Appendix A

Big Spring Creek Wetland Characterization: South of Southeast 424th Street, between 244th Avenue Southeast and 236th Avenue Southeast

September 2008

Prepared by Cynthia Young, Ecologist

Reviewed by Jon Hansen, Senior Ecologist

King County

Department of Natural Resources and Parks
Water and Land Resources Division
Capital Projects Section
201 South Jackson Street, Suite 600
Seattle, Washington 98104-3855

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Introduction

King County Water and Land Resources Division has developed a proposal to enhance approximately 65.4 acres of wetland and riparian habitat and to relocate Big Spring Creek from an existing ditch into an 2,800 foot long meandered channel with attached wetland ponds and off-channel pools. The goal of the project is to modify existing degraded habitat to create a more natural wetland-stream complex with higher structural diversity and increased function. The Big Spring Creek restoration project is located in the southeast section of King County near Enumclaw WA (Figure 1 and 2).

The proposed work will be completed on four adjoining parcels. King County owns permanent conservation easements on three private parcels and the fourth is public land owned by the City of Enumclaw (Figure 3). The purpose of this report is to characterize the wetland within the proposed project area to assist with project planning, and to provide regulatory agencies with information needed to evaluate the proposed restoration project.

The U.S. Army Corp of Engineers, Seattle District, in cooperation with King County initiated a General Investigation Ecosystem Restoration Study in 1997 (U.S. Army Corp of Engineers, January and March, 1997). The purpose of the study was to analyze current habitat conditions, examine restoration opportunities and evaluate potential restoration strategies within the Green /Duwamish River ecosystem. The Big Spring Creek Restoration project #37 was identified as a restoration priority by the Corps of Engineers and King County via the Green/Duwamish River Basin Ecosystem Restoration Study Final Feasibility Report (U.S. Army Corp of Engineers, 2000). King County Water and Land Resources Division began planning efforts for the project on Big Spring Creek and adjacent wetlands, including the acquisition of easements in 2005.

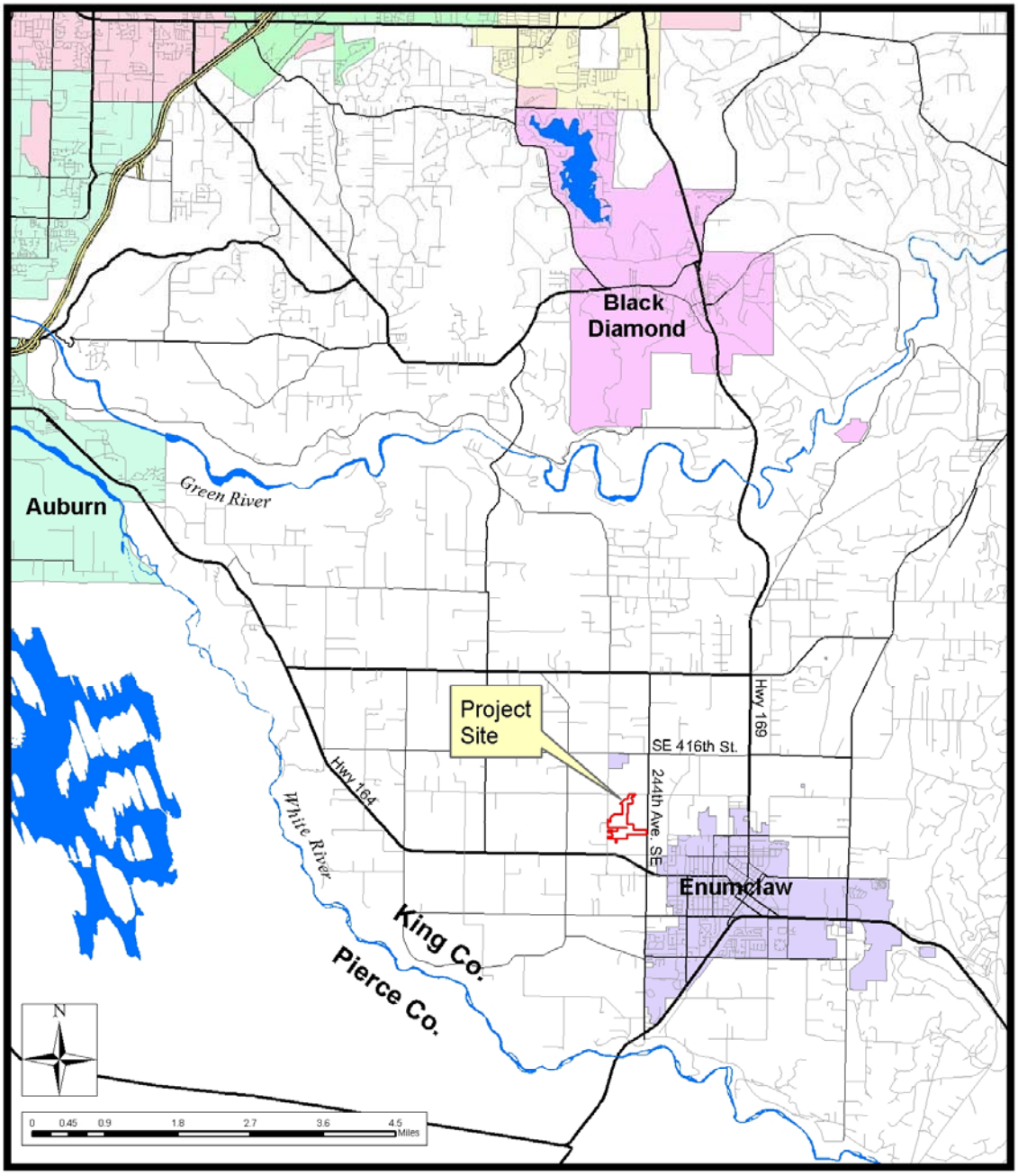

Figure 1: Vicinity Map

Big Spring Creek

Stream Relocation and Wetland Restoration Project

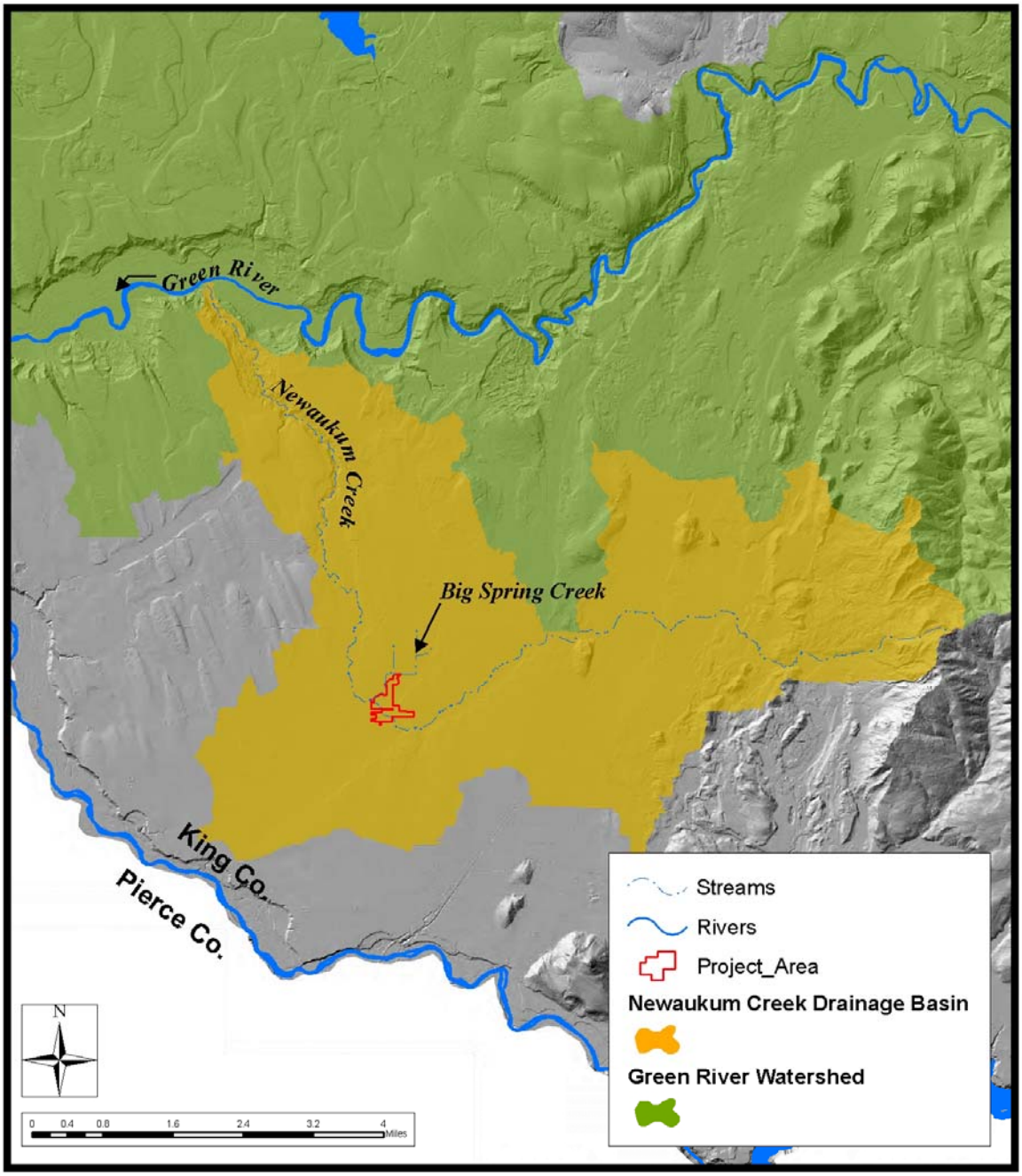

Figure 2: Watersheds and Drainage Basins

Big Spring Creek

Stream Relocation and Wetland Restoration Project

King County

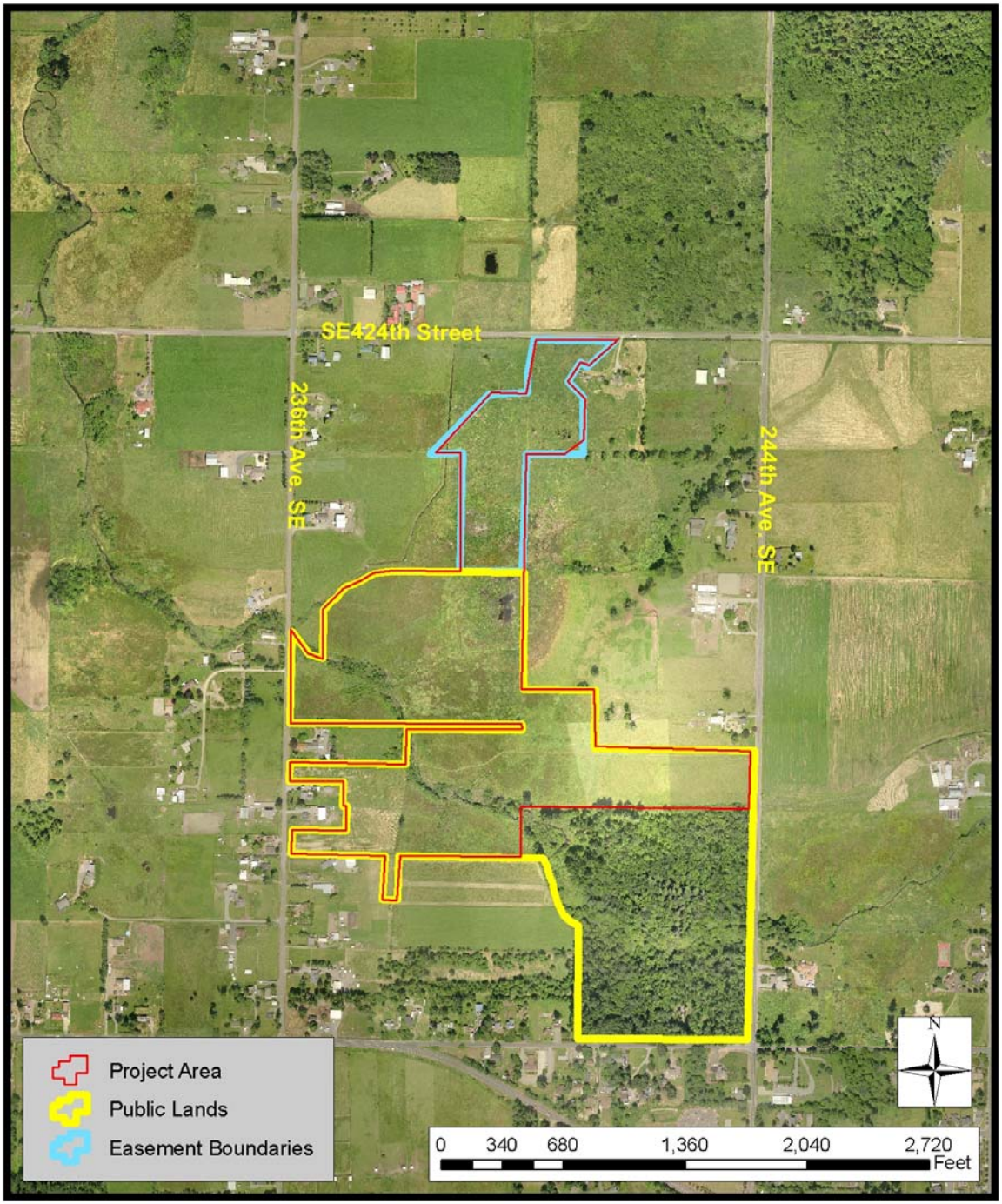

Figure 3: Aerial Photo of Project Area

Wetland Characterization

Big Spring Creek

Stream Relocation and Wetland Restoration Project

King County

Project Overview

The Big Spring Creek Wetland Restoration and Stream Relocation Project proposes to build a new stream channel and wetland features within the project area south of Southeast 424th Street (Figure 3 and 4). The current stream channel is relatively straight, has little adjacent native plant cover, and is partially constrained by reed canary grass growing in the channel. The wetland is relatively flat with little plant diversity. Reed canary grass dominates the landscape. The purpose of the project is to create a more natural channel configuration with meanders, off channel pools, and complex wetland communities including emergent, scrub/shrub and forested areas.

The project will be constructed in phases over the course of several years starting in 2009. Although King County does not currently have funding for construction of the entire project the following schedule is based on anticipated funding.

Year	
2009	100 foot planting buffer on Newaukum Creek.
2010	Widen buffer of Newaukum Creek. Construct upstream 1/3 of channel, wetland pools, wood installation and stream and wetland planting.
2011	Construct downstream 2/3 of channel, wetland pools, wood installation, and stream and wetland plantings.
2012	Connect Big Spring Creek to new channel. Further planting to easement edges.

Project Area

As part of the project, King County acquired permanent conservation easements located south of Southeast 424th Street, between 244th Avenue Southeast and 236th Avenue Southeast in southwestern King County, northwest of the City of Enumclaw (Figure 3). The project is located within these easements and on property to the south owned by the City of Enumclaw. The site is bordered by Southeast 424th Street to the north and homes and pastureland on the east, west, and south.

Background Information

As part of the planning effort for this project, background information, including the 1990 King County Sensitive Areas Folio, wetland delineation report (Watershed Dynamics 2000), topographic maps, soil survey information, and aerial photographs of the site were reviewed. The National Wetland Inventory Maps, USGS Quadrangle maps, and other relevant information were also considered. Photographs taken by King County staff are included.

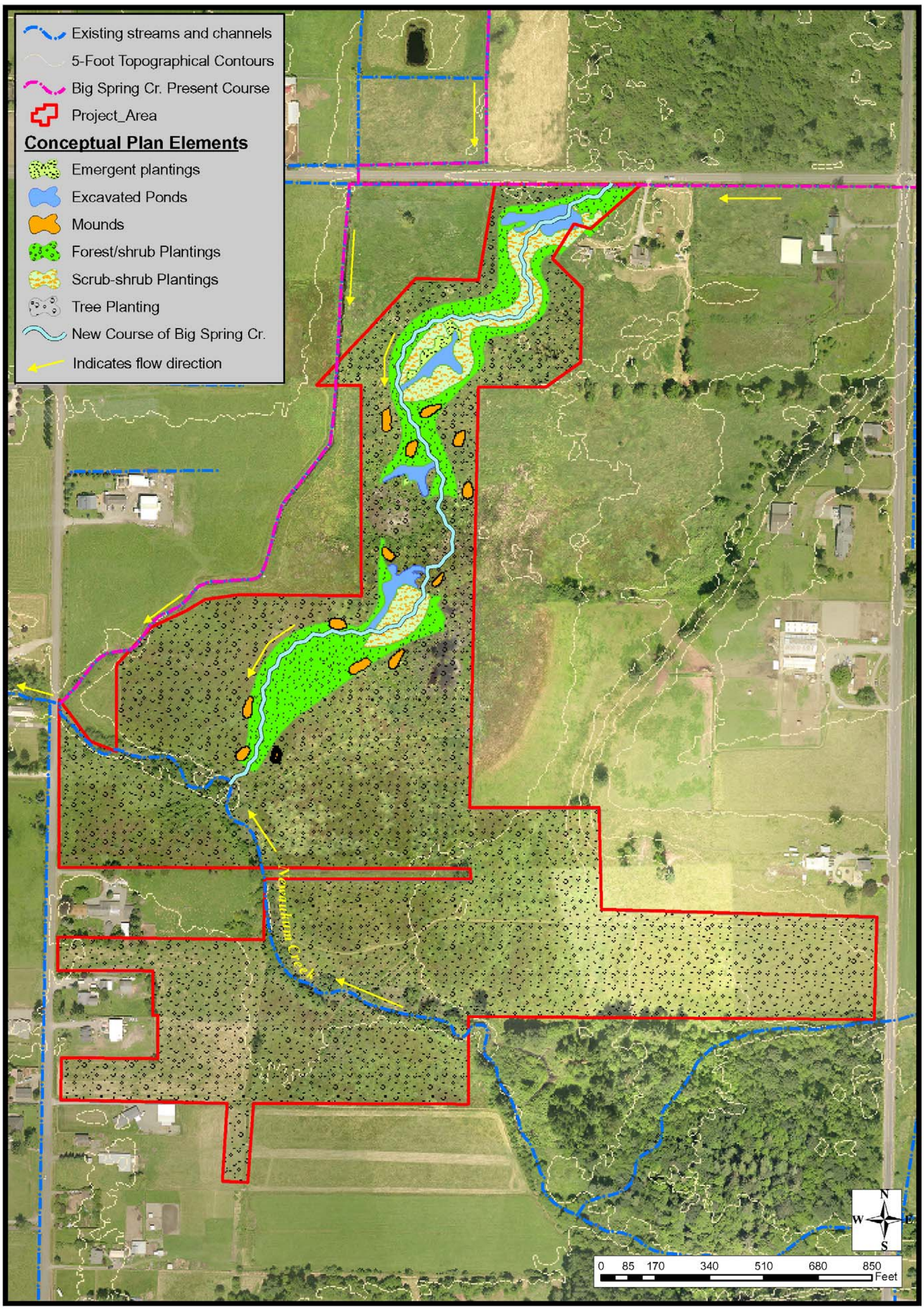

Figure 4: Conceptual Project Plan

Big Spring Creek
Stream Relocation and Wetland Restoration Project

King County

Wetland Characterization

Basin Characteristics

The Big Spring Creek watershed is located within the Newaukum Creek basin on the northern boundary of the Enumclaw Plateau northwest of Enumclaw (Figure 1and 2). Big Spring Creek is a 1.2-mile-long tributary of Newaukum Creek which in turn drains into the Green River at river mile 40.7. Big Spring Creek originates within a series of wetlands that are part of its 1,000-acre drainage area. The primary wetland within the Big Spring Creek watershed is the 144-acre King County Newaukum Creek Wetland 51 (Figure 5).

Folio and National Wetland Inventory

The proposed project is located south of Southeast 424th Street. The King County Wetland Inventory (1990) shows Newaukum Creek 51 extending only minimally into the project area and does not identify any other wetland within the project boundary (Figure 5). The majority of Wetland 51 is found north of the project area, north of Southeast 424th Street, and on both sides of 244th Avenue SE (Figure 5). The area directly north of Southeast 424th is heavily vegetated with native plants. Further upstream, east of 244th Avenue Southeast, open water with large patches of spirea dominate the landscape. The National Wetland Inventory shows three wetlands within the southern one-half of the project site and identified two as Palustrine Emergent and one as Palustrine Forested (Figure 6).

Very little area to the south of Southeast 424th is designated wetland in the King County map folio and the National Wetland Inventory, but further site assessments conducted by King County Ecologists confirm that the project area between the City of Enumclaw property and Southeast 424th Street is predominately wetland. Also, past delineation efforts (Watershed Dynamics, 2000) show that most of the City of Enumclaw property including much of the area south of Newaukum Creek is wetland.

Topography

The USGS maps confirm that the site is relatively flat (Figure 7). Survey data reveals a gentle slope from the northeast to the southwest with a difference in elevation of 5 feet (641 feet to 636 feet in elevation).

Soil Survey

The Natural Resources Conservation Service soil surveys show the northern third of the project area to consist largely of Shalcar and Seattle muck. The lower two thirds are mapped as Buckley silt loam (Figure 8). Shalcar and Seattle soils are found in flat floodplains, and are considered very poorly drained.

Photo Date: 7/22/89 Inventory Date: 5/21/90 N Scale: 1" = 1000'

WETLAND: Newaukum Creek 51

COMMUNITY PLAN AREA: Enumclaw

LOCATION (S,T,R): 14, 20N, 6E
15, 20N, 6E

BASIN OR DRAINAGE: Green River

ACREAGE: 144.0

SENSITIVE AREA MAP#: 12

CLASSIFICATION:	Fish & Wildlife Service	Common Name
PEM	Palustrine Emergent	Meadow
PSS	Palustrine Scrub-Shrub Deciduous (Vine Maple/Dogwood/Hardhack)	Forested
PFO	Palustrine Forested (Cottonwood/Alder/Cedar)	Forested
POW	Palustrine Open Water	Open Water

NOTE: Wetland boundaries shown are approximate. Further field studies are necessary to confirm the actual delineation of the wetland according to the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*.

Newaukum Creek 51

OBSERVED SPECIES (refer to Appendix 1):

Trees: *PT AR PS TP*

Shrubs: *AC CS RP RD RV SR RT OC SX SD RX PE*

Herbs: *EA MU RR UD VA GM LA PH TL VS MY SA KP*

Sedges/Grasses/Ferns: *AG JE PA LM SY AX CO CT*

Birds: *DD RB ST YT WW VS AR MW SS HM BI*

Mammals:

Fish:

Other: *BF*

HYDROLOGY:

Inlet: **Type:** **Condition:**

Outlet: **Type:** **Condition:**

Outflow enters:

Water movement through wetland: Standing flow.

Observed water quality in wetland: Water is clear.

SIGNIFICANT HABITAT FEATURES: Few snags taller than 25 feet in height - perches.

GENERAL OBSERVATIONS: This is a large diverse Class 1 wetland. Most of the forested sections are young second growth. The emergent zones are the youngest and most recently disturbed. The site is entirely surrounded by agricultural land and is shaped by this activity.This inventory updates and includes information for Newaukum Creek 15 Newaukum Creek 19 and Newaukum Creek 51 from the original inventory (1983).

WETLAND RATING (see Introduction for criteria): *I*

NOTE: Species listed are only those observed during field visits. Further field studies are necessary to obtain a complete list including rare, threatened, and/or endangered species.

