appears to affect/restrict high flows. Also, a portion of bank exists under culvert at the time of the visit, but it was unvegetated. Lastly, a building is located in the riparian area of a stretch of the reach on the northern side of the creek.

EVALUATION SUMMARY

FISH HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Stream Flow Influence		
1 – Vegetative Cover	3	**3**
2 – Associated Wetlands	2	**0**
3 – Springs or Seeps	3	**0**
4 – Altered Hydrology	0	**-2**
Influence on Water Temperature & D.O.		
5 – Canopy Cover	3	**2**
6 – Riffles	3	**3**
Ccontrol of Sedimentation		
7 – Slope/Vegetative Cover	3	**3**
8 – Vegetated Banks	3	**3**
Control of Stream Pollution		
9 – Vegetative Cover	3	**3**
10 – Associated Wetlands	2	**0**
Contribution to Food Web		
11 – Canopy Cover	3	**2**
12 – Dominant Tree Species	3	**1**
13 – Large Woody Debris	3	**0**
Structural Stream Diversity		
14 – Large Wood Debris	3	**0**
15 – Pools	3	**1**
16 – Riffles	3	**2**
17 – Off-channel Habitat	3	**0**
18 – Fines	2	**2**
HABITAT SUBTOTAL (HS):	***48***	***23***

TERRESTRIAL WILDLIFE HABITAT FUNCTIONS

FUNCTION	POSSIBLE POINTS	SCORE
Structural Complexity		
19 – Native Woody Plant Species	3	**2**
20 – Multiple Canopy Layers	3	**3**
21 – Snags	3	**1**
22 – Downed Logs	3	**1**
Connectivity		
23 – Non-native Plant Species	1	**-1**
24 – Connection to Other PHS	2	**2**
Abundant Food Sources		
25 – Native Woody Plant Species	3	**2**
Available Water		
26 – Hydrological Characteristics	3	**3**
Moist & Mild Microclimate		
27 – Temperature/Micro. Difference	2	**2**
WILDLIFE SUBTOTAL (WS)	***23***	***15***
Total: WS X% of Riparian Area that is Vegetated	23	**10.05**
TOTAL SCORE +1 for Type 1 waters (FISH+WILDLIFE FUNCTIONS):	***72***	***33.05***