Figure 5: King County Wetland Inventory Pages
Wetland Characterization

Big Spring Creek

Stream Relocation and Wetland Restoration Project

King County

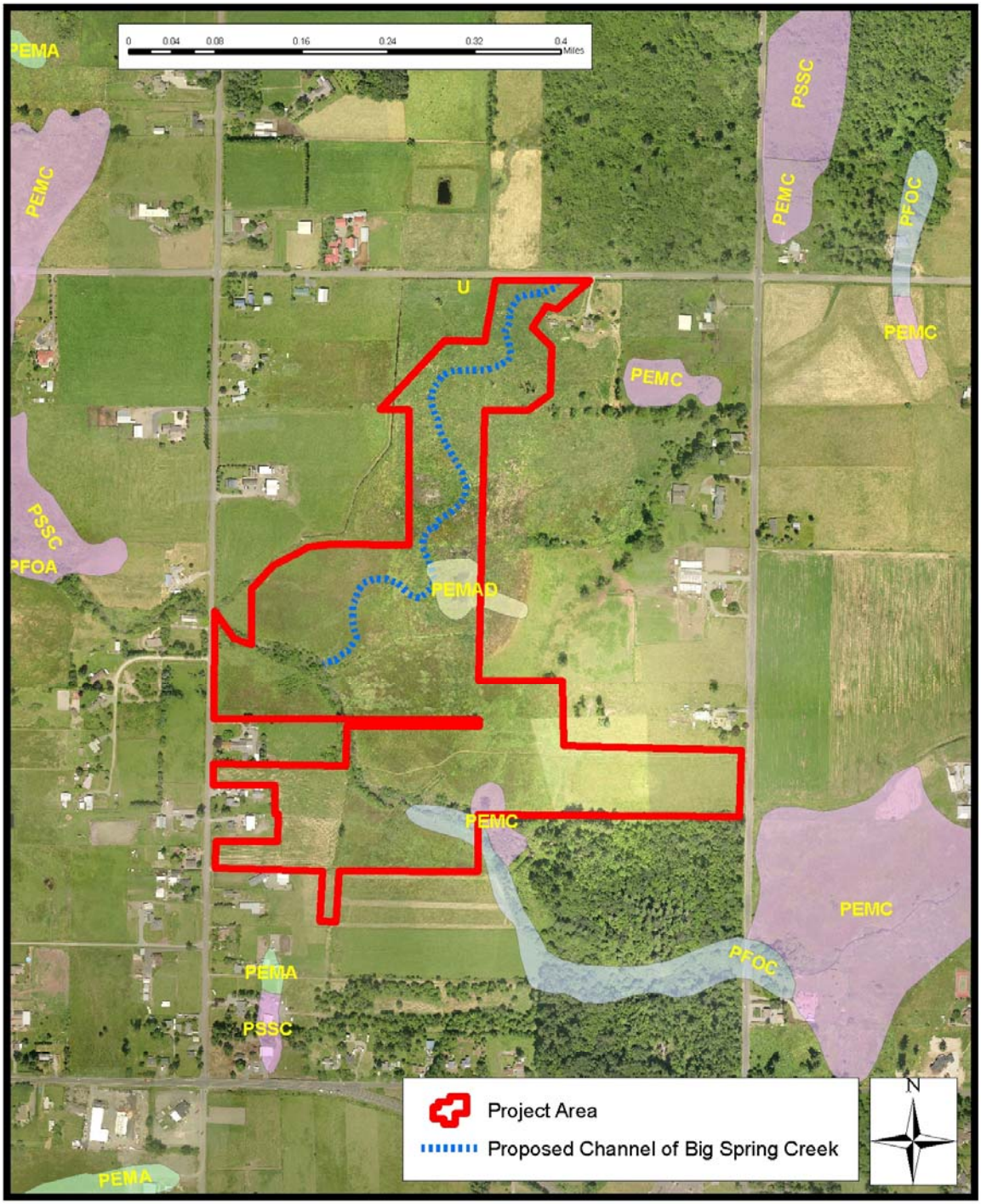

Figure 6: NWI Wetlands and Cowardin Classificaiton

Wetland Characterization

Big Spring Creek

Stream Relocation and Wetland Restoration Project

King County

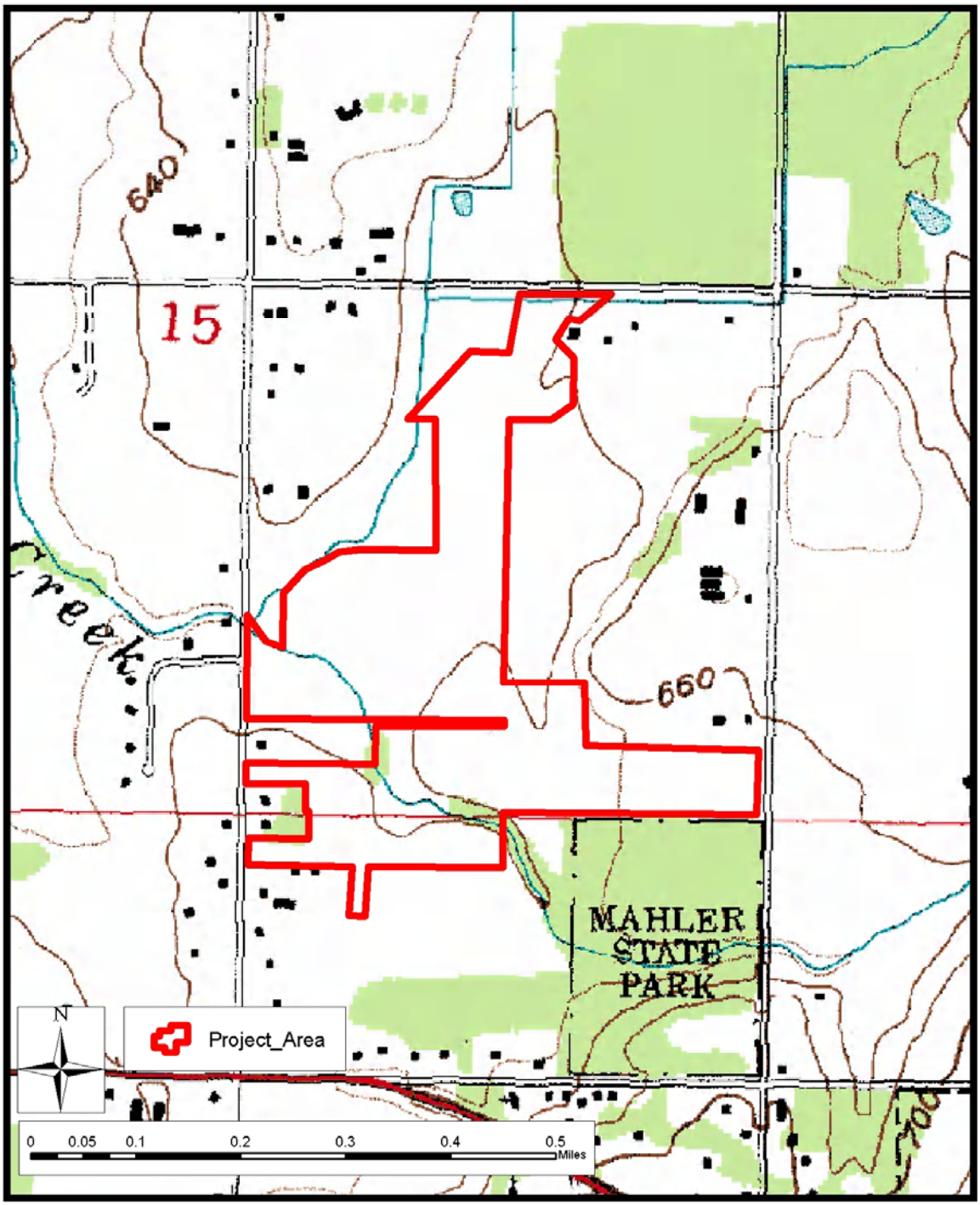

Figure 7: USGS Quadrangle

Wetland Characterization

Big Spring Creek
Stream Relocation and Wetland Restoration Project

King County

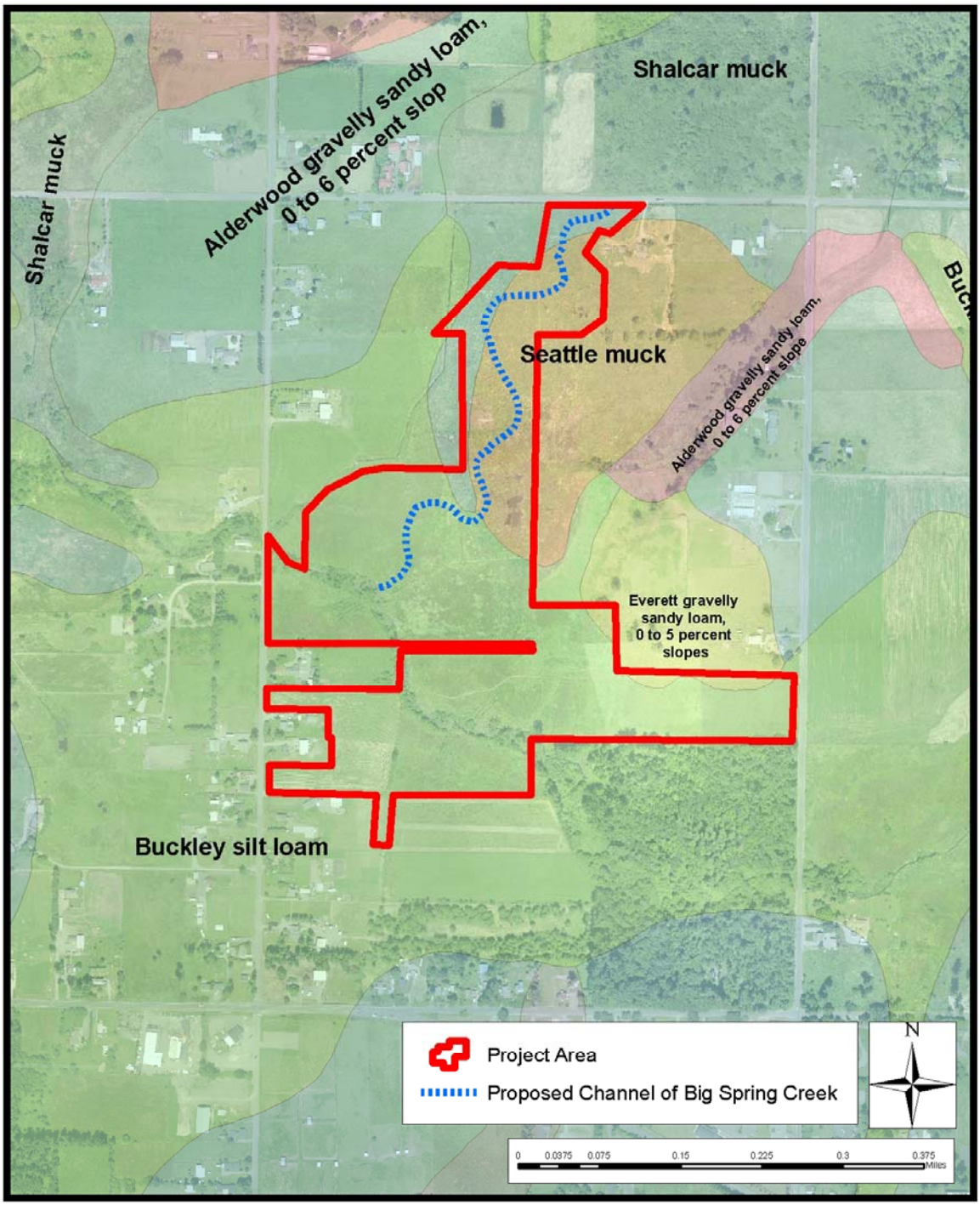

Figure 8: USDA SCS Soil Survey Units

Wetland Characterization

Big Spring Creek

Stream Relocation and Wetland Restoration Project

King County

Groundwater and Hydrology

Construction of roads and ditches, have bisected Wetland 51 and interrupted the natural surface and groundwater flow paths. As a result, Wetland 51 appears to be hydrologically separated from adjacent wetland areas. For instance the area south of Southeast 424th Street and the area directly north of Southeast of 424th Street have little or no hydrologic connection because of the road installation. Aerial photos from 1936, the earliest available (Figure 9), show the roads in the area already in place and Big Spring Creek flowing in its current alignment in the road side ditches (Figure 10). The wetland within the project site has no defined outlet; it drains to the southwest into Newaukum Creek via surface or ground water and also though manmade ditches on site.

General Site Conditions

The project site was cleared, ditched, and drained in the past to convert it to agricultural pasturelands. As a result, the site is largely open, dominated by pasture grasses with little woody vegetation except along the perimeter of Newaukum Creek where native trees and shrubs have been installed as part of previous restoration efforts.

The clearing and grading of the wetland and riparian buffer, along with unrestricted livestock access to Big Spring Creek in the project area and elsewhere in the basin has resulted in bank erosion, siltation, and degraded water quality (King County Basin Reconnaissance, 1990), which has ultimately affected Newaukum Creek. Vegetative structure and diversity is very poor downstream (south) of Southeast 424th Street where reed canary grass (*Phalaris arundinacea*) dominates the landscape (Appendix A photos 1, 2, and 3).

Much of the upstream portion of Big Spring Creek is in a roadside ditch adjacent to 244th Avenue Southeast. and Southeast 424th Street (Appendix 1, photo 4, Figure 10). The creek flows south of Southeast 424th Street in an agricultural ditch through the western portion of the project area before it enters Newaukum Creek (Appendix 1, photo 5, Figure 10). It is assumed to have been relocated but it is unclear exactly where the original stream channel flowed. The channel most likely was located between the existing stream channel and the slope to the east.

Wetland Assessment Methods

As part of the planning process, ecologists from King County closely examined site conditions to determine the extent and characteristics of wetland located on the project site. The site assessment included an evaluation of the plant community, soil conditions and the presence and sources of hydrology. Using the accepted wetland indicators found in the 1987 federal wetland delineation manual and the Interim Regional Supplement (April 2008), site indicators for each of those parameters was used to make a wetland determination. Observations from the site assessment are detailed in later sections.

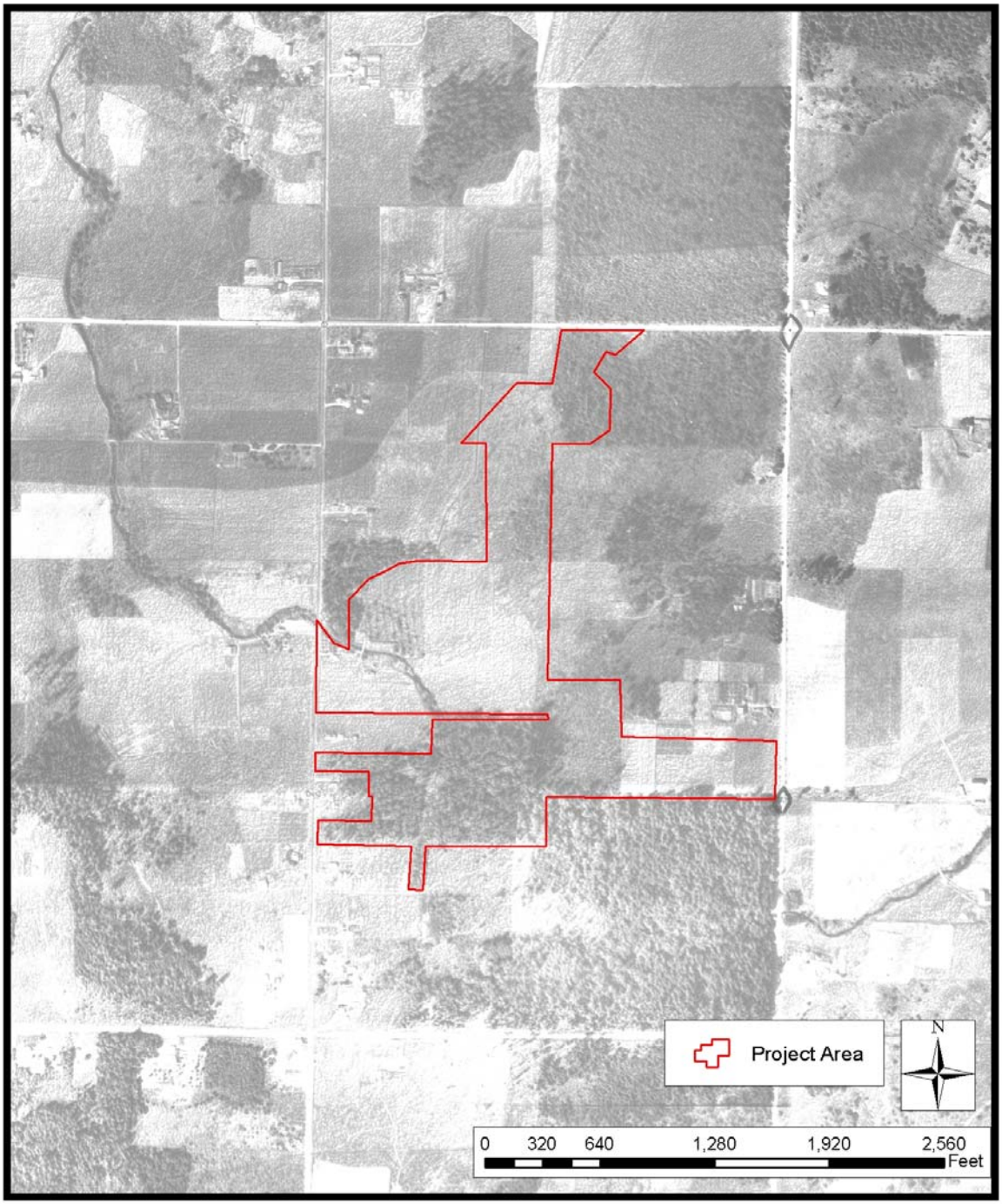

Figure 9: 1936 Aerial Photo of Wetland and Project Area

Compare to Figure 3

Wetland Characterization

Big Spring Creek

Stream Relocation and Wetland Restoration Project

King County

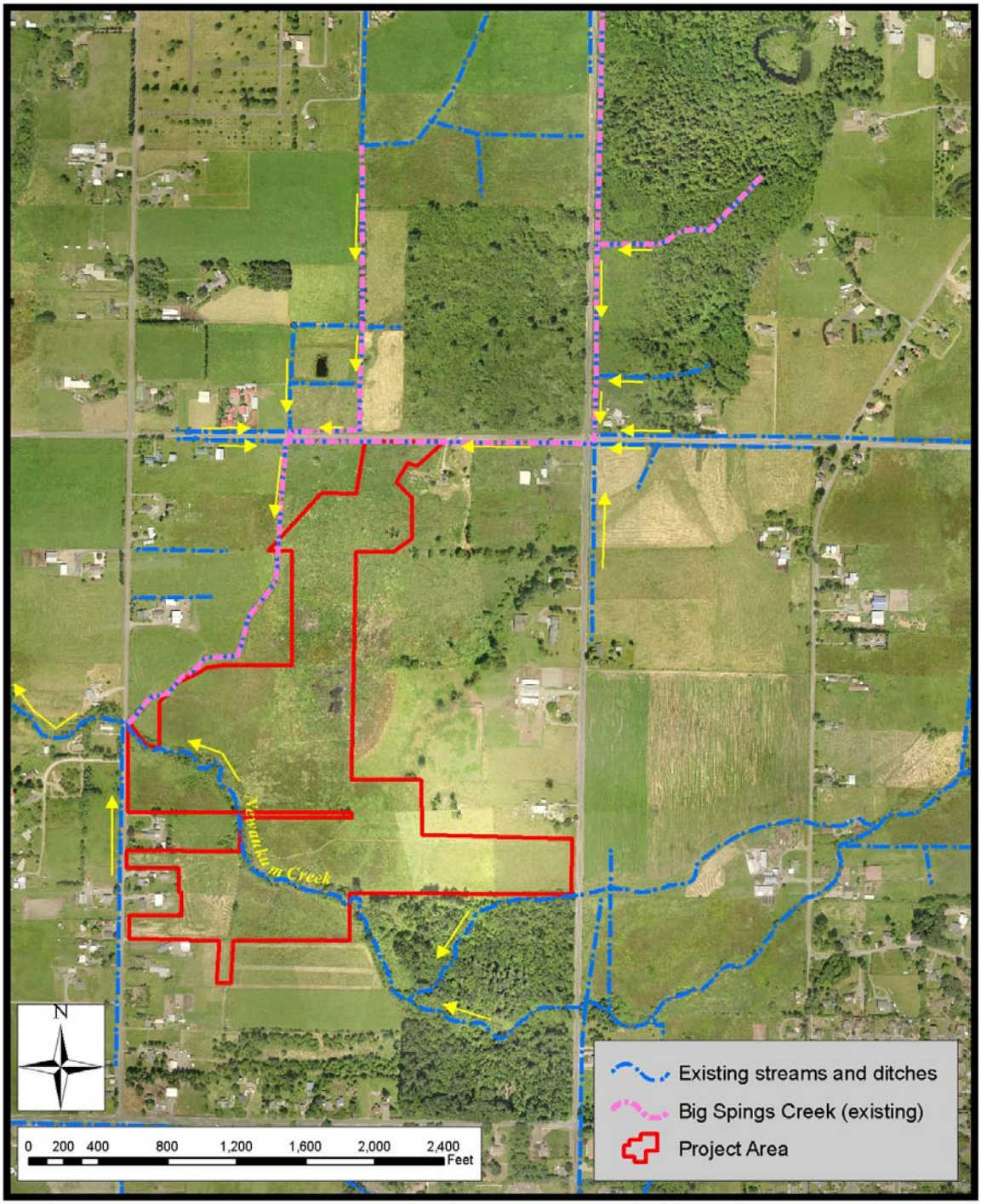

Figure 10: Hydrological Features and Directions of Flow

Big Spring Creek
Stream Relocation and Wetland Restoration Project

King County

Wetland Characterization

Soil Observations

Soil samples to a depth of approximately three feet were examined in many locations within the easement area and the soil was confirmed to be a well-decomposed organic soil (muck). Upland soils were found on the west portion of the City of Enumclaw property and on two privately owned parcels. The upland areas on the private parcels are noticeably higher in elevation than the rest of the project area, however, the elevation difference was not pronounced between the upland and wetland areas on the City of Enumclaw property. These areas may be used to spoil excess material from the channel excavation (Figure 11). Soils within the upland areas were dark brown to medium brown in color and sandy loam, sandy clay loam and loamy sand which is consistent with the Alderwood gravely sandy loam soils shown adjacent to the project site on the soils maps. Alderwood soils are often an inclusion found within Seattle and/or Shalcar series soils.

Hydrology

In an effort to better understand hydrologic conditions, King County installed and has been monitoring ten groundwater wells on the site (Figures 12 and 13). The wells were installed in April 2007. The wells were installed at least 3 feet in depth throughout the wetland and have been read every 2 weeks throughout the year. In the summer of 2007, it became evident that four of the wells (B3, B4, B5, and B6) were filling with sediment through the slots in the sides of the instrument and giving erroneous readings. Two of the most crucial wells for project design, B4 and B5, were reinstalled with cloth sediment barriers in June 2008. Well B7 in the southeastern portion of the project site consistently shows the wettest conditions with readings often indicating standing water. Well B4, in the mid-western portion of the project site also shows wetter conditions than the other wells. Both Wells B4 and B7 are adjacent to areas that are ponded for much of the year. In general, the driest conditions were found in wells B3 and B6 in the southern portion of the site near the proposed mouth of Big Springs Creek. All wells indicate the presence of wetland hydrology.

Plant Communities

The subject wetland directly south of Southeast 424th Street is largely reed canary grass (*Phalaris arundinacea*) with some areas of cattails (*Typha latifolia*) in localized depressions. Soft rush (*Juncus effucus*), spirea (*Spirea douglasii*), buttercup (*Ranunculus repens*), red fescue (*Festuca rubra*), velvet grass (*Holcus lanatus*), and other pasture grasses are also found on site. Previous native plantings installed by King County near Newaukum Creek on City of Enumclaw property within the current project area demonstrate that Sitka spruce (*Picea sitchensis*), Pacific willow (*Salix lasiandra*), Sitka willow (*Salix sitchensis*), red alder (*Alnus rubra*), cottonwood (*Populus balsamifera*), Oregon ash (*Fraxinus latifolia*), twinberry (*Lonicera involucrata*), Pacific ninebark (*Physocarpos capitatus*), red twig dogwood (*Cornus cericea*), red elderberry (*Sambucus racemosa*) and nootka rose (*Rosa nutkana*) thrive in this environment.

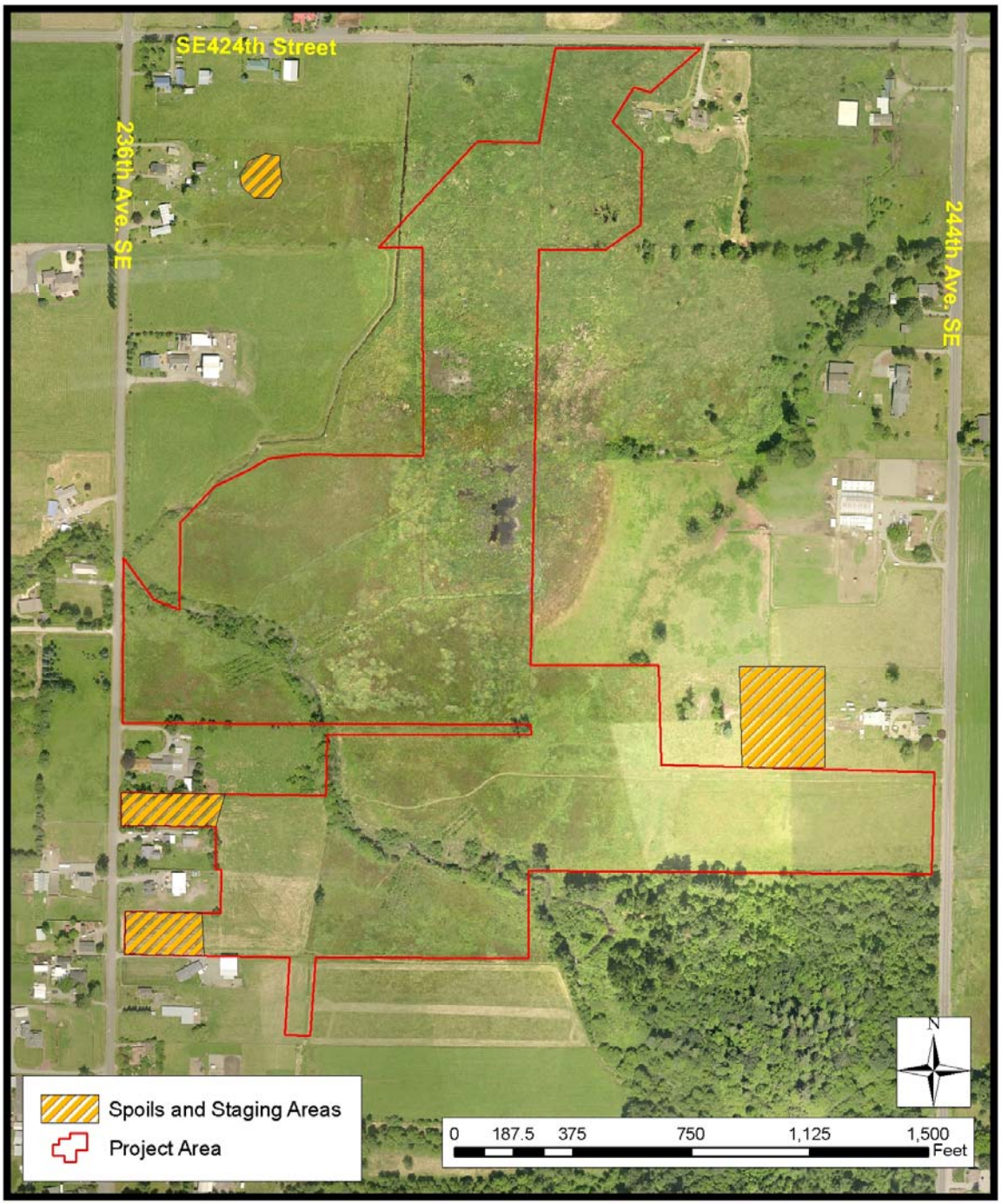

Figure 11: Spoils and Staging Areas

Wetland Characterization

Big Spring Creek

Stream Relocation and Wetland Restoration Project

King County

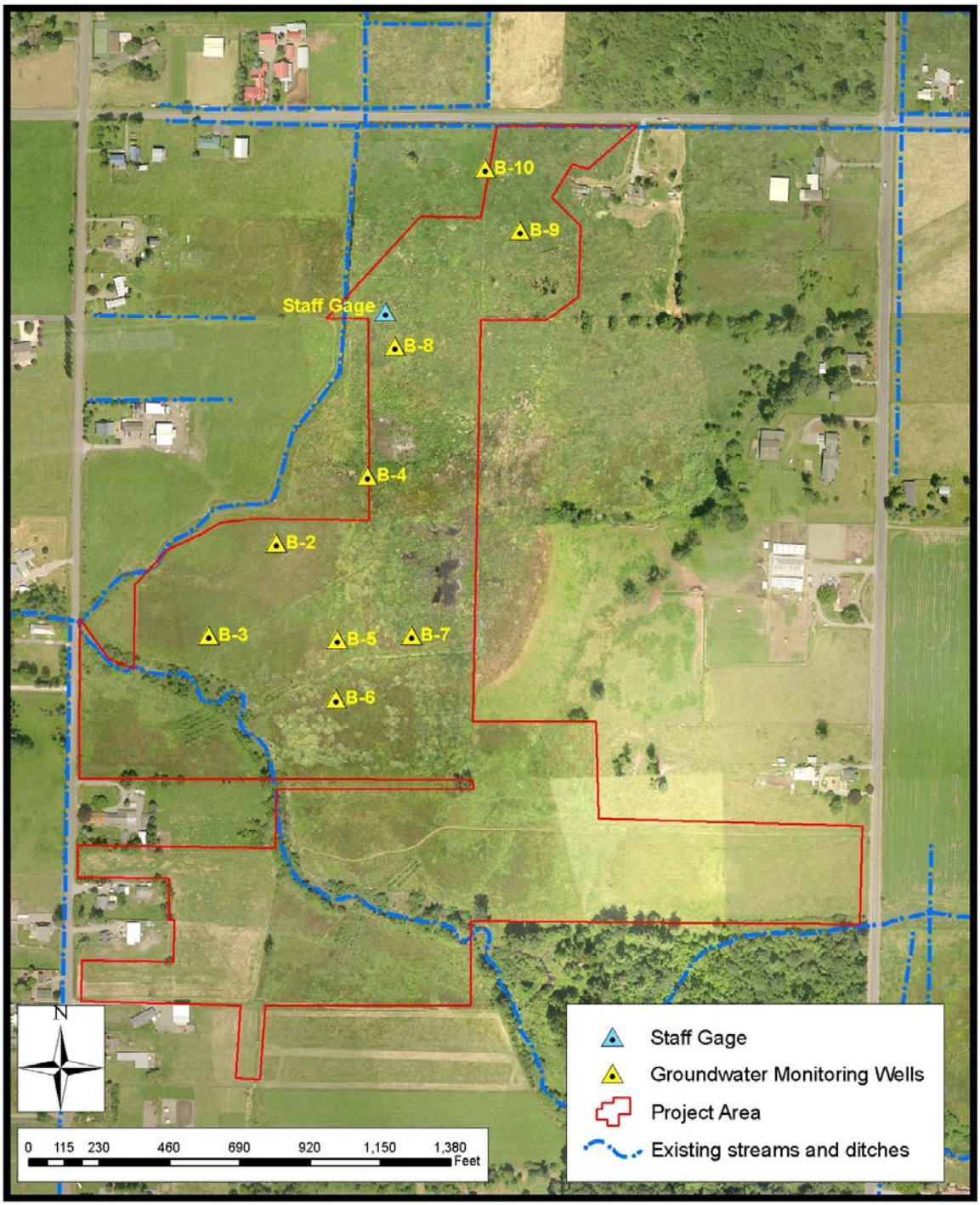

Figure 12: Groundwater Well and Staff Gage Locations

Big Spring Creek
Stream Relocation and Wetland Restoration Project

King County

Wetland Characterization

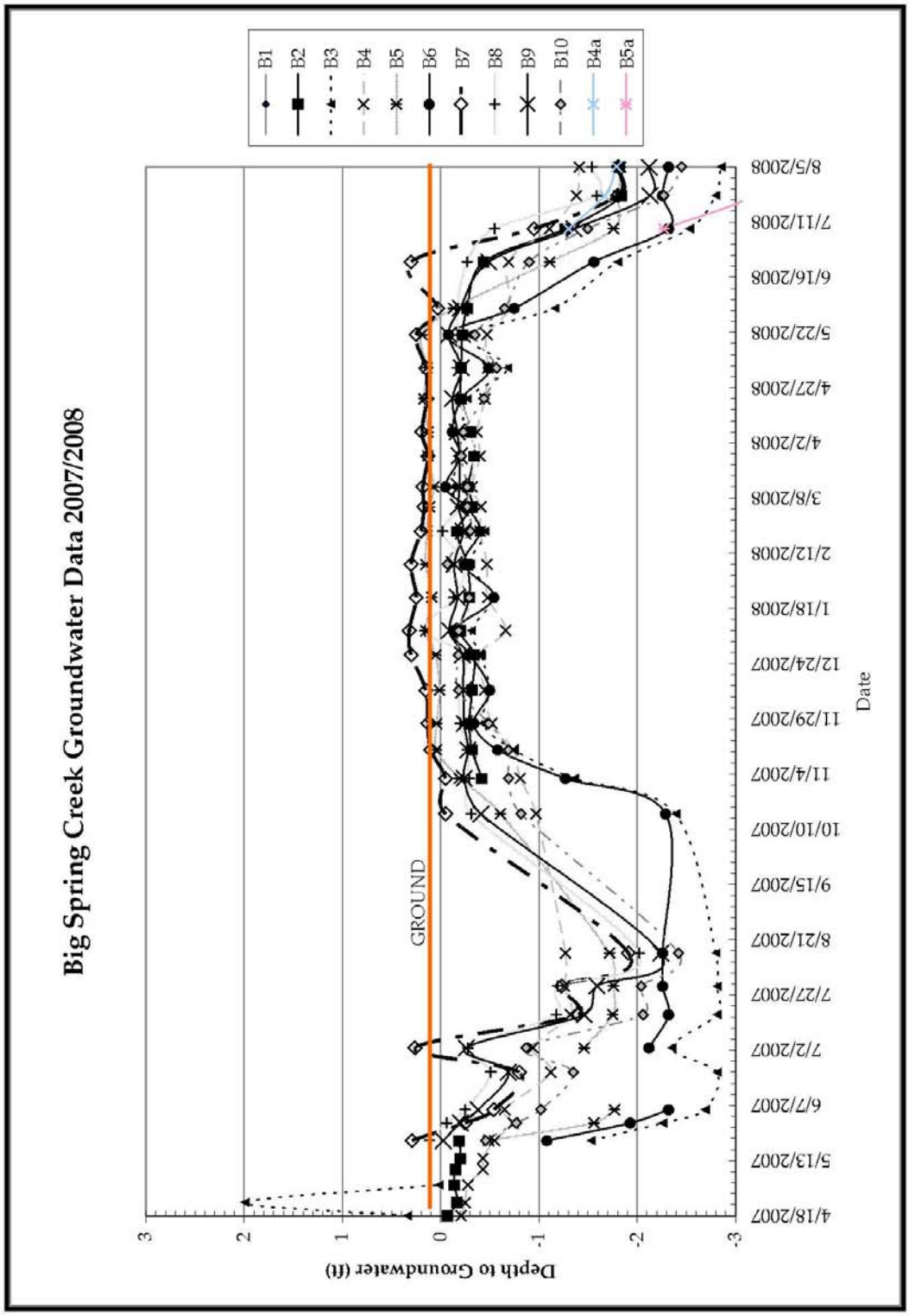

Figure 13: Groundwater Well Data

See Figure 5 for Well/Gage Locations

Big Spring Creek
Stream Relocation and Wetland Restoration Project

King County

Wetland Characterization

The wetland complex north of Southeast 424th Street located on the 30-acre parcel to the north of the subject wetland area is unique in that it has diverse native plant communities, including several large Sitka spruce trees. It is assumed that the wetland area characterized in this report was historically modified for agricultural use and once was similar in appearance to the area to the north.

Wetland Determination

For the purpose of this project, King County has made the assumption that the entire project area is wetland with the exception of areas field verified as upland on the City of Enumclaw's land (Figure 11). Although a detailed delineation was not performed, data collected from groundwater wells, observation of organic soils and the predominance of hydrophytic vegetation within the project area, confirmed this assumption. Upland inclusions may be present, but location of small upland islands was not deemed to be of consequence within the easement areas. King County generally agrees with the results of the delineation completed on the City of Enumclaw property, however further investigation found additional wetland areas on the City property.

To help defray project costs, spoils from project construction may be placed on the upland areas identified. Spoil material will also be used onsite within the wetland areas to create a more topographically diverse landscape that can accommodate a wider variety of plant species.

Wetland Classification and Rating

From visual observations reed canary grass constitutes approximately 70% of the wetland in the project area. Cattails, softrush and pasture grasses make up the majority of the rest of the site. Using the Cowardin classification system, the site would be considered a palustrine emergent community.

This wetland within the project area was rated according to the Department of Ecology wetland rating system. The rating exercise resulted in a Class II wetland rating (Appendix B). This depressional wetland scored highest for the Water Quality function, secondly the Hydrologic function, and lastly the Habitat function. Since the site is bordered by some grazed pastures and drainage from farm fields and a road enter the site, the wetland has the potential to improve water quality. It also has the potential to improve water quality because of the persistent ungrazed vegetation and organic soil found on the site. The potential to reduce flooding and erosion is high because water is able to pond in some areas. Habitat is degraded by the heavy grazing in buffers, low vegetative diversity and lack of undisturbed, unbroken vegetated corridors to other wetland areas outside of the project area.

Potential Wetland Alterations

Construction of the project as proposed will result in the conversion of approximately 0.25 acres of emergent wetland to new stream channel. The channel will be constructed through a section of the wetland that is currently dominated by reed canary grass. The channel will be designed to carry flows diverted from the ditched sections of Big Spring Creek. Other portions of the wetland will also be graded to create the off channel-pools and high spots within the wetland. These areas are expected to remain wetland, but will be temporarily disturbed during construction.

Sections of the existing ditch system will need to be filled to ensure flows are diverted into the new channel, but most of the existing ditch system will remain open and accessible as wetland and off-channel habitat.

Project Benefits

This wetland restoration and stream relocation project will create 2,800 linear feet of new channel and 1.7 acres of off-channel pools and shallow ponded areas and enhance 65.4 acres of wetland and riparian habitat with native plantings (Figure 4). In addition, 280 pieces of woody debris will be placed throughout the project area both within the channel and the adjacent wetland.

The new location of Big Spring Creek will allow creation of a more natural and complex channel configuration with meanders and connections to excavated and existing off-channel pools and shallow ponds. Rerouting the stream into this area from the adjacent ditch will benefit fish and other wildlife. Also, the stream and the proposed off-channel pools and shallow ponded areas will create opportunities for more plant diversity.

The channel has been designed with deep water habitats to provide rearing and refuge for salmonids, riffle areas for spawning and shallow emergent and shrub areas for use by juvenile salmonids, amphibians, water fowl and other birds. Marine derived nutrients from decaying fish will improve soil quality to support plant life. Excavated channel spoils will be mounded to create topographic relief for planting species that require dryer conditions. The topographic adjustments to the current flat topography will allow the creation of a more vegetatively diverse wetland complex.

The enhanced wetland and stream will be more attractive to, and more heavily utilized by wildlife such as river otter (*Lutra canadensis*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethica*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), great blue heron (*Ardea herodias*), raptors, amphibians and reptiles. The channel and adjacent wetland will become a wildlife corridor. In addition, the plantings will provide stream cover, bank erosion protection, a future source of woody debris, nutrients for aquatic insects and wildlife and provide shade to reduce the density of reed canary grass and other invasive non-native plants.

The native plant community will be restored by planting Sitka spruce , Western red cedar (*Thuja plicata*), and a variety of deciduous trees within the wetland to create a vegetated forested condition. Shrubs and emergents will also be planted to complete a vegetatively diverse community. Reed canary grass is the most prevalent plant species found in the project area. Because of the height it attains and dense nature in which it grows it prevents natural establishment of other plants. Eventually, by the introduction of native trees and large shrubs the reed canary grass will be shaded and reduced in density. This strategy will then allow natural seeding of those bare areas with more native species. Landscape fabric will be installed initially to suppress the grass and native plants will be planted into the fabric. This technique will allow the plants to become established faster than without a sheet mulch.

A large number of logs and wood debris placed extensively both in the stream channel and in the project area wetland will serve to trap sediments and gravel, slow flood flows, improve pool habitat, provide shelter to fish and wildlife, provide nutrients to aquatic insects, improve soil quality over time and generally provide a more natural and complex floodplain environment.

Conclusion

The project as a whole will dramatically improve both wetland and stream habitat within the Big Spring Creek system and the entire 65 acres of project area will be permanently protected by conservation easements. The activities allowed under the U.S. Army Corp of Engineers Nationwide 27 permit (aquatic habitat restoration, establishment and enhancement activities) are consistent with the proposed project.

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Appendix A

Photos

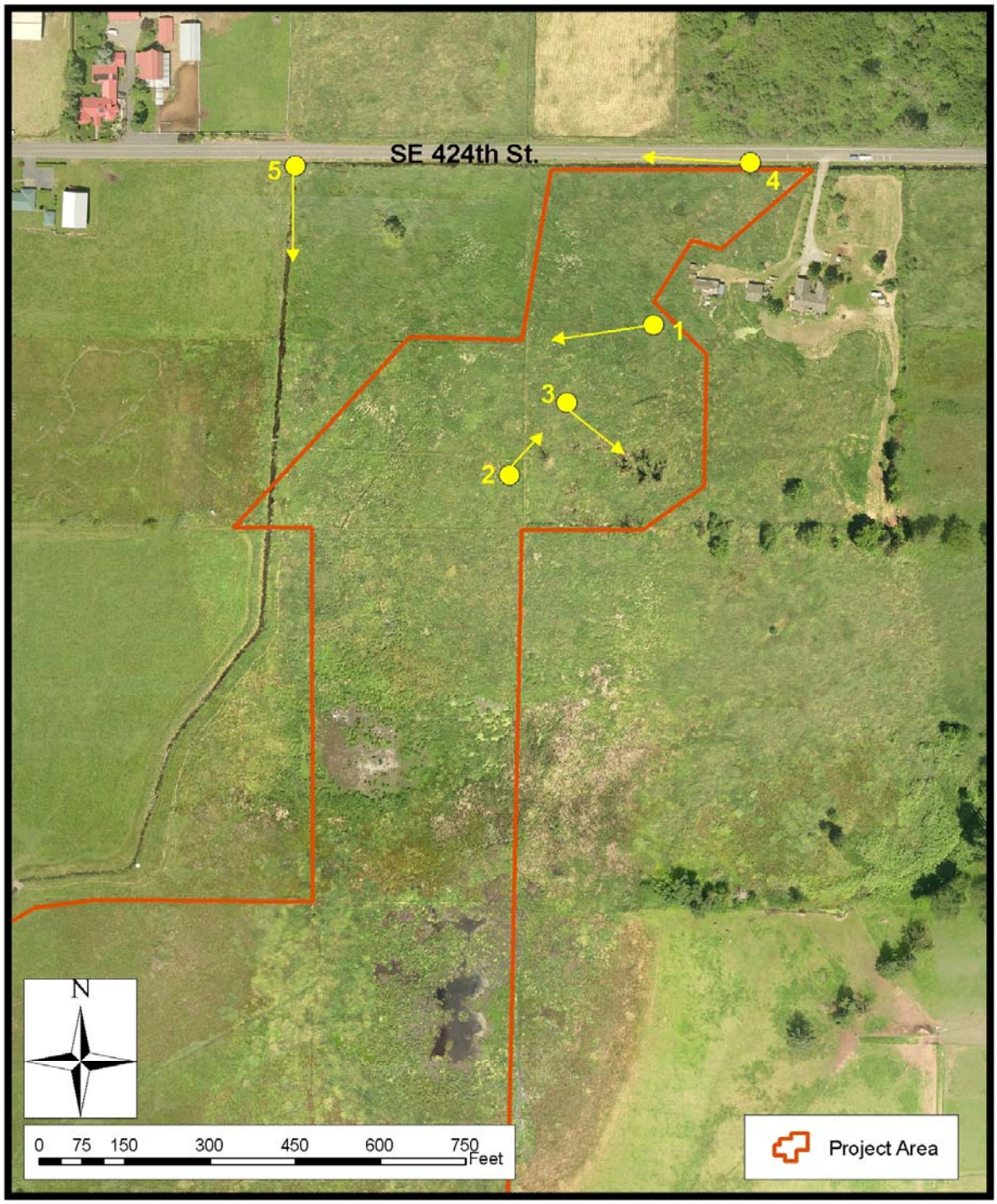


Photo Locations and Aspects

Appendix A
Wetland Characterization

Big Spring Creek

Stream Relocation and Wetland Restoration Project

King County

Appendix A: Photos

Photo 1

Photo 2

Photo 3

Appendix A: Photos

Photo 4

Photo 5

Appendix B

Wetland Rating Form

Wetland name or number _____

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): Nowaukum Creek #51 Date of site visit: March 13, 2008

Rated by Cynthia Young Trained by Ecology? Yes X No___ Date of training_____

SEC: 15 TWNSHP: 20N RNGE: 6E Is S/T/R in Appendix D? Yes___ No___

Map of wetland unit: Figure ____ Estimated size 60 acres

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II X III___ IV___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	20
Score for Hydrologic Functions	18
Score for Habitat Functions	13
TOTAL score for Functions	51

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply___

Final Category (choose the "highest" category from above) II

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		**Depressional**	X
Natural Heritage Wetland		**Riverine**	
Bog		**Lake-fringe**	
Mature Forest		**Slope**	
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above N/A		Check if unit has multiple HGM classes present	

Wetland name or number _____

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		X
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		X
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number _____

D	**Depressional and Flats Wetlands** **WATER QUALITY FUNCTIONS** - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
D	**D 1. Does the wetland unit have the <u>potential</u> to improve water quality?**	*(see p.38)*
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) points = 3 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 1 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing"*) Provide photo or drawing	**Figure ___** 1
D	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES points = 4 NO points = 0	4
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation > = 95% of area points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	**Figure ___** 5
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0 Map of Hydroperiods	**Figure ___** 0
D	**Total for D 1** *Add the points in the boxes above*	10
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 44)* multiplier 2
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	20

Wetland name or number _____

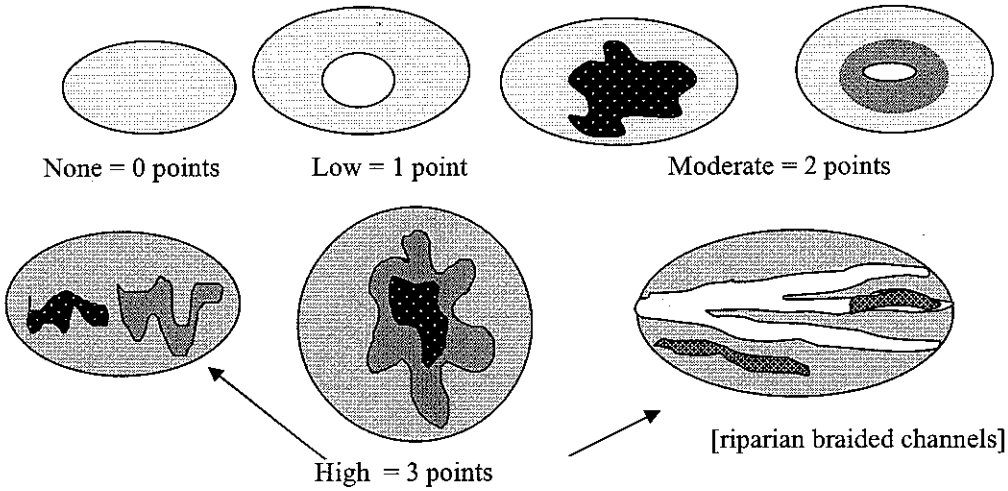
D	**Depressional and Flats Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream degradation	**Points** (only 1 score per box)
	D 3. Does the wetland unit have the <u>potential</u> to reduce flooding and erosion?	*(see p.46)*
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) points = 4 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 *(If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 0	1
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 The wetland is a "headwater" wetland" points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 Unit is flat (yes to Q. 2 or Q. 7 on key) but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft points = 0	5
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire unit is in the FLATS class points = 5	3
D	**Total for D 3** *Add the points in the boxes above*	9
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* — Wetland is in a headwater of a river or stream that has flooding problems — Wetland drains to a river or stream that has flooding problems — Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 49)* multiplier 2
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	18

Wetland name or number _____

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed _X_Emergent plants _X_Scrub/shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) *If the unit has a forested class check if:* ____The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 3 structures — points = 2 2 structures — points = 1 1 structure — points = 0 Map of Cowardin vegetation classes	**Figure ___** 1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (see text for descriptions of hydroperiods)* _X_Permanently flooded or inundated — 4 or more types present — points = 3 _X_Seasonally flooded or inundated — 3 types present — points = 2 _X_Occasionally flooded or inundated — 2 types present — point = 1 _X_Saturated only — 1 type present — points = 0 _X_ Permanently flowing stream or river in, or adjacent to, the wetland ____ Seasonally flowing stream in, or adjacent to, the wetland ____ ***Lake-fringe wetland* = 2 points** ____***Freshwater tidal wetland* = 2 points** Map of hydroperiods	**Figure ___** 3
H 1.3. Richness of Plant Species ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species — points = 2 *List species below if you want to:* 5 - 19 species — points = 1 < 5 species — points = 0	1

Total for page 5

Wetland name or number _____

	Figure ___
H 1.4. Interspersion of habitats *(see p. 76)* Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points [riparian braided channels] High = 3 points NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	2
H 1.5. Special Habitat Features: *(see p. 77)* *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ____Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ____Standing snags (diameter at the bottom > 4 inches) in the wetland ____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ____At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated. *(structures for egg-laying by amphibians)* ____ Invasive plants cover less than 25% of the wetland area in each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	7

Comments

Wetland name or number _____

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.** — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 1
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	1

Total for page 2

Wetland name or number _____

H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see p. 82)* Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* *These are DFW definitions. Check with your local DFW biologist if there are any questions.* ____**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres). ____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ____**Old-growth forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. ____**Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest. ____**Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community. ____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages ____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%. ____**Urban Natural Open Space**: A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development. ____**Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons. _____**Marine/Estuarine Shorelines**: Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control). If wetland has **3 or more** priority habitats = **4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat = **1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	1

Wetland name or number _____

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	5
TOTAL for H 1 from page 14	7
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	13

Wetland name or number _____

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	**Category**
SC 1.0 Estuarine wetlands ***(see p. 86)*** Does the wetland unit meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt. YES = Go to SC 1.1 NO	
SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? YES = Category I NO go to SC 1.2	**Cat. I**
SC 1.2 Is the wetland unit at least 1 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

SC 2.0 Natural Heritage Wetlands ***(see p. 87)*** Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site ___ YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO ___ SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? YES = Category I (NO)___not a Heritage Wetland	**Cat. I**
SC 3.0 Bogs ***(see p. 87)*** Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes - go to Q. 3 No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Is a bog for purpose of rating No - go to Q. 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. YES = Category I (No)___ Is not a bog for purpose of rating	**Cat. I**

SC 4.0 Forested Wetlands ***(see p. 90)*** Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its functions.* — **Old-growth forests**: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. — **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. YES = Category I (NO) ___not a forested wetland with special characteristics	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons ***(see p. 91)*** Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* YES = Go to SC 5.1 NO___ not a wetland in a coastal lagoon SC 5.1 Does the wetland meets all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than 1/10 acre (4350 square feet) YES = Category I (NO) = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO__ not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: • Long Beach Peninsula- lands west of SR 103 • Grayland-Westport- lands west of SR 105 • Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	N/A

Appendix B

Big Spring Creek Wetland Characterization: Northwest Corner of Southeast 424th Street and 244th Avenue Southeast

April 2008

King County

Department of Natural Resources and Parks
Water and Land Resources Division
Capital Projects Section
201 South Jackson Street, Suite 600
Seattle, Washington 98104-3855

Big Spring Creek Wetland Characterization: Northwest Corner of Southeast 424th Street and 244th Avenue Southeast

April 2008

Prepared by
Cynthia Young, Ecologist
Reviewed by Jon Hansen, Senior Ecologist

King County

Department of Natural Resources and Parks
Water and Land Resources Division
Capital Projects Section
201 South Jackson Street, Suite 600
Seattle, Washington 98104-3855

Introduction

Consistent with the goals of Ecosystem Restoration Project #37, Big Spring Creek (Figures 1 and 2), King County proposes to relocate Big Spring Creek from existing roadside ditches into an excavated 5,000-foot-long meandered channel with attached wetland ponds and off-channel areas. The channel will meander through two areas with distinctively different vegetative conditions. One area to the south of Southeast 424th Street is dominated by reed canarygrass and a few areas of cattails and the area north of Southeast 424th Street and west of 244th Avenue Southeast is densely vegetated with native vegetation. The purpose of this report is to characterize the wetland area north of Southeast 424th Street for use in evaluating the appropriateness of this area for channel excavation.

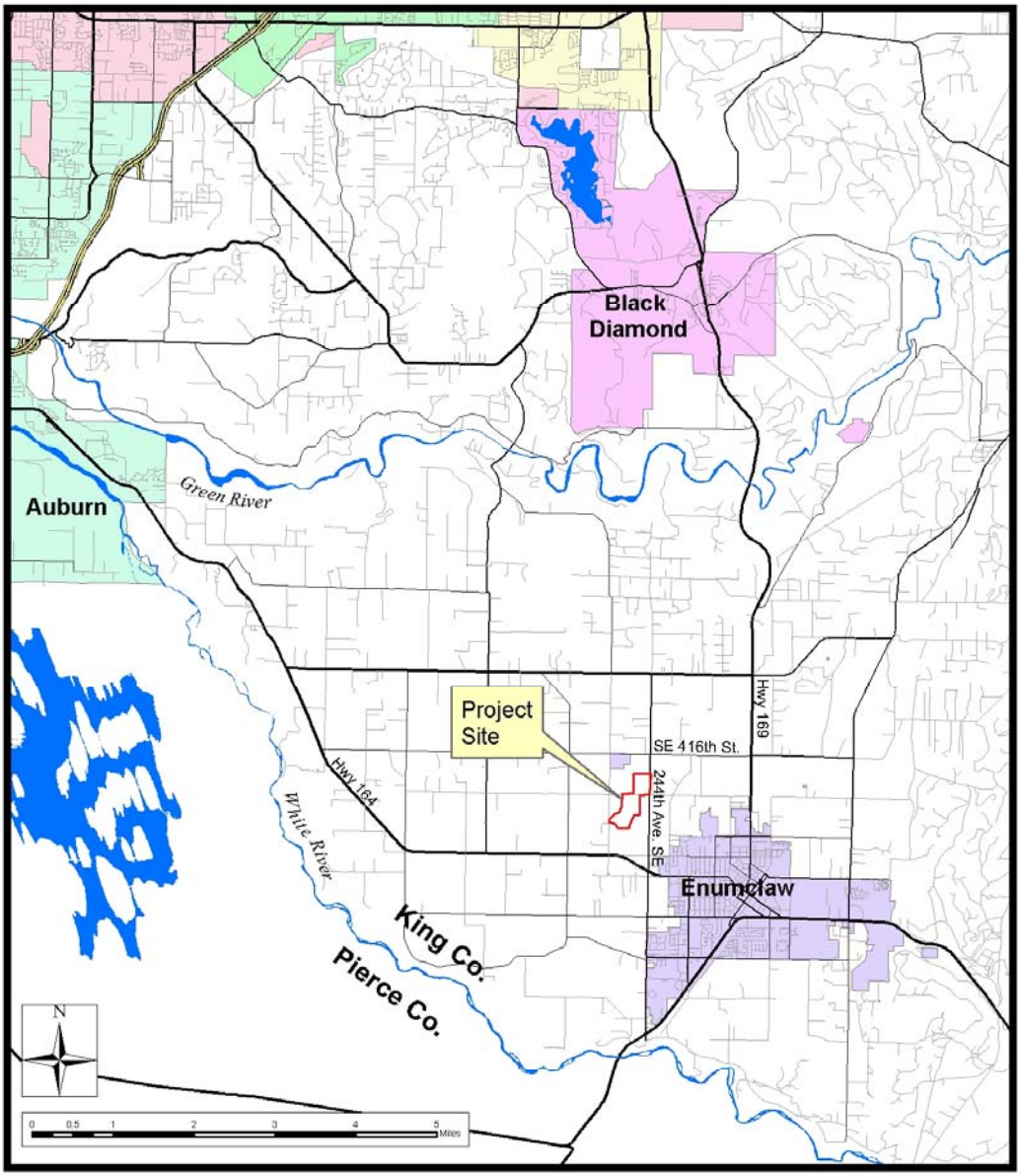


Figure 1: Vicinity Map

Wetland Characterization

Big Spring Creek

Stream Relocation and Wetland Restoration Project

King County

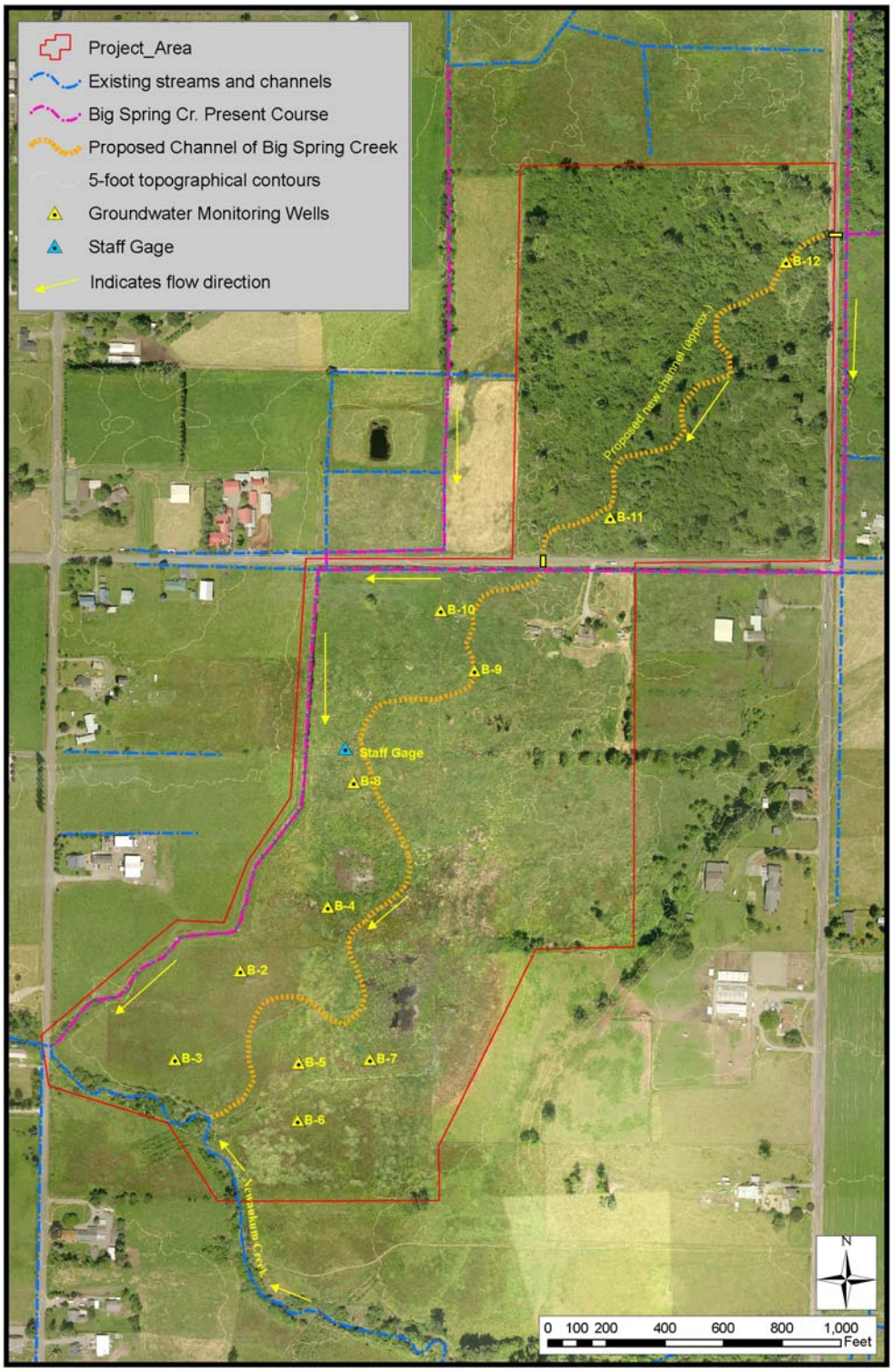


Figure 2: Conceptual Project Plan
and Groundwater Well / Staff Gage Locations

Wetland Characterization

Big Spring Creek
Stream Relocation and Wetland Restoration Project
King County

Project Area

The Big Spring Creek watershed is located within the Newaukum Creek basin on the northern boundary of the Enumclaw Plateau northwest of Enumclaw (Figure 3). The 1.2-mile-long Big Spring Creek is a tributary of Newaukum Creek entering at river mile (RM) 6.3. Big Spring Creek originates within a series of wetlands that are part of its 1,000-acre drainage area. The primary wetland within the Big Spring Creek watershed is the 144-acre King County Newaukum Creek Wetland 51 (Figure 4).

Much of Wetland 51 south of Southeast 424th Street has been cleared, ditched, and drained to convert it to agricultural pasturelands, though the area directly north of Southeast 424th Street remains heavily vegetated. Further upstream, east of 244th Avenue Southeast, the wetland is mostly open water with large patches of spirea (Figure 3 and Appendix A, Photos 5 and 6).

The upstream portion of Big Spring Creek is in a roadside ditch adjacent to the wetlands. The downstream portion is flowing in a straight ditch through the western part of Wetland 51 before it enters Newaukum Creek. It is assumed to have been relocated but it is unclear where the original stream channel flowed.

The clearing of the wetland riparian buffer, grading, and livestock access to Big Spring Creek and the source wetlands has resulted in bank erosion, siltation, and degraded water quality (King County Basin Reconnaissance, 1990), which has ultimately affected Newaukum Creek. The road fill has disrupted hydrologic connectivity and function within the wetland and between the stream and the wetland. These impacts have also affected both stream and wetland habitat that once provided good rearing habitat for both resident trout and juvenile anadromous salmonids. Vegetative structure and diversity is very poor, especially downstream (south) of Southeast 424th Street where reed canarygrass (*Phalaris arundinacea*) dominates the landscape.

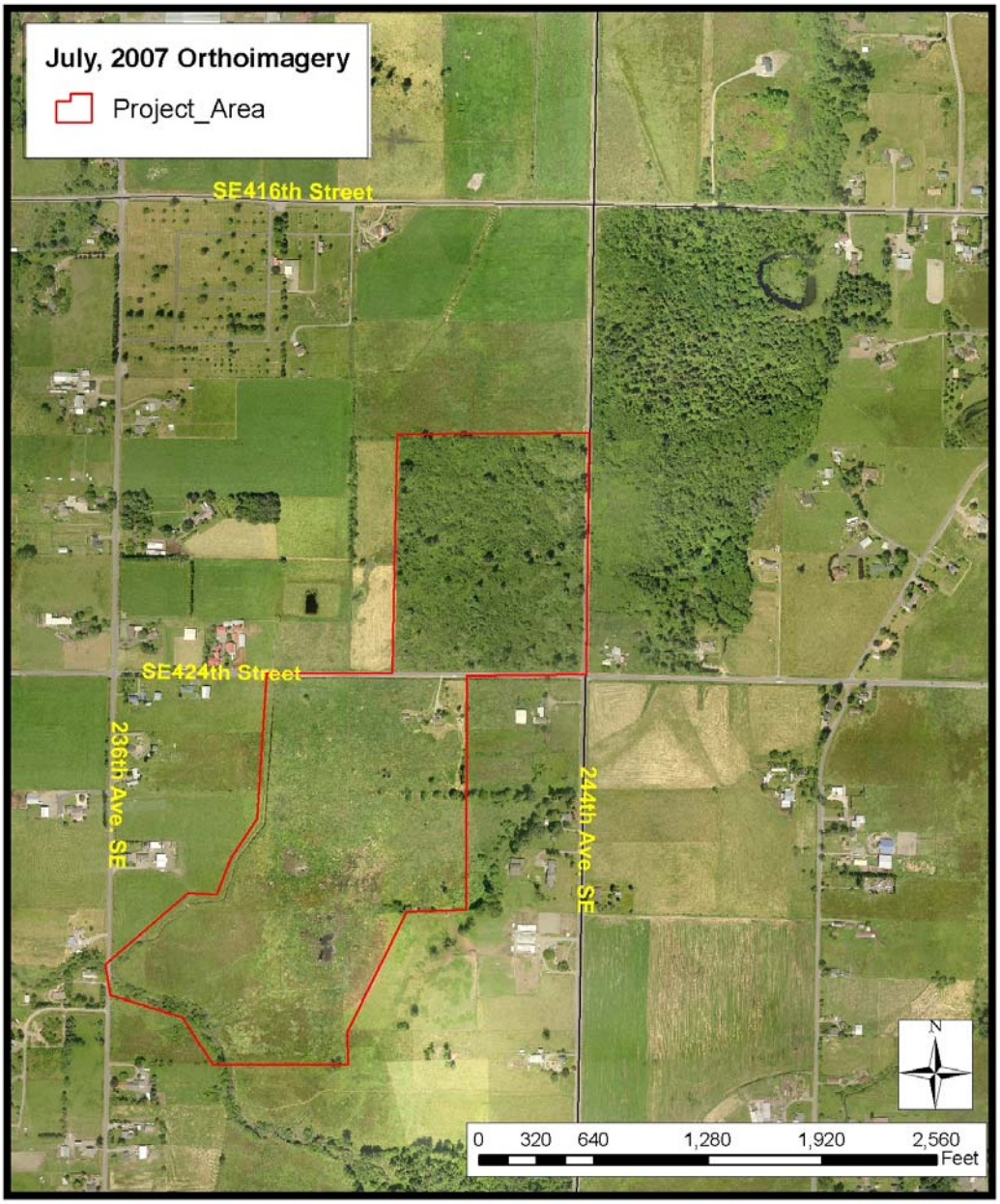


Figure 3: Aerial Photo of Wetland and Project Area

Wetland Characterization

Big Spring Creek
Stream Relocation and Wetland Restoration Project
King County

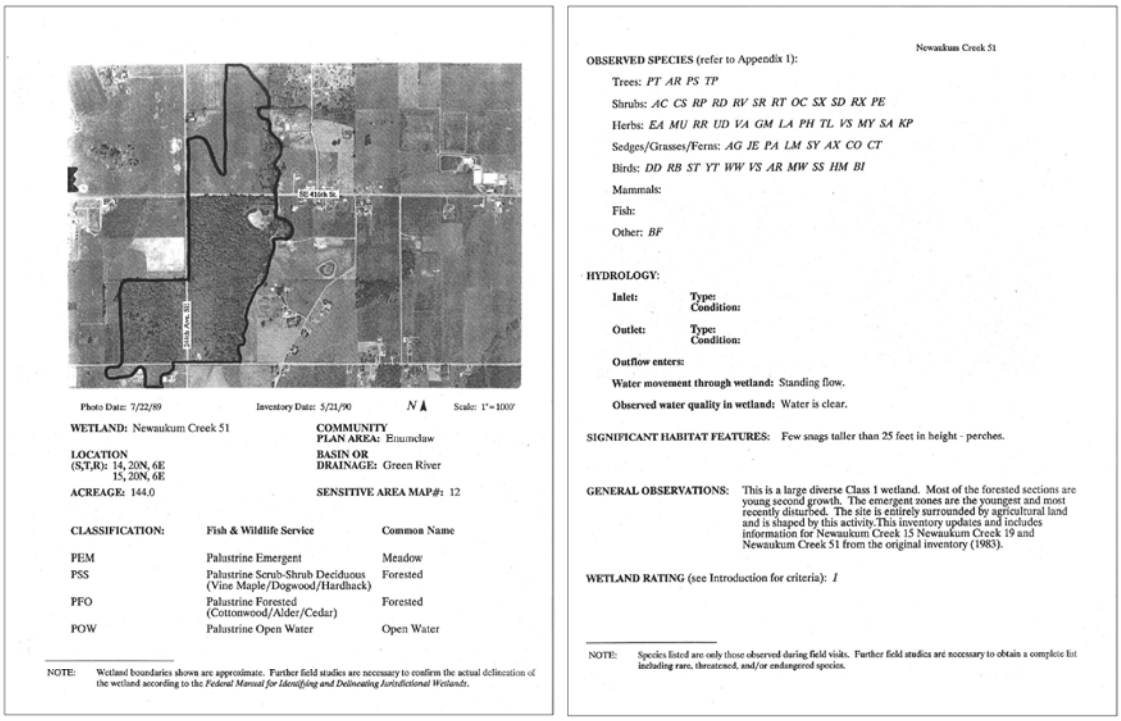


Photo Date: 7/22/89 Inventory Date: 5/21/90 N Scale: 1"=1000'

WETLAND: Newaukum Creek 51

COMMUNITY PLAN AREA: Enumclaw

LOCATION (S,T,R): 14, 20N, 6E; 15, 20N, 6E

BASIN OR DRAINAGE: Green River

ACREAGE: 144.0

SENSITIVE AREA MAP#: 12

CLASSIFICATION:	Fish & Wildlife Service	Common Name
PEM	Palustrine Emergent	Meadow
PSS	Palustrine Scrub-Shrub Deciduous (Vine Maple/Dogwood/Hardhack)	Forested
PFO	Palustrine Forested (Cottonwood/Alder/Cedar)	Forested
POW	Palustrine Open Water	Open Water

NOTE: Wetland boundaries shown are approximate. Further field studies are necessary to confirm the actual delineation of the wetland according to the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*.

Newaukum Creek 51

OBSERVED SPECIES (refer to Appendix 1):

Trees: *PT AR PS TP*

Shrubs: *AC CS RP RD RV SR RT OC SX SD RX PE*

Herbs: *EA MU RR UD VA GM LA PH TL VS MY SA KP*

Sedges/Grasses/Ferns: *AG JE PA LM SY AX CO CT*

Birds: *DD RB ST YT WW VS AR MW SS HM BI*

Mammals:

Fish:

Other: *BF*

HYDROLOGY:

Inlet: **Type:** **Condition:**

Outlet: **Type:** **Condition:**

Outflow enters:

Water movement through wetland: Standing flow.

Observed water quality in wetland: Water is clear.

SIGNIFICANT HABITAT FEATURES: Few snags taller than 25 feet in height - perches.

GENERAL OBSERVATIONS: This is a large diverse Class 1 wetland. Most of the forested sections are young second growth. The emergent zones are the youngest and most recently disturbed. The site is entirely surrounded by agricultural land and is shaped by this activity.This inventory updates and includes information for Newaukum Creek 15 Newaukum Creek 19 and Newaukum Creek 51 from the original inventory (1983).

WETLAND RATING (see Introduction for criteria): *1*

NOTE: Species listed are only those observed during field visits. Further field studies are necessary to obtain a complete list including rare, threatened, and/or endangered species.

Figure 4: King County Wetland Inventory Pages
Wetland Characterization

Big Spring Creek

Stream Relocation and Wetland Restoration Project

King County

Background Information

As part of the project, King County acquired a 30-acre parcel located on the northwest corner of Southeast 424th Street and 244th Avenue Southeast in Enumclaw (Figure 5 and Appendix A, Photos 1, 2, and 3). It is bordered by roads on the east and south and by pastureland on the north and west. (The surrounding pasturelands are likely wetland as well.) It was historically part of a larger wetland complex, but because of bisecting roads and ditches, it is separated from adjacent wetland areas to the south and east. Water does flow out of the wetland and into Big Spring Creek via ditches.

Figure 5: Aerial View of Forested/Scrub-Shrub Wetland

Wetland Characterization

Big Spring Creek
Stream Relocation and Wetland Restoration Project

King County

The site is heavily vegetated with a combination of trees and shrubs, making access into and across the site difficult. King County ecologists, however, have traversed the site and collected data about the soil, vegetation, and site hydrology.

As part of the planning effort for this project, background information, including topographic maps, soil survey information, the 1990 King County Sensitive Areas Folio, and aerial photographs of the site were reviewed. The National Wetland Inventory Maps, USGS Quadrangle maps, and other relevant information were also considered. Photographs taken by King County staff and a map showing the location where they were taken are included for your information.

Topography

The USGS maps confirm that the site is very flat (Figure 6). Survey data collected by King County Roads indicate a slight slope from the northeast to the southwest. The road prisms on the south and east side are higher in elevation than the surface of the wetland. A ditch is present between the road and the wetland.

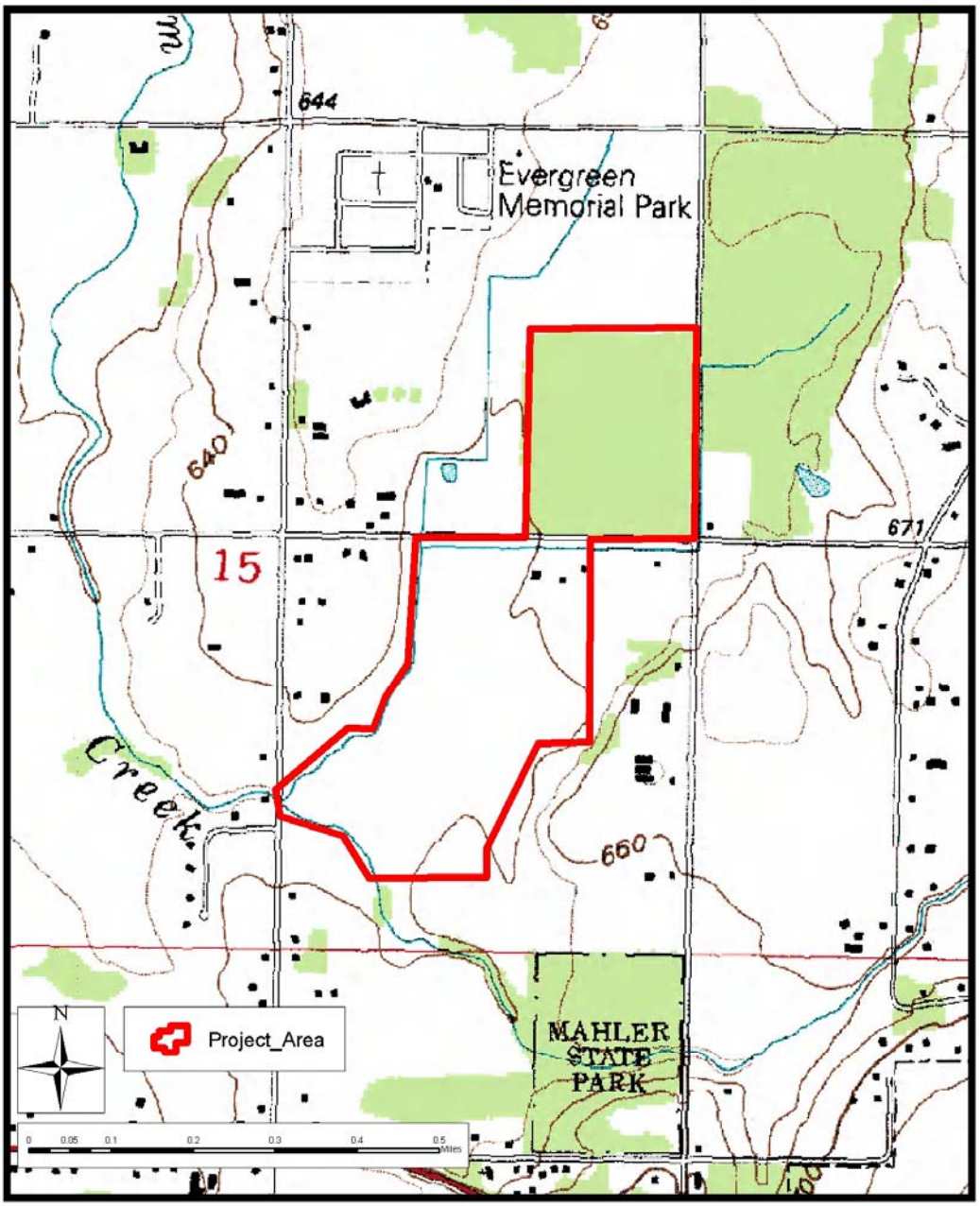


Figure 6: USGS Quadrangle

Big Spring Creek
Stream Relocation and Wetland Restoration Project

Wetland Characterization

King County

Soil Survey

The Natural Resources Conservation Service soil surveys show this area to be largely Shalcar muck with Buckley silt loam found in the northwest corner of the site (Figure 7). Shalcar soil is found in flat floodplains, and is considered very poorly drained. Soil samples to a depth of 18 inches were examined in the southwest and northwest portion of the site and the soil was confirmed to be a well-decomposed organic soil (muck).

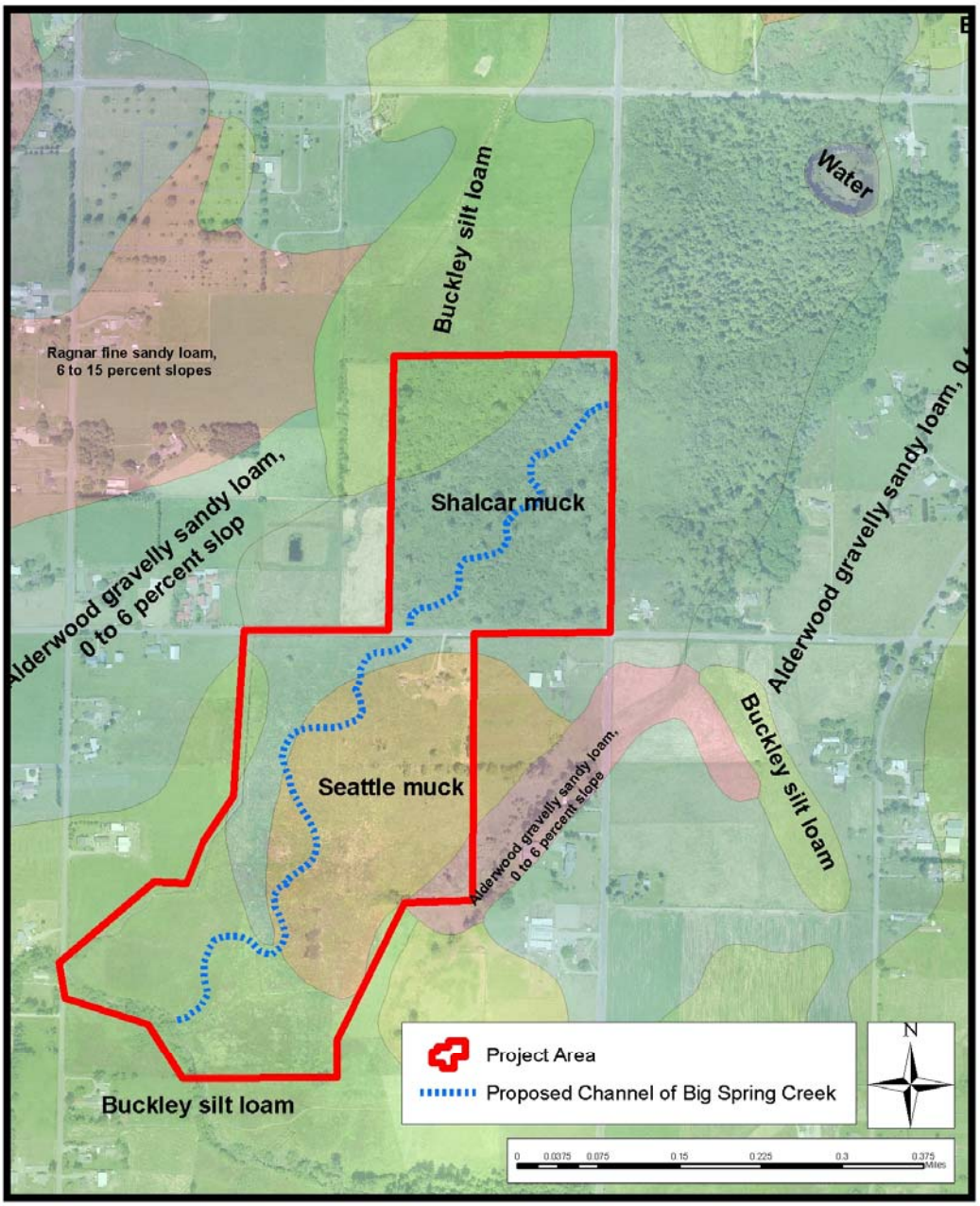


Figure 7: USDA SCS Soil Survey Units
Wetland Characterization

Big Spring Creek
Stream Relocation and Wetland Restoration Project
King County

Folio and National Wetland Inventory

The King County map folio identifies the wetland in this area as Newaukum Creek 51 and 144 acres in size (Figure 8). The wetland is shown to include the subject area but also large areas east of 244th Avenue Southeast, northward to an area north of Southeast 416th Street. Very little area to the south of Southeast 424th is shown as wetland, but past delineation efforts (Watershed Dynamics, 2000) show that most of the area south of Southeast 424th to Newaukum Creek is wetland. General observations in the 1990 inventory indicated that the forested sections in Newaukum Creek 51 are young second growth. Indicated in the folio is the caveat that the wetland boundaries shown are considered approximate. The National Wetland Inventory shows wetland areas north of Southeast 416th and east of 244th Avenue Southeast only and absent in the subject area (Figure 9).

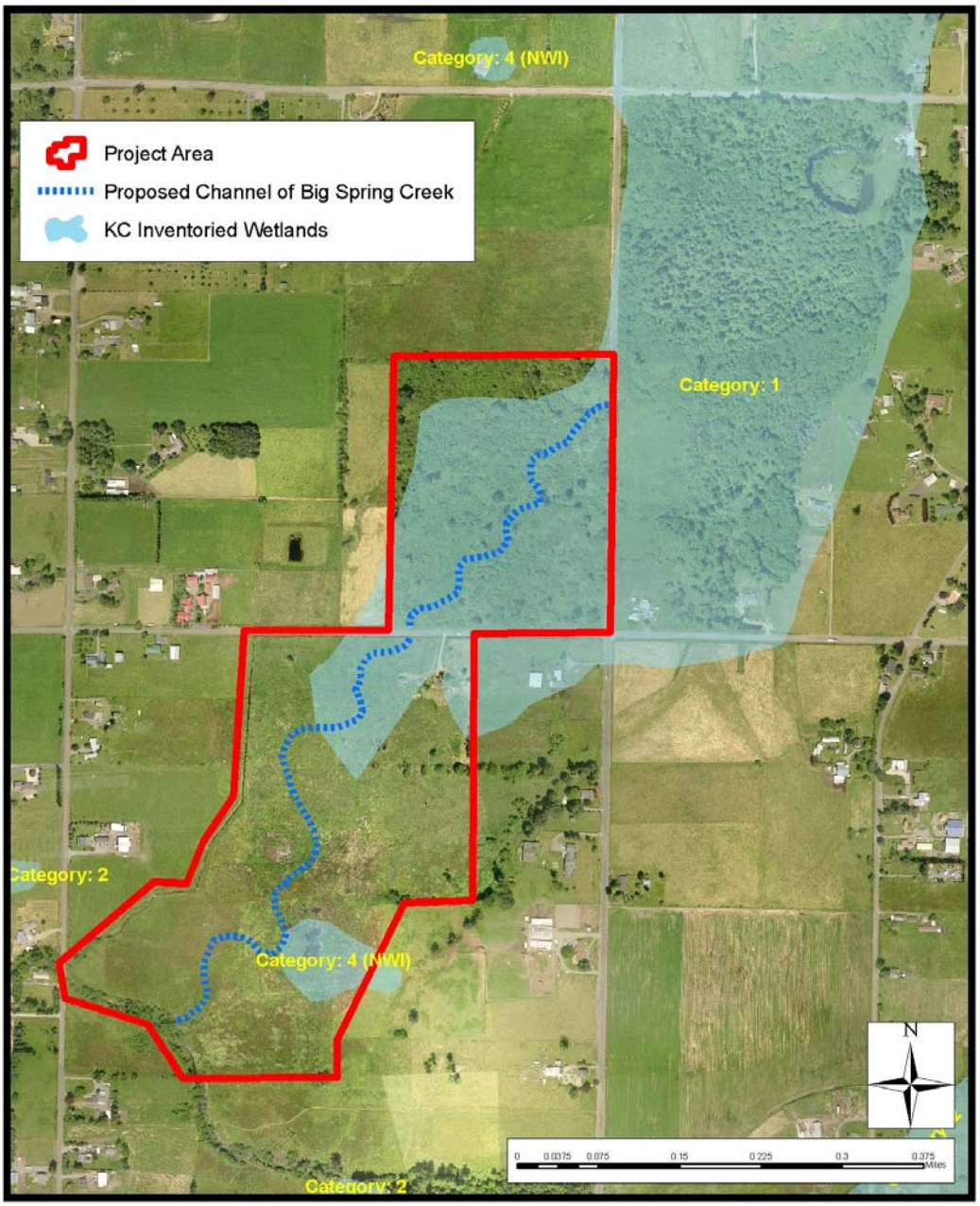


Figure 8: King County Inventoried Wetlands
Wetland Characterization

Big Spring Creek
Stream Relocation and Wetland Restoration Project
King County

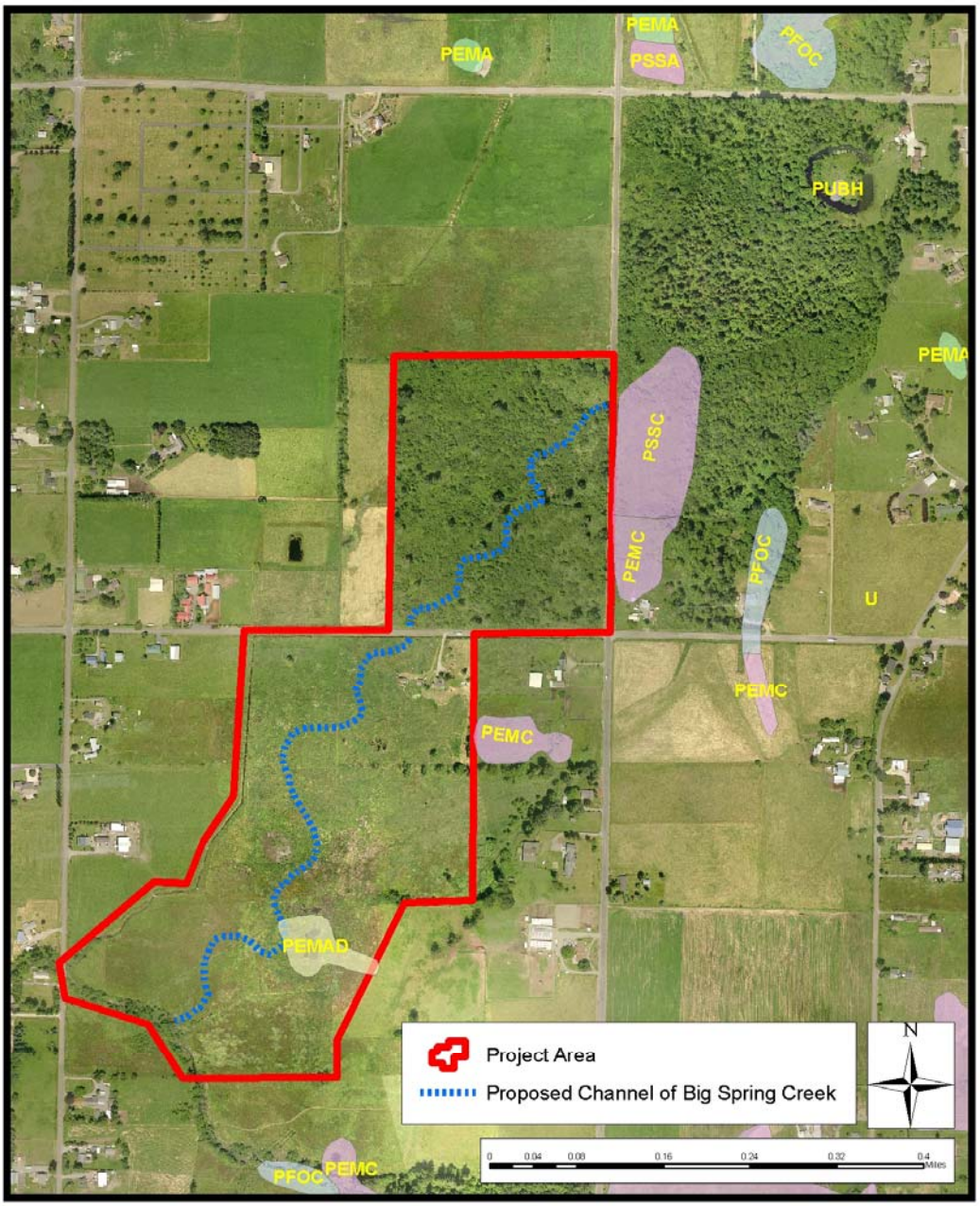


Figure 9: NWI Wetlands and Cowardin Classificaiton
Wetland Characterization

Big Spring Creek
Stream Relocation and Wetland Restoration Project
King County

Groundwater and Hydrology

King County installed and has been monitoring two groundwater wells on the site. The wells were installed in November 2007. One site is found in the northeast portion of the site and the other well is found in the southwest portion of the site. The well in the southwest portion shows consistently wetter conditions than the northern area. The water depth for the southwest well (B11) ranges from .39 to .79 feet below the surface and the northeast well (B12) water readings range from 1.05 to 1.43 feet below the surface, between November 2007 and March 2008 (Figure 10. See Figure 2 for well/gage locations).

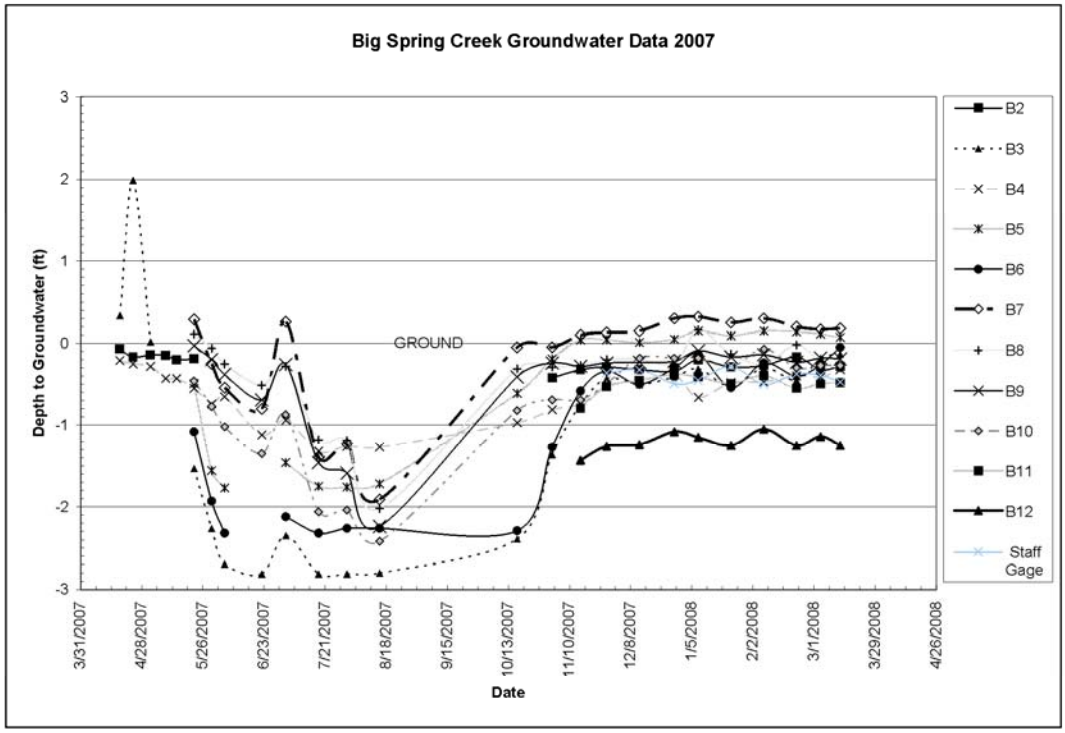


Figure 10: Groundwater Well Data

See Figure 4 for Well/Gage Locations

Wetland Characterization

Big Spring Creek
Stream Relocation and Wetland Restoration Project
King County

The trees found growing in the southern portion of the site appear stunted, and some have dying tops, whereas the trees in the northern portion are generally larger, indicating that the southern portion of the wetland is historically wetter than the northern area. Standing water has been observed on the south side of the site, but no surface water has been seen on the north side of the wetland. The wetland has no defined outlet; it drains to the southwest into a manmade ditch on the north side of Southeast 424th Street. Once entering the ditch, the water flows west for about 700 feet, turns south, and flows through a culvert under

Southeast 424th Street before joining the Big Spring Creek channel on the south side of Southeast 424th Street.

Big Spring Creek flows in a manmade ditch on the east side of 244th Avenue Southeast, south to the intersection of Southeast 424th Street and 244th Avenue Southeast, westward on the south side of Southeast 424th Street, and southward along the west portion of the wetland area south of Southeast 424th. Aerial photos from 1936, the earliest available (Figure 11), show the roads in the area already in place and Big Spring Creek flowing in its current alignment.

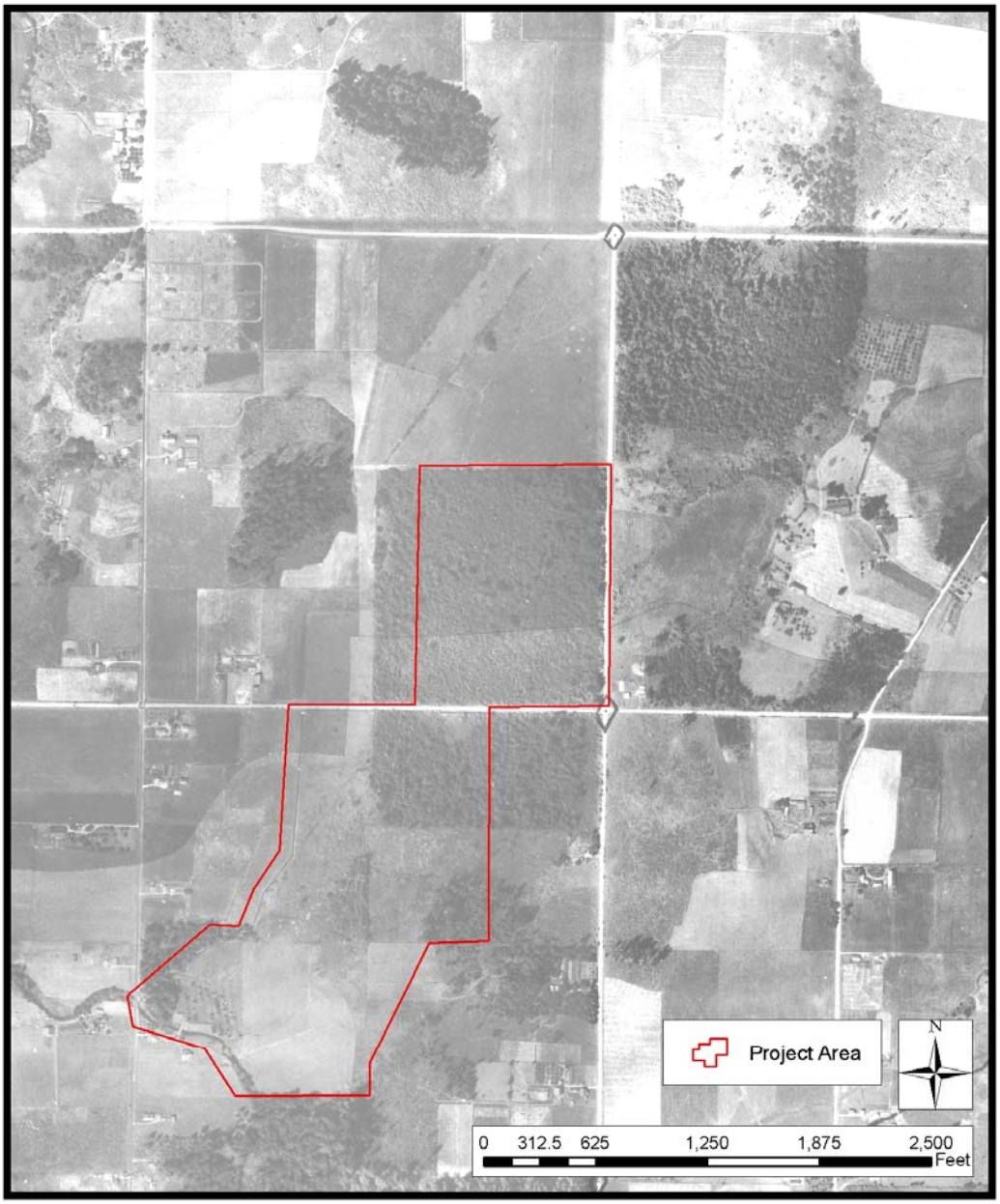


Figure 11: 1936 Aerial Photo of Wetland and Project Area

Compare to Figure 3

Wetland Characterization

Big Spring Creek

Stream Relocation and Wetland Restoration Project

King County

Plant Communities

The wetland complex located on the 30-acre parcel is unique in that it has diverse native plant communities, including several large Sitka spruce (*Picea sitchensis*) trees (Appendix A, Photos 1, 2, 3, and M1). The surrounding properties were historically modified for agricultural use and are dominated by reed canarygrass. Although access into this site is difficult due to the dense vegetative growth, staff equipped with a GPS unit took photos at recorded points as they explored the site (Appendix A, Photos Q2, I1, 1295, 1296, and 1297).

The area directly south of Southeast 424th Street is largely reed canarygrass (*Phalaris arundinacea*) with some areas of cattails (*Thypha latifolia*) (Appendix A, Photo 4). To the east the wetland area is dominated by spirea (*Spirea douglasii*) and open water (Appendix A, Photos 5 and 6).

Aerial photos and visual observation from ground level in and outside of the wetland were used to identify vegetative communities. Less than 30 mature Sitka spruce and only one dying Western red cedar are found growing on this 30-acre parcel. At least eight spruce have fallen in recent storm events (Appendix A, Photo M1). About 15 cottonwood (*Populus balsamifera*) red alder (*Alnus rubra*), birch (*Betula spp.*), and big-leaf maple (*Acer macrophylum*) over 50 feet in height are found scattered across the site (Appendix A, Photos 1, 2, 3, and C2). Collectively, the trees cover approximately 10 percent of the surface of the site or 3 acres. Other native plants 30 to 35 feet in height found on the site include Pacific willow (*Salix lasiandra*), Sitka willow (*Salix sitchensis*), red alder, birch (*Betula spp.*), and Pacific crabapple (*Pyrus fusca*). They occupy approximately 20 percent (6 acres) of the project site. Dominant native and non-native shrubs include spirea (*Spirea douglasii*), Nootka rose (*Rosa nutkana*), vine maple (*Acer circinatum*), red-twig dogwood (*Cornus sericea*), twinberry (*Lonicera involucrata*), and Himalayan and evergreen blackberry (*Rubus armeniacus* and *Rubus lacinatus*). The shrubs, all less than 20 feet in height, are found growing over about 70 percent (21 acres) of the site. False lily of the Valley (*Mianthemum dilitatum*) covers much of the ground. Mosses are found on much of the woody vegetation as well as the ground.

Wetland Vegetative Classification

From visual observations and examination of aerial photos, vegetation over 20 feet in height is found to constitute, at most, 30 percent of the wetland. Some of this tall woody vegetation is scattered throughout the site and some is found in distinct areas. While the areas covered in trees are scattered, they are cumulatively large enough to be considered an individual class. Using the Cowardin classification system, the site would be considered to have both palustrine forested and palustrine scrub-shrub communities. Although there are individual trees and small clusters that that exceed 50 feet in height, none of the communities found on the site appear to meet the Corps definition of a Mature Forested Wetland. To meet the Corps definition, 50 percent of the cover of the upper forest canopy must consist of evergreen trees older than 80 years or deciduous trees older than 50 years, or 50 percent of the forest canopy must consist of trees taller than 50 feet. In the areas identified as forested, the cover of evergreen or deciduous trees, and the cover of trees greater than 50 feet in height are both less than 50 percent.

Wetland Rating

This wetland area was rated according to the Department of Ecology wetland rating system. The rating exercise resulted in a Class III wetland rating (Appendix B). This depressional wetland scored highest for the Water Quality function, secondly the Habitat function, and lastly the Hydrologic function. Since the site is bordered by agricultural fields on two sides, it has the opportunity to improve water quality and because of the persistent ungrazed vegetation and organic soil found on the site, the wetland also has the potential to improve water quality. The potential to reduce flooding and erosion is low because there is no obvious outlet and the outlet is a manmade ditch. The terrain also is very flat and water is not ponded to any great extent. Habitat is degraded by the lack of vegetated buffers, and undisturbed, unbroken vegetated corridors to other wetlands, but does possess special features such as large downed woody debris, standing snags, and growth of non-native plants below the threshold.

Benefits of Project

The Big Spring Creek Stream Relocation and Wetland Restoration Project proposes to create a channel through this wetland area (Figure 2). The purpose of the project is to reconnect Big Spring Creek to riparian wetlands, increase forested conditions of the wetland, and improve habitat to salmonids that now use roadside ditches to rear and spawn. Rerouting the stream into this area will allow King County to move the stream from the ditches and reconnect it to riparian wetlands to the benefit of fish and other wildlife. Wildlife such as river otter (*Lutra conadensis*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethica*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), great blue heron (*Ardea herodias*), and raptors will be more drawn to this area if flowing water and the open water ponds are created within it. The channel itself will become a wildlife corridor. Marine derived nutrients from decaying fish will improve soil quality to support plant life. A stream and the proposed off-channel pools will also create opportunities for more plant diversity.

The channel construction will avoid large trees and their roots, including those of Sitka spruce. In addition, the native plant community will be enhanced by planting more Sitka spruce, Western red cedar, and deciduous trees within the wetland to create a more densely vegetated forested condition. Also, non-native plants, especially the large patches of blackberry, will be removed and replaced with native vegetation to improve the value of the wetland for wildlife (Appendix A, Photos Q2 and G1).

Alternate Channel Routes

The Big Spring Creek project team has examined the possibility of routing the creek through the wetland area to the east of 244th Avenue Southeast and north of Southeast 424th instead of the area north of Southeast 424th Street and west of 244th Avenue Southeast (Appendix A, Photos 5 and 6). It was determined from numerous site visits and viewing aerial photos that that area is colonized by a large stand of spirea growing in standing water 3 to 4 feet deep. Heavy equipment will not be able to access the site because of the permanent deep water conditions. Also, an unresponsive landowner downstream and south of that area on the northeast corner of Southeast 424th Avenue Southeast and Southeast 244th Street will

not likely allow the new stream channel to cross their land. This would limit the stream relocation to only 500 linear feet north of the private property, and therefore the benefits would not outweigh the cost. If a stream channel is not allowed to traverse the forested site, the stream will remain in the ditches along 244th Avenue Southeast and Southeast 424th Street and be subject to pollutants from automobile traffic and routine dredging maintenance. It should also be noted that this eastern location is not consistent with the description for the ERP Project, and therefore NEPA/SEPA, and ESA Consultation and Concurrence would have to be obtained from both Services as the project would no longer be covered with the underlying programmatic documents and existing approvals.

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Appendix A

Photos

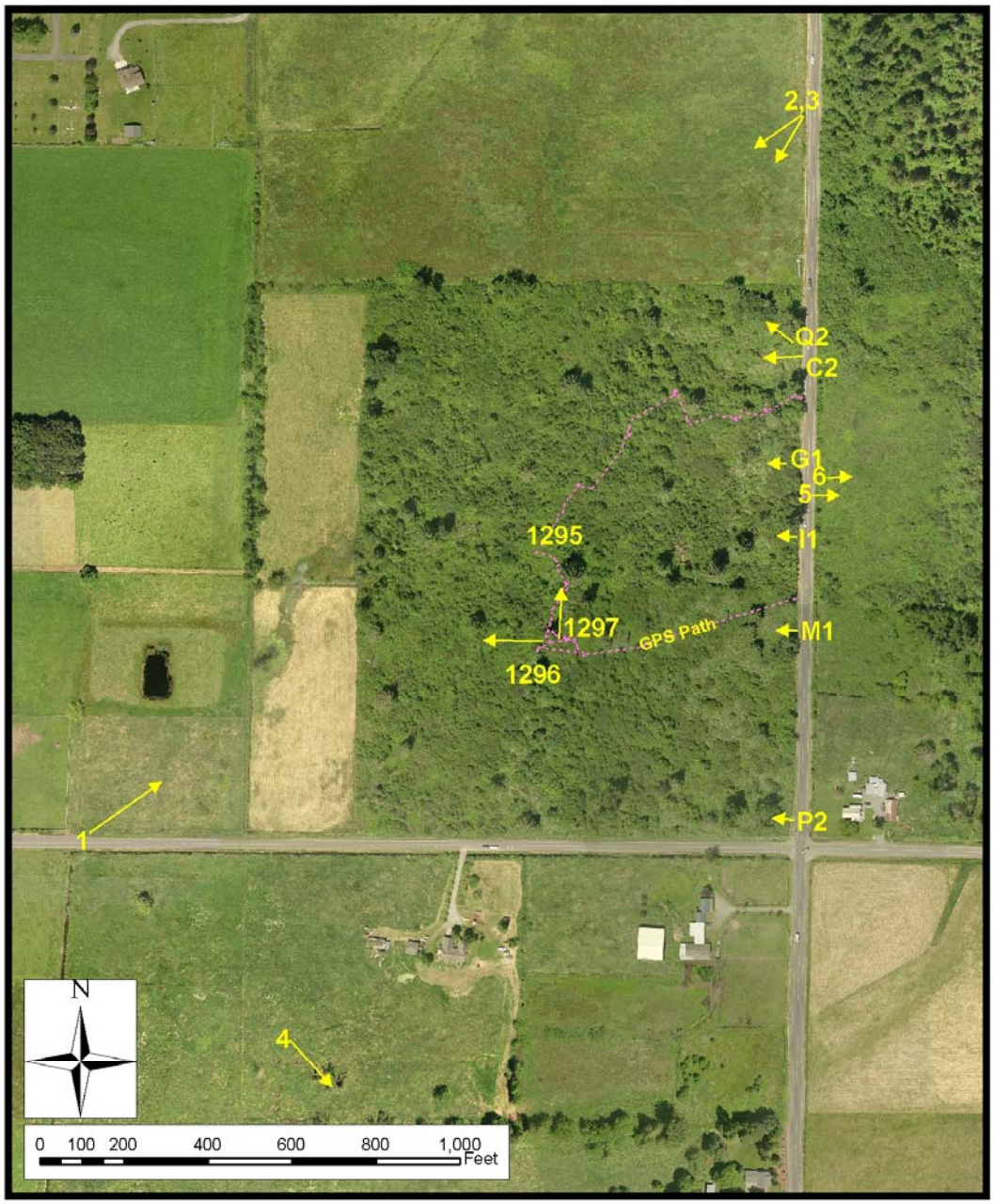


Photo Locations and Aspects

Appendix A
Wetland Characterization

Big Spring Creek

Stream Relocation and Wetland Restoration Project

King County

Appendix A: Photos

1: Looking NE at subject wetland.

2: Looking SW at subject wetland

Appendix A: Photos

3: Looking SW at subject wetland

4: Wetland south of SE 424th St.

Appendix A: Photos

5: Looking east from 244th Ave. SE

6: Looking east from 244th Ave. SE

Appendix A: Photos

C2: Looking west at subject wetland

G1: Looking west at subject wetland

Appendix A: Photos

I1: Looking west at subject wetland

M1: Looking west at subject wetland; Sitka spruce blowdown

Appendix A: Photos

P2: Looking west at subject wetland

Q2: Looking NW at subject wetland

Appendix A: Photos

1295: Interior of subject wetland

1296: Interior of subject wetland

Appendix A: Photos

1297: Interior of subject wetland

Appendix B

Wetland Rating Form

Wetland name or number _____

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): NE corner of SE 424th st. and 244th Ave SE, Enumclaw, WA Date of site visit: March 13, 2008

Rated by Cynthia Young Trained by Ecology? Yes X No___ Date of training_____

SEC: ___ TWNSHP: ____ RNGE: ____ Is S/T/R in Appendix D? Yes___ No___

Map of wetland unit: Figure ____ Estimated size 30 acres

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III X IV___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	20
Score for Hydrologic Functions	10
Score for Habitat Functions	16
TOTAL score for Functions	46

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply X

Final Category (choose the "highest" category from above) III

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		Depressional	X
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above		Check if unit has multiple HGM classes present	

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		✓
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		✓
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		✓
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		✓

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
NO – go to 2 **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe NO – Saltwater Tidal Fringe (Estuarine)**

If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is rated as an* ***Estuarine*** *wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
NO – go to 3 **YES** – The wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
___At least 30% of the open water area is deeper than 6.6 ft (2 m)?
NO – go to 4 **YES** – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?
____The wetland is on a slope (*slope can be very gradual*),
____The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
____The water leaves the wetland **without being impounded**?
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than 1 foot deep).*
NO – go to 5 **YES** – The wetland class is **Slope**

5. Does the entire wetland unit **meet all** of the following criteria?

____ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river

____ The overbank flooding occurs at least once every two years.

NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.

NO - go to 6 **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM clases. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or if you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D	**Depressional and Flats Wetlands** **WATER QUALITY FUNCTIONS** - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
D	**D 1. Does the wetland unit have the <u>potential</u> to improve water quality?**	*(see p.38)*
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) points = 3 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 1 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing"*) Provide photo or drawing	**Figure ___** 1
D	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES points = 4 NO points = 0	4
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation > = 95% of area points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	**Figure ___** 5
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0 Map of Hydroperiods	**Figure ___** 0
D	**Total for D 1** *Add the points in the boxes above*	10
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging X Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 44)* multiplier 2
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	20

D	**Depressional and Flats Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream degradation	**Points** (only 1 score per box)
	D 3. Does the wetland unit have the potential to reduce flooding and erosion?	*(see p.46)*
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) points = 4 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing"*) Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 0	1
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 The wetland is a "headwater" wetland" points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 Unit is flat (yes to Q. 2 or Q. 7 on key) but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft points = 0	1
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire unit is in the FLATS class points = 5	3
D	**Total for D 3** *Add the points in the boxes above*	5
D	**D 4. Does the wetland unit have the opportunity to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* — Wetland is in a headwater of a river or stream that has flooding problems — Wetland drains to a river or stream that has flooding problems X Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems — Other _____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 49)* multiplier 2
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	10

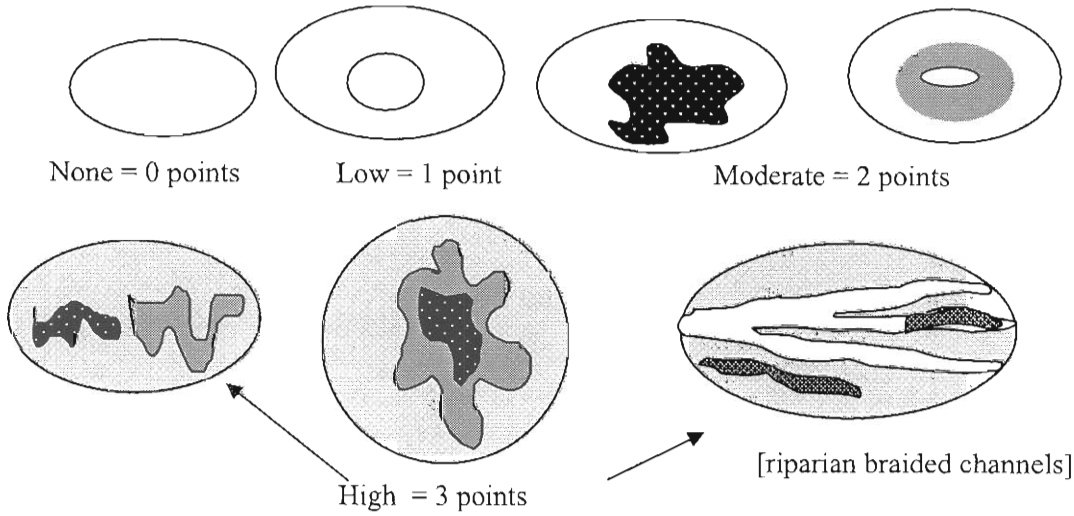
These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed ____Emergent plants _X_Scrub/shrub (areas where shrubs have >30% cover) _X_Forested (areas where trees have >30% cover) *If the unit has a forested class check if:* _X_The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 3 structures — points = 2 2 structures — points = 1 1 structure — points = 0 Map of Cowardin vegetation classes	**Figure ___** 2
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (see text for descriptions of hydroperiods)* ____Permanently flooded or inundated — 4 or more types present — points = 3 _X_Seasonally flooded or inundated — 3 types present — points = 2 _X_Occasionally flooded or inundated — 2 types present — point = 1 _X_Saturated only — 1 type present — points = 0 ____ Permanently flowing stream or river in, or adjacent to, the wetland ____ Seasonally flowing stream in, or adjacent to, the wetland ____ ***Lake-fringe wetland*** **= 2 points** ____***Freshwater tidal wetland*** **= 2 points** Map of hydroperiods	**Figure ___** 2
H 1.3. Richness of Plant Species ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. *(different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species — points = 2 5 - 19 species — points = 1 < 5 species — points = 0 *List species below if you want to:*	2

Total for page 6

H 1.4. Interspersion of habitats *(see p. 76)*

Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.

Figure ___



3

NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes

H 1.5. Special Habitat Features: *(see p. 77)*

Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.

X Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long).

X Standing snags (diameter at the bottom > 4 inches) in the wetland

____ Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m)

____ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)*

____ At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated. *(structures for egg-laying by amphibians)*

X Invasive plants cover less than 25% of the wetland area in each stratum of plants

NOTE: The 20% stated in early printings of the manual on page 78 is an error.

3

H 1. TOTAL Score - potential for providing habitat
Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5

12

Comments

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers ***(see p. 80)*** *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** X Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0**. — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 0
H 2.2 Corridors and Connections ***(see p. 81)*** H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	1

Total for page 1

H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see p. 82)*

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.*

These are DFW definitions. Check with your local DFW biologist if there are any questions.

____**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres).

____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.

____**Old-growth forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age.

____**Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.

____**Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community.

____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages

____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%.

____**Urban Natural Open Space**: A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development.

____**Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons.

_____**Marine/Estuarine Shorelines**: Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control).

If wetland has **3 or more** priority habitats = **4 points**

If wetland has **2** priority habitats = **3 points**

If wetland has **1** priority habitat = **1 point** No habitats = 0 points

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

0

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	4
TOTAL for H 1 from page 14	12
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	16

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	**Category**
SC 1.0 Estuarine wetlands ***(see p. 86)*** Does the wetland unit meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt. YES = Go to SC 1.1 NO X	
SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? YES = Category I NO go to SC 1.2	**Cat. I**
SC 1.2 Is the wetland unit at least 1 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

SC 2.0 Natural Heritage Wetlands *(see p. 87)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site ___ YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO _X_ SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? YES = Category I NO _X_ not a Heritage Wetland	**Cat. I**
SC 3.0 Bogs *(see p. 87)* Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes - go to Q. 3 No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Is a bog for purpose of rating No - go to Q. 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. YES = Category I No _X_ Is not a bog for purpose of rating	**Cat. I**

SC 4.0 Forested Wetlands ***(see p. 90)*** Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its functions.* — **Old-growth forests**: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. — **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. YES = Category I NO X not a forested wetland with special characteristics	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons ***(see p. 91)*** Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* YES = Go to SC 5.1 NO X not a wetland in a coastal lagoon SC 5.1 Does the wetland meets all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO X not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: • Long Beach Peninsula- lands west of SR 103 • Grayland-Westport- lands west of SR 105 • Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	Not Applicable

Appendix C

Big Springs Creek Wildlife Report

Prepared by:

Jennifer Vanderhoof, Wildlife Ecologist,
Water and Land Resources Division,
King County Department of Natural Resources and Parks

Purpose of Study

This report is intended to satisfy the Wildlife Habitat Conservation Areas study component of a critical areas report for the Big Springs Creek Relocation and Wetland Restoration Project. The project site is located on the Enumclaw plateau. The project extends from the Big Spring/Newaukum Natural Area at the northern end (near the corner of SE 424th and 244th Ave S.) to the confluence of Big Spring Creek and Newaukum Creek at the southern end.

This study addresses the presence or absence of breeding habitat as well as documentation of any potential nesting or denning sites of the following species, whose nesting/denning sites form Wildlife Habitat Conservation Areas in King County:

- Bald Eagle
- Great Blue Heron
- Northern Goshawk
- Peregrine Falcon
- Osprey
- Vaux's Swift
- Red-tailed Hawk
- Band-tailed Pigeon
- Townsend's Big-eared Bat

Additionally, potential breeding habitat observed on site for any of the other species protected via the Critical Areas Ordinance will also be described and addressed.

Field methods are summarized below. Detections of any study species are described and discussed. Additionally, all bird and mammal species detected incidentally are listed. An ArcView-generated map indicating major habitat patches in the study area is included in the report.

Methods

The Big Spring Creek Relocation and Wetland Restoration Project site was surveyed on April 29, 2008, for the presence of priority wildlife species and their habitat. Approximately 2 hours in cloudy, dry weather was spent in the field visually inspecting potential nesting/breeding habitat of the study species. Forest and forested wetland habitat was surveyed in County-owned Big Springs/Newaukum Creek Natural Area (parcels 1520069005 and 1520069004) as well as from both SE 424th St. and 244th Ave. SE. The northern-most 20 percent of the forested park area was entered. Additionally, the forested wetland directly to the east of 244th Ave. SE was observed from the road for the presence of large nest trees, raptor or heron nests, or large snags.

Snags located during the survey were inspected for cavity holes and any other indicators of nesting habitat (hollowness, broken tops) for Vaux's swifts or Townsend's big-eared bats. The forest floor was observed for the presence of large downed logs that could be suitable for denning of mammals. Incidental observations of other animal species were recorded.

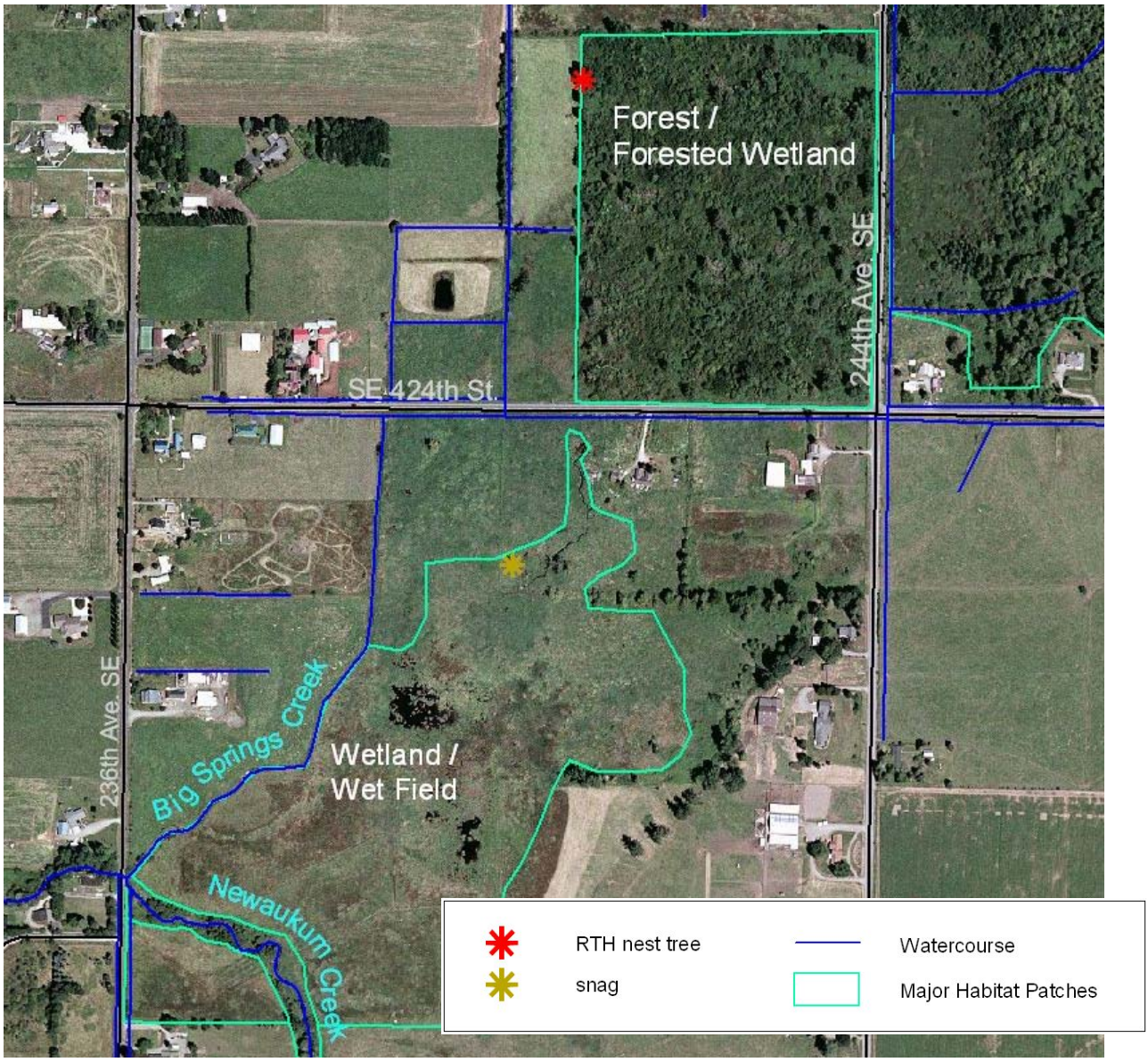
Results

Plant communities found on site are described in this section followed by discussions of the presence of the study species and habitats.

Plant Communities

The forested portion of the study site is bordered to the east and south by paved roads and to the north and west by agricultural fields. The agricultural field portion of the site is bordered to the north by SE 424th St. and to the east, south, and west by more agriculture fields. Upland forest and forested wetland, wet agricultural field, and emergent wetlands are present on the study site (Figure 1).

Figure 1. Major habitat features at Big Springs Creek project site.



Big Springs/Newaukum Creek Natural Area at the study site (the forested portion of the study site) is a combination of upland forest and forested wetland. Big Springs Creek will be relocated from alongside the roads, where it currently flows in a ditch, to flow through this forested area. Sitka spruce trees are present sporadically throughout the forested area (Figure 2); these trees are approximately 60-70 ft in height with diameters at breast height of 3-5 ft. The wetland characterization report for this project (Young and Hansen 2008) enumerated fewer than 30 mature Sitka spruce remaining after at least 8 were blown down in a wind storm, December 2006. Other trees present in this area include black cottonwood (averaging 70 ft in height and 20" DBH), birch (30 ft height, 6-8" DBH), red alder (40 ft height, 8" DBH), and at least one western redcedar (40 ft height), which appears to be unhealthy and possibly dying. Pacific and Sitka willow and vine maple are present throughout the site.

Figure 2. Aerial view of vegetation at Big Springs Creek project site.

The southern portion of the forested site is dominated by forested wetland, though it is likely some spots are dryer upland. Red-osier dogwood and Pacific and Sitka willow are the dominant mid-story vegetation. Himalayan blackberry and Douglas spirea are the dominant understory cover in this area. In some places the blackberry mat is impenetrably thick; it grows throughout the eastern portion of the site as well. Reed canarygrass is present growing in the ditch along SE 424th St.

The northern portion of the natural area is mostly upland forest. The primary ground cover in this area is false lily-of-the-valley, with stinging nettles, western trillium, and some sword fern also present. Also growing in this area is skunk cabbage, which indicates that although this part of the forest is dryer than the southern portion, the soil is still relatively wet. Shrub

species present include salmonberry, Himalayan blackberry, red elderberry, and black gooseberry.

The wetland on the east side of 244th Ave. SE is largely covered in Douglas spirea. Trees on its eastern edge are similar in composition to the forest in the study site. Willow trees dominate the vegetation at the north end.

South of SE 424th St., Big Springs Creek flows through agriculture fields until it meets Newaukum Creek at 236th Ave. SE (Figure 3). The wet field adjacent to and between the two creeks is covered in reed canarygrass (Figure 4). Willow, Sitka spruce, and apple trees are present at the confluence directly adjacent to the creeks.

Figure 3. Big Springs Creek at its confluence with Newaukum Creek. Photo is looking northeast towards Big Springs Creek/Newaukum Creek Natural Area, which can be seen in background.

Figure 4. Aerial view of Big Springs Creek at its confluence with Newaukum Creek.

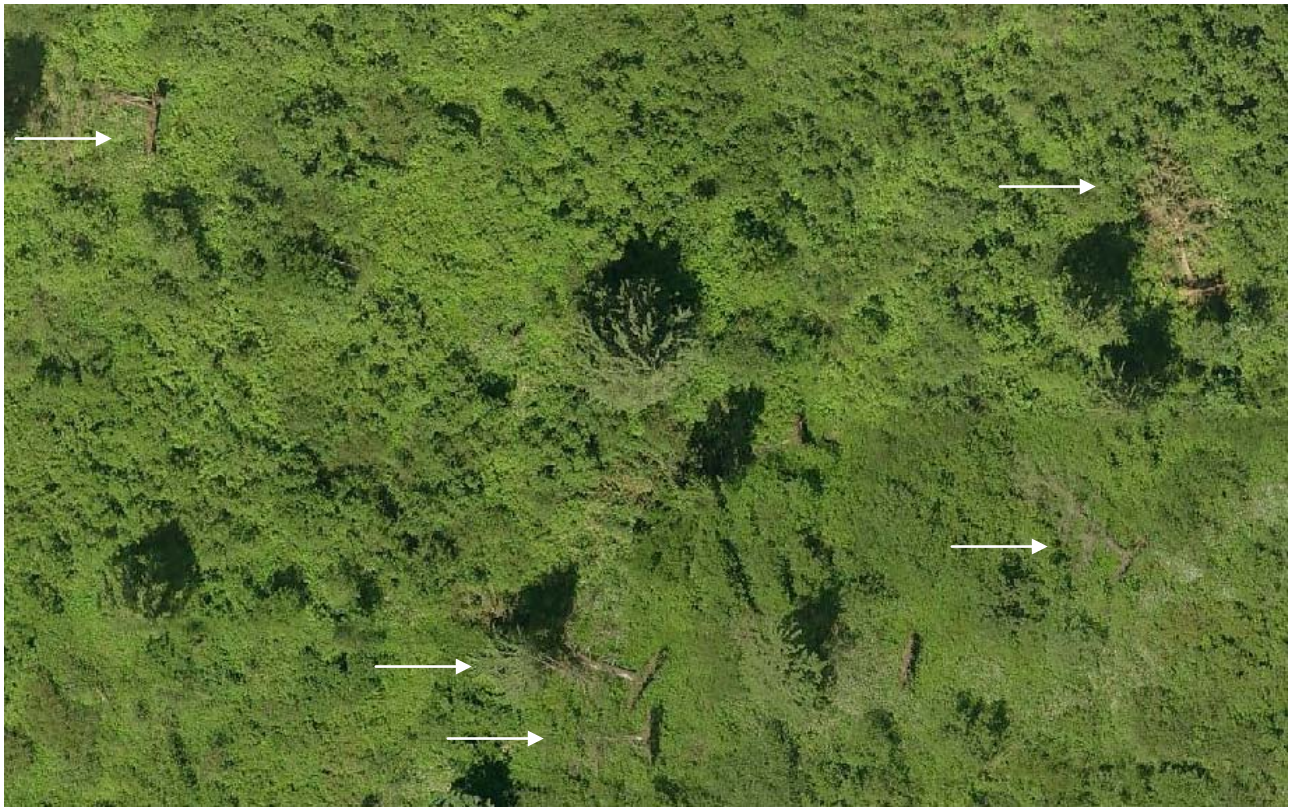
Down Woody Material, Snags, and Stumps

Down woody material was observed uncommonly on site. Small (8-10” diameter) red alder logs were present and willow trees also created some down wood. A wind storm in December 2006 blew down several of the large Sitka spruce in the forested area (Figure 5). These whole trees with massive intact root wads are the only source of large logs on the forest floor, and in many instances Himalayan blackberry is beginning to grow over and cover them.

No large snags were observed in the forested portion of the study site. Two snags observed in the forested wetland across 244th Ave. SE were not large enough to house nesting Vaux’s swift or roosting Townsend’s big-eared bat colonies. Although the spruce trees may eventually form hollow snags for Vaux’s swift nests in the future once they begin to die, at present they do not support any nests. The western redcedar present on site appear unhealthy; if these trees die, their snags would make good raptor perches. One larger snag is present in the agriculture field south of SE 424th St. (Figure 1). This snag is approximately 40 ft in height with a 12” diameter at breast height, is whole (not broken-topped), and a Red-tailed Hawk was observed perching on it. Two smaller, broken-topped snags are also in this field.

No stumps were observed on site.

Figure 5. Living and down Sitka spruce trees at Big Spring Creek/Newaukum Creek Natural Area. White arrows indicate some of the down trees.



Wildlife Presence

This wildlife survey occurred during mid-spring. All priority species being surveyed for would have been at some stage of nesting or breeding by the time of the survey. This study focuses on presence of breeding habitat as well as actual nest sites. Overall, the habitat at this location is considered less than optimal for most priority species because of a lack of large snags, a lack of contiguous naturally vegetated habitat, and a lack of large water bodies in the direct vicinity.

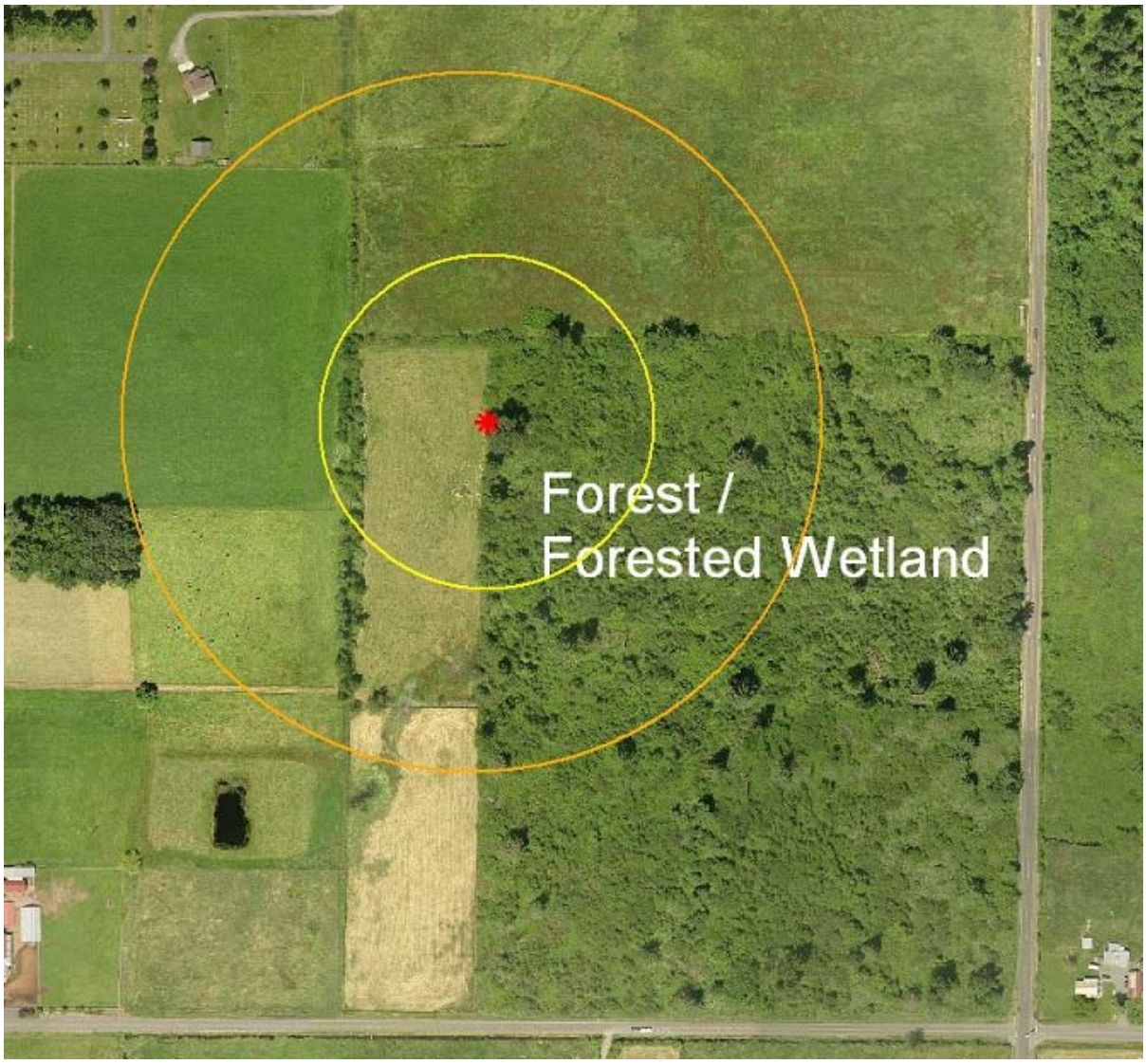
Presence or absence of each study species and its habitat is discussed below followed by a list of animal species detected on site.

Red-tailed Hawk

One red-tailed hawk nest was observed on the property in a black cottonwood at the northwest corner of the forested area. An adult was sitting with the nest, and a downy chick was observed in the nest. A second adult red-tailed hawk was seen perched in a snag south of the forest (Figure 1). The two adults observed may be the mated pair. For a red-tailed hawk, the following Critical Areas Ordinance wildlife habitat conservation area code is in effect: (1) The wildlife habitat conservation area is an area with a radius of 325 feet from an active nest; and (2) Between March 1 and July 31, clearing and grading is not allowed within 660

feet of an active nest. The nestling currently present in the study area may be disturbed if work occurs within the wildlife habitat conservation area.

Figure 6. Wildlife Habitat Conservation Area for red-tailed hawk: area with radius of 325 ft around an active nest (yellow circle), and no clearing and grading within 660 ft of nest between March 1 and July 31 (orange circle).



Bald Eagle

No bald eagle nests were observed on site. Bald eagles prefer to nest on a large tree in a heterogeneous mature or old-growth coniferous forest (Stalmaster et al. 1985). The coniferous trees and cottonwoods found on site are large enough to support a bald eagle nest. WDFW had a previous record of a bald eagle nest in a black cottonwood tree adjacent to Newaukum Creek about half a mile west of the current red-tailed hawk nest. The nest was observed in 2000; when the site was checked in 2001 and 2005, no eagles were present. It is unknown if they have renested elsewhere nearby. If bald eagles are nesting in the vicinity, it

is more likely they would be closer to the Green River, which would provide a better supply of fish than nearby Newaukum Creek.

Great Blue Heron

No great blue herons were observed on site or flying overhead. Great blue herons nest in colonies and frequently prefer that their nest trees are either on islands or in swamps (presumably to reduce the risk of mammalian predation) (Butler 1992). It is possible the trees in this forested wetland could be used for nesting great blue herons in the future; however, the large trees are spaced far apart, and great blue heron nest trees are frequently in forests with a much higher canopy cover. Additionally, although herons could feed on small rodents in the agricultural areas, the nearest water body that would likely supply them with fish would be the Green River, some 3.5 miles north, or the White River, about 3 miles to the south. The nearest known great blue heron colonies are 4 and 5 miles to the north and west, respectively. No great blue herons are currently nesting on site or in the immediate vicinity.

Osprey

No osprey were observed on site or flying overhead. For nesting, osprey require large live or dead trees with strong branches at the top that can support their large nests (Ewins 1997). The nest trees either need to rise above the surrounding canopy or be in open sites. Additionally, osprey nest near rivers, estuaries, lakes, and other large bodies of water, as long as the water can sustain medium-sized fish. Although trees at the project site are large enough to potentially support osprey nest, the site is not close enough to the Green River or another larger body of water to likely ever support nesting osprey.

Band-tailed Pigeon

No band-tailed pigeons or nests were observed on site. This species almost always uses mature conifer trees (especially Douglas-fir) for nesting (Keppie and Braun 2000). Although no nests were observed, the Sitka spruce and western redcedar on site could be potential nest sites.

Northern Goshawk

No northern goshawks were observed on or near the property. Northern goshawk nesting habitat typically includes mid to high-elevation conifer forest near forest edge. In King County, goshawk nests are uncommon and generally found in the forest production zone. No goshawk nesting habitat is present on site.

Peregrine Falcon

No peregrine falcons were observed on or near the property. Peregrine falcon nesting habitat includes cliffs and cliff-like structures, so during the breeding season they are usually found near mountainous or rocky areas, or man-made structures that substitute as cliffs (Hays and Milner 2004). No such cliffs are present on site or in the immediate vicinity.

Vaux's Swift

No Vaux's swifts or their nesting habitat were found on site. This species requires hollow snags typically found in old-growth forest for nesting (Bull and Collins 1993). Large live trees are present on site, but until they begin to die and form snags, no appropriate nesting sites are present.

Townsend's Big-eared Bat

No Townsend's big-eared bats were observed on the property, and none are presumed breeding on or near the property. Townsend's big-eared bats require caves (and will use mines) for roosting and breeding (Humphrey and Kunz 1976; Kunz and Martin 1982). No caves or mines are located on site or are known to exist in adjacent properties.

Bird and Mammal Observations

The following list indicates all birds and mammals detected on site. Black bears have been reported to Washington Department of Fish and Wildlife approximately 3 miles to the east on the other side of the City of Enumclaw. Unidentified scat was observed by other project staff on one of the down spruce trees; based on the description of the scat, it is possibly from a black bear.

One additional mammal sighting of note occurred in 2006 (Finlinson, J. Roads Maintenance. Pers. Comm.). Two river otters were observed in Big Spring Creek at the diagonal culvert outlet at SE 424th St. and 244th Ave. SE.

Common Name	Scientific Name	Visually Observed	Heard or Sign Observed
BIRDS			
Red-tailed Hawk	*Buteo jamaicensis*	x	
Black-capped chickadee	*Parus atricapilus*		x
Common Yellowthroat	*Geothlypis trichas*		x
Marsh Wren	*Cistothorus palustris*		x
Bewick's Wren	*Thryomanes bewickii*		x
Rufous Hummingbird	*Selasphorus rufus*	x	x
Common Raven	*Corvus corax*		x
American Crow	*Corvus brachyrhynchos*	x	x

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Appendix D

Clean Water Act Section 404(b)(1) Analysis

Big Springs Creek Ecosystem Restoration
Channel Creation

Enumclaw, King County, Washington

Clean Water Act

Prepared by:

U.S. Army Corps of Engineers
Seattle District
Environmental Resources Branch

JUNE 2012

US Army Corps of Engineers ®
Seattle District

1) Introduction

The purpose of this document is to record the U.S. Army Corps of Engineers (USACE) Clean Water Act Section 404 compliance evaluation of a plan to restore Big Spring Creek in southeastern King County, Washington, to more natural stream bed from the current roadside and pasture ditches. Restoration actions to improve fish rearing habitat and storm refuge at this site include channel relocation and reconstruction, wetland enhancement, riparian re-vegetation, and woody debris additions. Two culverts would also be installed to increase upstream and downstream connectivity.

2) Project Background

Big Spring Creek (WRIA 09.0119) is located within the Newaukum Creek Basin (Middle Green River sub-watershed) on the Enumclaw plateau northwest of the City of Enumclaw. The project area is bounded by SE 416th Street to the north, SE 436th St. to the south, 252nd Way SE to the east, and 236th Avenue SE to the west. The 1.2 mile-long stream is a tributary of Newaukum Creek entering at river mile (RM) 6.3. Newaukum Creek is a left-bank tributary of the Green River (RM 40). Big Spring Creek originates from a series of wetlands that are part of its 1,000 acre drainage area.

The Big Spring Creek sub-basin prior to agricultural and development-related disturbance most likely supported a larger population of coho salmon, steelhead, and cutthroat trout than it presently does. The upper and middle sub-basin likely consisted of a preponderance of forested wetlands and old-growth terrestrial forest that provided deep rearing pools and critical habitat for salmonids. Presently many of the wetlands have been filled or drained for agricultural use; Big Spring Creek has been ditched for much of its course. Restoration actions to improve rearing habitat and storm refuge at this site include channel relocation and reconstruction, wetland enhancement, riparian re-vegetation, and woody debris additions. Two culverts will also be installed to increase upstream and downstream connectivity.

3) Project Purpose and Need

The goal of the project is to restore salmonid habitat complexity and process-based ecological functions by removing Big Spring from roadside ditches to its original wetland location. A more robust and higher-surviving population of Coho salmon, steelhead, and cutthroat trout can be encouraged by restoring off-channel rearing and refuge pools that are connected to Big Spring Creek, thus creating a greater complexity of habitats for juvenile fish.

The clearing of the wetland riparian buffer, grading, and livestock access to Big Spring Creek and the source wetlands has resulted in bank erosion, siltation, and degraded water quality which has ultimately affected Newaukum Creek (King County, 2000). The road fill has disrupted hydrologic connectivity and function within the wetlands and between stream and wetland. These impacts have also affected both stream and anadromous salmonids. Vegetative structure and diversity is very poor, especially downstream (south) of SE 424th Street where reed canary-grass (*Phalaris arundinacea*) dominates the landscape.

4) Proposed Action and Alternatives

Alternatives considered under NEPA must include the proposed action (preferred alternative), and the no-action alternative. Other reasonable alternatives that meet the project purpose and

need must also be considered in detail. Four alternatives were considered in the planning phase of the project, these include three different routes for the streambed and the no-action alternative.

a) **No Action**. Under the no-action alternative, Big Spring Creek would remain in its current location, flowing through roadside and pasture ditches. The No Action Alternative was eliminated because it did not meet the project objectives.

b) **Proposed action alternative.** The Big Spring Creek Restoration Project was originally intended to be constructed in two phases over two summers. However, due to timing constraints, the project will now be constructed in a single season. The project is still divided into two phases or areas separated by SE 424^{t}h Street and are distinctly different habitat environments. The southern segment, Area I, restoration is the southern parcel that is currently pasturelands dominated by reed canary-grass (*Phalaris arundinacea*). The northern segment, Area II, is comprised of second-growth forest and shrubby habitat. Construction of the entire project is expected to take approximately six months.

i) AREA **1** - The construction footprint would be 200 feet wide to include the new stream and replanted riparian corridor. This width would allow all construction access. This phase of construction would create a new stream channel, approximately 2,800 lineal feet long, from SE 424th Street to Newaukum Creek. The new stream bed would have an average bottom width of approximately 6 feet, with varying side slopes and a top width of 5 to 15 feet. Maximum depth would be approximately 4 feet. Four off-channel excavated embayments would be constructed and connected to the main channel. A typical embayment area would be approximately 100 feet long and up to 4 feet deep. In addition three flow-through side pools, approximately 120 feet long, would be constructed at the inside of the bends in the main channel. Two on-line pools, 100 feet diameter, would be constructed in the main channel. The stream would meander hydrologically connecting to existing wetland pools in the area. During construction, the new channel will be isolated from the flowing stream by plugs at the upstream and downstream ends of the new channel. These plugs would be substantial enough to prevent flood flows from entering the new channel during construction. Approximately 280 pieces of large woody debris would be placed in and along the newly-created stream channel and side pools. The large woody debris structures would consist of fir, cedar, or other approved coniferous species. Earthen material removed from the stream channel excavation would be deposited within the project boundaries to create small hillocks no more than 5 feet high. Any additional earthen material would be disposed in designated upland areas and revegetated, or used to fill part of the abandoned ditch.

Wetlands buffers would be planted with native emergent plants such as sedges (*Carex spp*), rushes (*Juncus spp*), and bulrush (*Scirpus microcarpus*). The riparian corridor would be planted with fast growing species such as willows (*Salix spp*) and cottonwoods (*Populus trichocarpa*) as well as native conifers such as Sitka spruce (*Picea sitchensis*) and red cedar (*Thuja plicata*). To help control weeds, all bare ground would be covered with approximately 6 inches of mulch. Plantings would be maintained as necessary for three years to ensure 80 percent or greater survival of

each species or contingency species. Fences would be repaired and/or constructed along the easement boundary to exclude livestock.

Temporary construction access and staging would take place on either an approximate 12 acre parcel of pasture that is owned by King County on the southern boundary of the project area off 244th Avenue SE, or on an approximate 2 acre parcel at off SE 424th Street which would require a temporary real estate easement from the land owner. If the larger southern parcel was utilized, a temporary road would be required for access. In all likelihood the entire parcel wouldn't be used for construction staging, and the area chosen would be such to have the least impacts to wet meadows. Should the soils prove soft in the construction staging area, marsh mats would be utilized to limit soil compaction.

ii) AREA **2** - The construction would be similar in design as the Area I design described previously, but would be 1,500 lineal feet long, and would extend from SE 424th Street to the inlet of Big Spring Creek at 244th Avenue SE. The new stream channel would be placed to avoid impacts to existing coniferous trees. In an effort to reduce construction effects to the second growth forest in Area II, existing large wood within the construction area would be salvaged and utilized for stream structure, but no additional large wood would be brought in. The upstream end of the old channel (south and west of SE 424th Street) would be closed and securely armored to prevent re-entry of any flow. Armor material would consist of clean, angular rock, and would be installed to withstand the 100-year peak flow.

Approximately 600 cubic yards of the excavated earthen materials will be utilized to construct a low berm along part of the southwest side of Area II. The berm would be approximately 660 feet in length connecting to the road embankment at the south end and to higher ground at the north end. The berm would have a 5-ft wide top crown, 2:1 side slopes, and an average bottom width of 10 to 15 ft. A plug would be constructed in the ditch at the intersection of the new berm and SE 424th Street. The purpose of the berm is to control surface water flows up to a 100-yr storm event. Hydrologic modeling has indicated that the southwest portion of Area II would be inundated at flows greater than a 10-yr event with addition of the new stream alignment.

Two new fish passable culverts, approximately 10 to15 feet in wide and 5 to 7 feet high would be installed at 244th Avenue SE and SE 424th Street to direct the stream from roadside ditches to the new stream channels. Roadside ditches would be hydrologically connected to the new stream bed at 244th Avenue SE, but would be blocked at SE 424th Street.

Temporary construction access and staging would be in the northeast corner of the Area II parcel adjacent to 244th Avenue SE. This corner is slightly higher in elevation and would not incur wetland impacts. Existing scrub/shrub vegetation would be cleared using chainsaws or other equipment to make the area safe.

iii) CONSTRUCTION SCHEDULE - Construction of Area I is expected to commence in the summer of 2013, and take 9 months to complete. The streambed will be allowed to "season" for several months, and water will be diverted into the new stream alignment during the June 16 through September 16 in-water work window in 2014.

Construction of Area II is expected to commence in 2014 and take 9 months to complete. The new streambed will be allowed to rest, with water diverted into the new channel in the fall of 2015.

c) Alternatives considered but eliminated

i) **Relocate the streambed to east of 244th Avenue SE**. This alternative would create a stream channel east of 244th Avenue SE flowing southwards, cross under SE 424th Street east of the residence that is on the corner, cross westwards under 244th Avenue SE, approximately 500 feet south of the 424th Street/244th Avenue intersection and continue diagonally southwestwards to connect with Newaukum Creek. This route would require very difficult construction in year-round standing water which can be as deep as 4 to 5 feet in the dry season, with greater depths during winter. The route would transverse through *Spiraea* filled wetland and would require the purchase of three rural residential homes and land. The new channel and buffer area would still be in close proximity of existing roads, providing limited benefit. The farther east the channel could be moved, the more uphill the route would become. The longer the channel, the less the resulting downhill gradient could be achieved to meet the ecological goal of providing a design with both spawning and rearing habitat. With these multiple issues, this alternative was abandoned.

ii) **Connect the streambed to the existing channel near the confluence of Newaukum Creek**. This alternative is a variation of the current proposed alternative, and would reconnect with the more natural stream channel that exists above the confluence with Newaukum Creek. The lower reach (existing channel) has fewer buffers between the stream and agricultural field runoff and the confluence is near a paved road (236th Ave SE), both non-point sources of water pollution. The existing channel is still fairly straight, heavily modified, and contains very poor fish habitat. In addition, some of the adjacent land owners were less willing to give conservation easements. For these reasons, the use of the existing lower stream channel was considered to be less than optimal.

5) Potentially Adverse Effects (Individually or Cumulatively) on the Aquatic Environment

a) Effects on Physical, Chemical, or Biological Characteristics of the Aquatic Ecosystem

Temporary increases in turbidity may result from construction activities. There would be a pulse of sedimentation following the diversion of the stream into the restored streambed, resulting in short-term turbidity increases as the streambed adjusts to the new flow. This should be lessened somewhat by allowing the newly created streambed to remain de-watered for a year post-construction. Localized shifting of sediments would continue sporadically as the new stream heals and adjusts. High flows during the winter and spring following construction would continue to mobilize sediments in the project area, potentially contributing to small increases in turbidity over that normally seen during high flow events.

In order to reduce the temporary increases in turbidity and potential related effects on juvenile salmonids, all “in-water” construction work would take place during the established

fish window (June 16 through September 15), which is the driest time of the year. Construction techniques, sequencing, and timing would minimize soil disturbance to the extent practical to reduce the generation of turbidity during construction of the new channel to the headwaters and Newaukum Creek. Similarly, the design and implementation of the erosion-control and the Storm Water Pollution Prevention Plan (SWPPP) would incorporate best management practices (BMPs) such as installation of silt-fence, placement of staging areas in flat areas above the ordinary high water line with either gravel pads or removable "marsh-mats," minimizing the number of trips heavy equipment makes through the site, and revegetation of disturbed areas to further reduce the duration and magnitude of the temporary increases in turbidity. Turbidity monitoring during construction would ensure these temporary increases are in compliance with State Water Quality Conditions.

Water quality in Big Spring Creek should improve as a result of the project. Storm water from 244th Avenue SE and SE 424th Street would no longer run off directly into the creek, and the buffering wetland and riparian corridor would filter pollutants from the run-off before it enters the creek. In addition, as the native trees and shrubs along the stream bank mature, they would shade the stream channel, preventing further increases in water temperature. Finally, large woody debris in the stream channel would provide localized areas of temperature refuge.

In Area II, with the construction of the berm along the southwestern border, all flood flows up to the 100-year modeled event would be contained to east of the berm. These flood waters could come from either backwater flooding from Newaukum Creek or downstream flows from a rain event. In Area I, floodwaters would expand over the riparian corridor and into adjacent pastures.

b) Effects on Recreational, Aesthetic, Historical, and Economic Values

Removing Big Spring Creek from the existing roadside ditches and relocating it into a more natural stream channel would greatly improve the visual and aesthetic appeal of the creek. A buffer of trees and shrubs would shield the creek from SE 424th Street and SE 244th Avenue for the majority of the reach. Removal of invasive weeds and the planting of native vegetation would also increase the visual appeal of the site.

During excavation and construction of the site, the aesthetic quality of the general area could be reduced due to the noise and air emissions generated by the construction equipment, which may disturb local homeowners. However, these impacts would be temporary and highly localized, and are not expected to result in significant impacts.

Professional cultural resources studies have been conducted for the proposed project. These studies have defined the Area of Potential Effect (APE) as the immediate project area where ground disturbing activities will occur. One archaeological site (45KI64) is partially located within the Area I project APE, but will not be directly impacted by construction activities. An archaeologist will be required to be on site for all ground disturbing activities to monitor the site in order to prevent an adverse effect to historic properties during construction. Long-term impacts of the project may include future degradation of site 45KI64 due to exposure and erosion as a result of stream migration. Section 106 of the National Historic

Preservation Act (16 USC 470) requires consultation with the Washington State Historic Preservation Officer and a request for tribal concurrence with determinations of eligibility. The Corps has initiated consultation with the Washington State Historic Preservation Officer (SHPO) and the Muckleshoot Tribe of Indians (Tribe) for the 2012 project and anticipates concurrence with a finding of "No Historic Properties Affected Pending Monitoring" from both SPHO and Tribe for this project.

c) Findings

There would be no significant adverse impacts to aquatic ecosystem functions and values. It is expected that aquatic ecosystem functions and values would increase by restoration of the streambed and planting its corridor with native vegetation.

6) Appropriate and Practicable Measures To Minimize Potential Harm to the Aquatic Ecosystem

Four project alternatives were evaluated in order to select the best alternative for minimizing cost and impact to the environment. The proposed project action was selected because it will have the least negative impact on the environment and generate the greatest potential gains for habitat value and ecosystem functions.

a) Impact Avoidance Measures

Potential impacts to aquatic animals and fish would be avoided by constructing the new channel in the dry, without connection to the inlet to Big Spring Creek and the outlet to Newaukum Creek. Any in-water work would be conducted during designated fish windows, July 2 to March 2.

b) Impact Minimization Measures

The Corps would take all practicable steps during construction of the project to minimize impacts to aquatic resources during in-water construction. Contingencies would be in place if any of the water quality protection measures fail to achieve their intended function. The Corps would observe all construction windows to ensure that impacts to migratory fish would be avoided or minimized. The minimization measures would be as follows:

- Best management practices (BMPs), such as stormwater runoff prevention, will be used to ensure that no unnecessary damage to the environment occurs.
- In-water work will only occur during June 16 through September 15 work window.
- During inlet/outlet construction and watering of the new channel with appropriate turbidity control measures (temporary coffer dam, silt curtains, or similar) would be used to isolate construction from the existing Big Spring Creek channel and Newaukum Creek and to minimize turbidity impacts.
- Utilization of marsh mats / swamp pads to minimize impacts to wetland soils.
- All required de-watering activities during construction would use appropriate devices (i.e. pumps, sand bags, sumps). All water removed from the site would be discharged in a vegetated upland location, a de-siltation basin, or location that would not incur damage due to water discharge.
- Drive trains of equipment would not operate in the water.
- All equipment would be cleaned prior to in-water construction work.

- No refueling would occur near Newaukum Creek or the existing Big Spring Creek channel.
- Construction equipment shall be regularly checked for drips or leaks.
- Construction equipment would include dust suppression methods to minimize airborne particulate matter that would be created during any ground disturbing activities that could create dust. Additionally, all equipment and vehicles would be required to be kept in good operating condition to minimize exhaust emissions. Standard practices would be used to control fugitive dust during the construction phase and during daily operations and maintenance of the proposed project.

c) Compensatory Mitigation Measures

Although the project will result in the loss of approximately 2.9 acres of pasture (1.8 acres) and forested (1.1 acres) wetlands to restore Big Springs Creek to a more natural streambed, the gain in habitat value and ecosystem function from moving the stream away from the road, meandering it through a forested wetland, and planting approximately 22.6 acres of native vegetation will exceed this loss.

d) Findings

Given the temporary, localized, necessary, and minor nature of these effects, the Corps has determined that the proposed restoration project would not result in significant adverse environmental impacts.

7) Other Factors in the Public Interest

a) Fish and Wildlife

USACE has coordinated construction activities with the Muckleshoot tribe, and state and federal resource agencies to ensure that only minimal impacts to fish and wildlife resources would occur. The in-water portions of project construction would take place during the designated fish window, June 16 through September 15, established by Washington Department of Fish and Wildlife (WFDW), to avoid impacts to fish. The Corp has determined that the project may affect, not likely to adversely affect bull trout, Chinook salmon, steelhead, and coho salmon. The project may affect, not likely to adversely affect the critical habitat of Chinook salmon. The project would have no effect on Canada lynx, gray wolf, grizzly bear, marbled murrelet, northern spotted owl, golden paintbrush, fisher, wolverine, Oregon spotted frog, yellow-billed cuckoo, and whitebark pine. The proposed project would have no effect on the critical habitat of bull trout, marbled murrelet, northern spotted owl, and Canada lynx. In an email dated May 10, 2012, the NMFS concurred with the finding for the three species of fish under their jurisdiction. Coordination with the USFWS is on-going and will be completed prior to finalization of the NEPA process.

b) Water Quality

The Corps concludes that this project would not violate state water quality standards and has submitted an application for a Section 401 water quality certificate to the Washington Department of Ecology.

c) Historical and Cultural Resources

Area 1 of the project was previously surveyed for King County in January 2009 by Paragon Research Associates (PRA) (Hoyt et al 2009). Archival research of the Washington State Department of Archaeology and Historic Preservation (DAHP) records database showed that a portion of a known archaeological site (45-KI-64) is located inside the project area, and intensive shovel testing was completed to accurately relocate site boundaries. Based on the results of this testing, a monitoring plan will be implemented, requiring a professional archaeologist to be on site during all ground disturbing activities to the exposure of lahar deposits within 75 meters of 45-KI-64. A "no drive" zone will be established around site boundaries and any vehicle movement within 50 meters of the site will be deemed "ground disturbing activity". All equipment and access routes and staging areas will be located outside of site boundaries.

A search of the archaeological and historic site records on the DAHP records database indicated that no properties listed in the National Register of Historic Places (NRHP) or the Washington State historic site register are recorded within Area 2 of the project area. The Corps has required an archaeological investigation of the project area, including a pedestrian reconnaissance survey. Accessible areas of the project area were surveyed and shovel tested, however the impenetrable nature of the project site precluded the ability to thoroughly investigate the site. No archaeological deposits or historic properties were encountered during the investigation. While there is a low to moderate potential for cultural resources to exist within the project area due to the wet nature of the site, an archaeological monitoring and testing plan will be implemented during vegetation clearing and construction activities. .

d) Environmental Benefits

The project would restore ecosystem function and structure that has been degraded by directing flows of Big Spring Creek into roadside and pasture ditches by restoring to a natural streambed, increasing shallow habitat for juvenile salmonids and other fish, and creating riparian habitat for other wildlife. The addition of native riparian plants along the stream would provide shading and cover leading to localized cooler temperatures, and increase primary production in the form of insect and leave drop. Woody debris would create pools and cover that provide refuge for juvenile salmonids from avian predators. Riparian vegetation will create habitat for birds, amphibians, and small mammals.

8) Conclusions

USACE finds that this project is within the public's interest, complies with the substantive elements of Section 404 of the Clean Water Act and the Rivers and Harbors Act, and meets the criteria of Nationwide Permit 27: Aquatic Habitat Restoration, Establishment, and Enhancement Activities.

9) References

Hoyt, Bryan, Chabot, Katherine F., and Johnson, Paula. (2009). Archaeological Big Spring Creek Relocation Phase I Cultural Resources Assessment. Paragon Research Associates.

Attachment A

CLEAN WATER ACT 404(B)(1) EVALUATION [40 CFR §230]
PERMIT APPLICATION EVALUATION [33 CFR §320.4]

404(B)(1) EVALUATION [40 CFR §230]

POTENTIAL IMPACTS ON PHYSICAL AND CHEMICAL CHARACTERISTICS [SUBPART C]:

1) Substrate [230.20]
The placement of the gravel/cobble (3-inch minus sized cobble) would be suitable for benthic invertebrate colonization that will provide juvenile salmonids with a forage base is expected to lead to an overall improvement in ecosystem function in Big Spring Creek.

2) Suspended particulates/turbidity [230.21]
In order to reduce the temporary increases in turbidity and potential related effects on juvenile salmonids, all "in-water" construction work would take place during the established fish window (June 16 through September 15), which is the driest time of the year. Construction techniques, sequencing, and timing would minimize soil disturbance to the extent practical to reduce the generation of turbidity during construction of the new channel to the headwaters and Newaukum Creek. Similarly, the design and implementation of the erosion-control and the Storm Water Pollution Prevention Plan (SWPPP) would incorporate best management practices (BMPs) such as installation of silt-fence, placement of staging areas in flat areas above the ordinary high water line with either gravel pads or removable "marsh-mats," minimizing the number of trips heavy equipment makes through the site, and revegetation of disturbed areas to further reduce the duration and magnitude of the temporary increases in turbidity. Turbidity monitoring during construction would ensure these temporary increases are in compliance with State Water Quality Conditions.

3) Water [230.22]
Temporary increases in turbidity may result from construction activities. There would be a pulse of sedimentation following the diversion of the stream into the restored streambed, resulting in short-term turbidity increases as the streambed adjusts to the new flow. This should be lessened somewhat by allowing the newly created streambed to remain de-watered for a year post-construction. Localized shifting of sediments would continue sporadically as the new stream heals and adjusts. High flows during the winter and spring following construction would continue to mobilize sediments in the project area, potentially contributing to small increases in turbidity over that normally seen during high flow events.

In order to reduce the temporary increases in turbidity and potential related effects on juvenile salmonids, all "in-water" construction work would take place during the established fish window (June 16 through September 15), which is the driest time of the year. Construction techniques, sequencing, and timing would minimize soil disturbance to the extent practical to reduce the generation of turbidity during construction of the new channel to the headwaters and Newaukum

Creek. Similarly, the design and implementation of the erosion-control and the Storm Water Pollution Prevention Plan (SWPPP) would incorporate best management practices (BMPs) such as installation of silt-fence, placement of staging areas in flat areas above the ordinary high water line with either gravel pads or removable "marsh-mats," minimizing the number of trips heavy equipment makes through the site, and revegetation of disturbed areas to further reduce the duration and magnitude of the temporary increases in turbidity. Turbidity monitoring during construction would ensure these temporary increases are in compliance with State Water Quality Conditions.

Water quality in Big Spring Creek should improve as a result of the project. Storm water from 244th Avenue SE and SE 424th Street would no longer run off directly into the creek, and the buffering wetland and riparian corridor would filter pollutants from the run-off before it enters the creek. In addition, as the native trees and shrubs along the stream bank mature, they would shade the stream channel, preventing further increases in water temperature. Coniferous large woody debris, which is resistant to breakdown (and therefore has low biochemical oxygen demand), would be placed to enhance fish habitat.

4) Current patterns and water circulation [230.23]

It is expected there would be some hyporheic flow of groundwater into the channel. The designed elevation of the channel bottom is below the groundwater table. Paired with the very poorly drained organic soils, Shalcar and Seattle series (NRCS, 1973, 2009)[1], soils on site, this seems to indicate that some hyporheic flow would be available to supplement the surface flow in the channel. This input has not been quantified, however.

Flooding of the surrounding area was modeled to access inundation of the Area II and impact to adjacent roads and lots. The new channel is designed with a 2-5 yr flow capacity. During large storm events the surrounding area is expected to be highly saturated. High flows that leave the new Area II channel and follow the existing terrain will intersect the North Fork ditch if not contained, which runs through the adjacent property and through a 36 inch culvert at 424th Street. This culvert is undersized for conveying flood flows that leave the new channel. Preliminary hydraulic modeling has shown that the north fork and the adjacent property will backwater and flood for approximately 600 ft upstream if the existing 36 inch culvert. The resulting water surface partially inundates SE 424th Street between the proposed new channel crossing and the existing North Fork ditch crossing. Modeling has shown that with a constructed berm along the west side of the site, that ties into existing high ground at each end, all flood flows up to 100 yr will be contained to Area II.

5) Normal water fluctuations [230.24].

Big Spring Creek's spring source flows from an aquifer located under the Osceola mudflow deposits that blanket the Enumclaw Plateau. Spring discharge at low flow is between 4 and 7 cubic feet per second (cfs). A long series of roadside, rural residential, highway, and agricultural properties ditches flow from the north and west of the spring source and these join at 244th Avenue SE. The next major input of flow comes from the North Fork of Big Spring Creek,

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[1] NRCS. (1973). Soil Survey of King County Area, Washington. US Department of Agriculture, Soil Conservation Service in cooperation with the Washington Agricultural Experiment Station.
NRCS. (2009). Web Soil Survey. Retrieved December 2011, from http://websoilsurvey.nrcs.usda.gov

which contains mostly a long series of agricultural ditches, combined with a reported set of springs north of SE 424th Street. Water quality of the North Fork is impacted by dairy cows allowed to pasture in the wetlands and creek, and possibly by dairy runoff. Young cows are also allowed to pasture south of 424th Street, adjacent to the mainstem of Big Spring Creek on one large agricultural parcel. This parcel is partially or wholly inundated with Big Spring flow, even in the summer, depending on beaver activity, and how recent the stream has been cleaned out of accumulated vegetation and organic matter build up.

Big Spring Creek has been observed by property owners and King County employees to have widespread flooding during storm events, as well as significant inundation throughout the wet season of a widespread area. SE 424th Street has been known to be overtopped, though it is not known the frequency of such overtopping. An extensive dredging effort from 2005 seemed to improve flooding and inundation temporarily, but has not had a lasting effect. Reed Canary grass and other invasive continue to choke the channel and lateral ditches. Newaukum Creek also has a significant backwater effect during large storm events, as is indicated by the 1995 Flood Insurance Rate Map (FIRM) 100 year flood maps. This backwater significantly reduces the effective water surface gradient at high flow. The 100 year flow for Big Spring Creek is roughly 70 cfs, while the 100 year flow for Newaukum Creek is approximately 1800 cfs.

6) Salinity gradients [230.25]
Not applicable, there is no salt intrusion in Big Spring Creek.

POTENTIAL IMPACTS ON BIOLOGICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM [SUBPART D]**:**

1) Threatened and endangered species [230.30]
The Corp has determined that the project may affect, not likely to adversely affect bull trout, Chinook salmon, steelhead, and coho salmon. The project may affect, not likely to adversely affect the critical habitat of Chinook salmon. The project would have no effect on Canada lynx, gray wolf, grizzly bear, marbled murrelet, northern spotted owl, golden paintbrush, fisher, wolverine, Oregon spotted frog, yellow-billed cuckoo, and whitebark pine. The proposed project would have no effect on the critical habitat of bull trout, marbled murrelet, northern spotted owl, and Canada lynx. In an email dated May 10, 2012, the NMFS concurred with the finding for the three species of fish under their jurisdiction. In a letter dated June 7, 2012, the USFWS concurred that the proposed project is not likely to adversely affect listed species.

2) Fish, crustaceans, mollusks and other aquatic organisms in the food web [230.31]
There may be temporary impacts to aquatic organisms during construction and connection of the channel due to turbidity or if the lakebed is disturbed during outlet construction and watering of the new channel. However, aquatic habitat quality conditions are expected to improve greatly following construction. Placement of streambed cobble and excavation into the existing Osceola mud flow geologic layer will provide rearing habitat and better substrate for the production of aquatic insects and other benthic organisms. Planting the stream banks and shoreline with native vegetation would provide shading that functions as a thermal refuge during warm summer days

as well as providing a source of organic input for the food chain and insect drop as a direct source of food.

3) Other wildlife [230.32]

Birds and other wildlife may be temporarily displaced during construction due to noise and presence of construction vehicles. Because these impacts would only occur during the period of construction, and the great majority of existing trees would be retained, they are expected to be inconsequential and temporary. Planting native trees and shrubs along the stream's riparian corridor will increase the extent and species diversity on the site and create additional opportunities for foraging, nesting, cover, and refuge for a wide variety of species.

POTENTIAL IMPACTS ON SPECIAL AQUATIC SITES [SUBPART E]:

1) Sanctuaries and refuges [230.40]

The proposed project is in a conservation area designated by King County.

2) Wetlands [230.41]

Approximately 15.1 acres of meadow in the Area I would be converted to stream (approximately 1.8 acres) and woodland corridor (13.3 acres). North of SE 424th Street, Area II, the new channel alignment would be designed to avoid impacts to larger conifers currently present, negating the need to remove them. Approximately 1.1 acres of scrub/shrub habitat in Area II would be permanently converted to stream, with an additional 9.3 acres affected by restoration activities. Some of the earthen material removed from excavating the stream would be utilized to provide small hillocks, less than 5 feet in height which would be replanted with upland plant communities. Throughout the 250 foot wide conservation corridor, native trees and shrubs would be planted to increase habitat for wildlife species. This conservation corridor would include various plant community types including aquatic wetlands, emergent wetlands, scrub/shrub, forested, and upland communities.

Temporary impacts to the wetland may result from the staging areas used to access the site and the placement of logs both in-channel and adjacent to the channel to create the wood berm. Impacts from the staging areas would occur mainly in areas of scrub/shrub and Himalayan blackberry, and would be returned to their original state (minus the invasive vegetation) following construction. Any impacts to vegetation in the wetland from the construction of the log berm would be compensated by riparian plantings.

Although the project would result in the loss of approximately 2.9 acres of the existing pasture (1.8 acres) and forested wetland (1.1 acres) converted to streambed; the newly constructed streambed would provide enhanced functional habitat value for fish, aquatic invertebrates, amphibians, and other aquatic biota, as well as a similar increase in function and value for mammals, birds, and insects in riparian areas. The plantings would increase the habitat value of the site by creating additional opportunities for foraging, nesting, cover, and refuge for a wide variety of species.

3) Mud flats [230.42]

Not applicable. There are no mudflats present.

4) Vegetated shallows [230.43]
Not applicable because there are no vegetated shallows present.

5) Coral reefs [230.44]
Not applicable.

6) Riffle and pool complexes [230.45]
Not applicable because the proposed project will be constructed in the dry, creating a new streambed and will divert stream flow away from roadside ditches.

POTENTIAL EFFECTS ON HUMAN USE CHARACTERISTICS [SUBPART F]:

1) Municipal and private water supplies [230.50]
The project would not impact water supply or other public utilities.

2) Recreational and commercial fisheries [230.51]
There are no known commercial fisheries at or near the project area. The Corps will coordinate with the Muckleshoot Tribe prior to construction to ensure that construction activities are coordinated with the tribe and impacts to tribal fishing are avoided and minimized. Recreation in the project area is not expected to change significantly. There are no plans to put in any access trails; however, the clearing of the invasive shrub vegetation may make access easier for those who would like to enjoy the creek for activities such as recreational fishing.

3) Water-related recreation [230.53]
Because of the small size of Big Springs Creek, opportunities for boating, even with small watercraft such as canoes or kayaks, would be unlikely. The only potential recreational use would be fishing or watching wildlife.

4) Aesthetics [230.53]
Restoration of the creek to a more natural stream bed and planting native vegetation along the newly created channel would greatly improve the visual and aesthetic appeal of the site. During excavation and construction of the site, the aesthetic quality of the general area could be reduced due to the noise and air emissions generated by the construction equipment, which may disturb local residents. However, these impacts would be temporary and highly localized.

5) Parks, national and historic monuments, national seashores, wilderness areas, research sites and similar preserves [230.54]
No such structures or areas are designated in the project area.

EVALUATION AND TESTING [SUBPART G]:

1) General evaluation of dredged or fill material [230.60]

Bank stabilization and streambed creation materials would consist of class III riprap, 3-inch minus crushed stone, and large woody debris. All imported material would be free from contamination and obtained from a permitted local source.

2) Chemical, biological, and physical evaluation and testing [230.61]

Armor rock and fill material used at the site under this analysis would be obtained from an established source. There is reasonable assurance that the proposed discharge material is not a carrier of contaminants. Therefore, the required determinations pertaining to the presence and effects of contaminants can be made without testing.

ACTIONS TO MINIMIZE ADVERSE EFFECTS [SUBPART H]:

The Corps would take all practicable steps during construction of the project to minimize impacts to aquatic resources during in-water construction. Contingencies would be in place if any of the water quality protection measures fail to achieve their intended function. The Corps would observe all construction windows to ensure that impacts to migratory fish would be avoided or minimized. The minimization measures would be as follows:

- Best management practices (BMPs), such as stormwater runoff prevention, will be used to ensure that no unnecessary damage to the environment occurs.
- Connecting the newly excavated stream bed with the headwaters and Newaukum Creek during established in-water work windows.
- During inlet/outlet construction and watering of the new channel with appropriate turbidity control measures (temporary coffer dam, silt curtains, or similar) would be used to isolate construction from the existing Big Spring Creek channel and Newaukum Creek and to minimize turbidity impacts.
- Utilization of marsh mats / swamp pads to minimize impacts to wetland soils.
- All required de-watering activities during construction would use appropriate devices (i.e. pumps, sand bags, sumps). All water removed from the site would be discharged in a vegetated upland location, a de-siltation basin, or location that would not incur damage due to water discharge.
- Drive trains of equipment would not operate in the water.
- All equipment would be cleaned prior to in-water construction work.
- No refueling would occur near Newaukum Creek or the existing Big Spring Creek channel.
- Construction equipment shall be regularly checked for drips or leaks.
- Construction equipment would include dust suppression methods to minimize airborne particulate matter that would be created during any ground disturbing activities that could create dust. Additionally, all equipment and vehicles would be required to be kept in good operating condition to minimize exhaust emissions. Standard practices would be used to control fugitive dust during the construction phase and during daily operations and maintenance of the proposed project.

1) Actions concerning the location of the discharge [230.70]

Since USACE is not selecting a disposal site, but rather is building a new streambed and planting the adjacent riparian corridor, the actions that would be taken are necessary for the location and project type.

2) Actions concerning the material to be discharged [230.71]
Material to be placed in the project area consists of a layer of a gravel / cobble within the new channel, and large woody debris placed to provide fish habitat.

3) Actions controlling the material after discharge [230.72]
Material to be added to the site includes streambed gravel/cobble, large woody debris, and riprap reinforcement at the openings of the new culverts. There may be a pulse of sedimentation following diversion of the stream into the new channel resulting in short term turbidity increases as the streambed adjusts to the new flow. Localized shifting of sediments may continue sporadically as the new stream adjusts.

4) Actions affecting the method of dispersion [230.73]
See above.

5) Actions related to technology [230.74]
Appropriate machinery and methods of transport of the material for removal and discharge would be employed. All machinery would be properly maintained and operated

6) Actions affecting plant and animal populations [230.75]
USACE has coordinated construction activities with local Native American Tribes and state and Federal resource agencies to ensure that minimal impacts to fishery and wildlife resources would occur. The in-water portions of project construction would take place during the designated fish window of June 16 through September 15. Providing rearing gravel, habitat improvement with large woody debris and planting the banks with native vegetation is expected to lead in an increase in habitat value for aquatic biota.

7) Actions affecting human use [230.76]
The project will occur in designated conservation area which does not have public facilities and currently has limited public access.

8) Other actions [230.77]
Best management practices would be used to ensure that impacts are minimized during construction.

GENERAL POLICIES FOR EVALUATING PERMIT APPLICATIONS [33 CFR §320.4]

1) Public Interest Review [320.4(a)]
USACE finds this ecosystem restoration action to be in compliance with the 404(b)(1) guidelines and not contrary to public interest.

2) Effects on wetlands [320.4(b)]
Approximately 15.1 acres of meadow in the Area I site would be converted to stream (approximately 1.8 acres) and woodland corridor (13.3 acres). North of SE 424th Street, the new channel alignment would be designed to avoid impacts to larger conifers currently present,

negating the need to remove them. Approximately 1.1 acres of scrub/shrub habitat would be permanently converted to stream, with an additional 9.3 acres affected by restoration activities. Some of the earthen material removed from excavating the stream would be utilized to provide small hillocks, less than 5 feet in height which would be replanted with upland plant communities. Throughout the 200 foot wide conservation corridor, native trees and shrubs would be planted to increase habitat for wildlife species. This conservation corridor would include various plant community types including aquatic wetlands, emergent wetlands, scrub/shrub, forested, and upland communities.

3) Fish and wildlife [320.4(c)]
USACE has consulted with state and federal resource agencies, tribes and other interested members of the public on this action.

4) Water quality [320.4(d)]
The Corps concluded that this project would not violate state water quality standards and is seeking a Section 401 water quality certification from the Washington Department of Ecology. The Corps will comply with all conditions set forth in the Certification.

5) Historic, cultural, scenic, and recreational values [320.4(e)]
Professional cultural resources studies have been conducted for the proposed project. These studies have defined the Area of Potential Effect (APE) as the immediate project area where ground disturbing activities will occur. One archaeological site (45KI64) is partially located within the Area I project APE, but will not be directly impacted by construction activities. An archaeologist will be required to be on site for all ground disturbing activities to monitor the site in order to prevent an adverse effect to historic properties during construction.

Long-term impacts of the project may include future degradation of site 45KI64 due to exposure and erosion as a result of stream migration.

The Corps has initiated consultation with the Washington State Historic Preservation Officer (SHPO) and the Muckleshoot Tribe of Indians (Tribe) for the 2012 project and anticipates concurrence with a finding of "No Historic Properties Affected Pending Monitoring" from both SPHO and Tribe for this project.

6) Effects on limits of the Territorial Sea [320.4(f)]
Not applicable, since the project would not occur in coastal waters.

7) Consideration of property ownership [320.4(g)]
Federal involvement in ecosystem restoration is supported in law and Executive Order.

8) Activities affecting coastal zones [320.4(h)]
An analysis of the coastal zone consistency determination for Big Spring Creek is being completed and will be submitted to the Washington Department of Ecology for approval.

9) Activities in marine sanctuaries [320.4(i)]
Not applicable, since the area is not a marine sanctuary.

10) Other federal, state, or local requirements [320.4(j)]
Concurrence with the Corps' determinations of may affect, but not likely to adversely affect for species that are federally listed as well as their critical habitat was received from USFWS on June 7, 2012, and from NMFS on May 10, 2012. The Corps received is seeking a Section 401 water quality certification from the Washington Department of Ecology. The local sponsor, King County, would obtain all locally necessary permits including a Hydraulic Approval Permit with the Washington Department of Fish and Wildlife.

11) Safety of impoundment structures [320.(k)]
Not applicable, since an impoundment structure is not being built.

12) Water supply and conservation [320.4(m)]
No impacts to water supply are anticipated.

13) Energy conservation and development [320.4(n)]
Not applicable.

14) Navigation [320.4(o)]
Not applicable as Big Spring Creek is non-navigable in its current location of roadside and pasture ditches, and will continue to be non-navigable once restored to a more natural streambed.

15) Environmental benefits [320.4(p)]
The project would create shallow water habitat and foraging area for juvenile salmonids. It would also include native plantings and large woody debris, both of which are integral to the development of salmonid and other wildlife habitat.

16) Economics [320.4(q)]
No impacts to economics are anticipated.

17) Mitigation [320.4(r)]
As this is a restoration project, it is considered self-mitigating. Although the project will result in the loss of approximately 2.9 acres of pasture (1.8 acres) and forested (1.1 acres) wetlands to restore Big Springs Creek to a more natural streambed, the gain in habitat value and ecosystem function from moving the stream away from the road, meandering it through a forested wetland, and planting approximately 22.6 acres of native vegetation will exceed this loss.

Appendix E

BIOLOGICAL EVALUATION

BIG SPRING CREEK RESTORATION

KING COUNTY, WASHINGTON

May 2012

US Army Corps of Engineers®
Seattle District

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1.0 INTRODUCTION

The Big Spring Creek sub-basin, in King County, Washington, prior to agricultural and development-related disturbance, most likely supported a larger population of coho salmon, steelhead, and cutthroat trout than it presently does. The upper and middle sub-basin of the Green River watershed likely consisted of a preponderance of forested wetlands and old-growth terrestrial forest that provided deep rearing pools and habitat for salmonids. Presently many of the wetlands have been filled or drained for agricultural use; including Big Spring Creek which has been ditched for much of its course. Proposed restoration actions to improve rearing habitat for coho, steelhead and cutthroat, and storm refuge at this site include channel relocation and reconstruction, wetland enhancement, riparian re-vegetation, and woody debris additions. Two culverts will also be installed to increase upstream and downstream connectivity. Existing ditches will remain and will be hydrologically connected to the new streambed where they intersect. The flow of Big Spring Creek will be diverted from the present location in ditches to the new streambed.

This biological evaluation (BE) is being submitted under the Endangered Species Act (ESA) of 1973, as amended (16 USC 1531), Sec. 7(a)(2), to address effects of the proposed action on species that are listed under ESA, and their designated critical habitat.

2.0 PROJECT HISTORY

The Big Spring Creek restoration was proposed as part of the larger Green-Duwamish River Ecosystem Restoration Project, authorized in the 2000 Water Resources Development Act. The Record of Decision on the Programmatic Environmental Impact Statement (PEIS) was signed April 23, 2002. As Big Spring Creek was included as one of the projects in the PEIS, this Biological Evaluation (BE) serves to update specifics on the proposed project area and changes in listing for species covered under the ESA as amended. In 2009, King County completed the permit process for the portion of the project south of SE 424th Street, which is chiefly reed canary-grass (*Phalaris arundinacea*) meadow. As the goal was to restore as much of the stream to natural conditions as possible, King County partnered with the US Army Corps of Engineers (Corps) to enlarge the project to the current proposal.

3.0 PROJECT DESCRIPTION

3.1 PROJECT LOCATION

Big Spring Creek (WRIA 09.0119) is located within the Newaukum Creek Basin (Middle Green River sub-watershed) on the Enumclaw plateau northwest of the City of Enumclaw (Figure 1). The project area is bounded by SE 416th Street to the north, SE 436th Street to the south, 244th Way SE to the east, and 236th Avenue SE to the west. The 1.2 mile-long stream is a tributary of Newaukum Creek entering at river mile (RM) 6.3. Newaukum Creek is a left-bank tributary of the Green River (RM 40). Big Spring Creek

originates from a series of wetlands that are part of its 1,000 acre drainage area. The current flow is almost entirely through roadside and pasture ditches. Project team members have been unable to locate the historic natural alignment either in field surveys or investigating old maps.

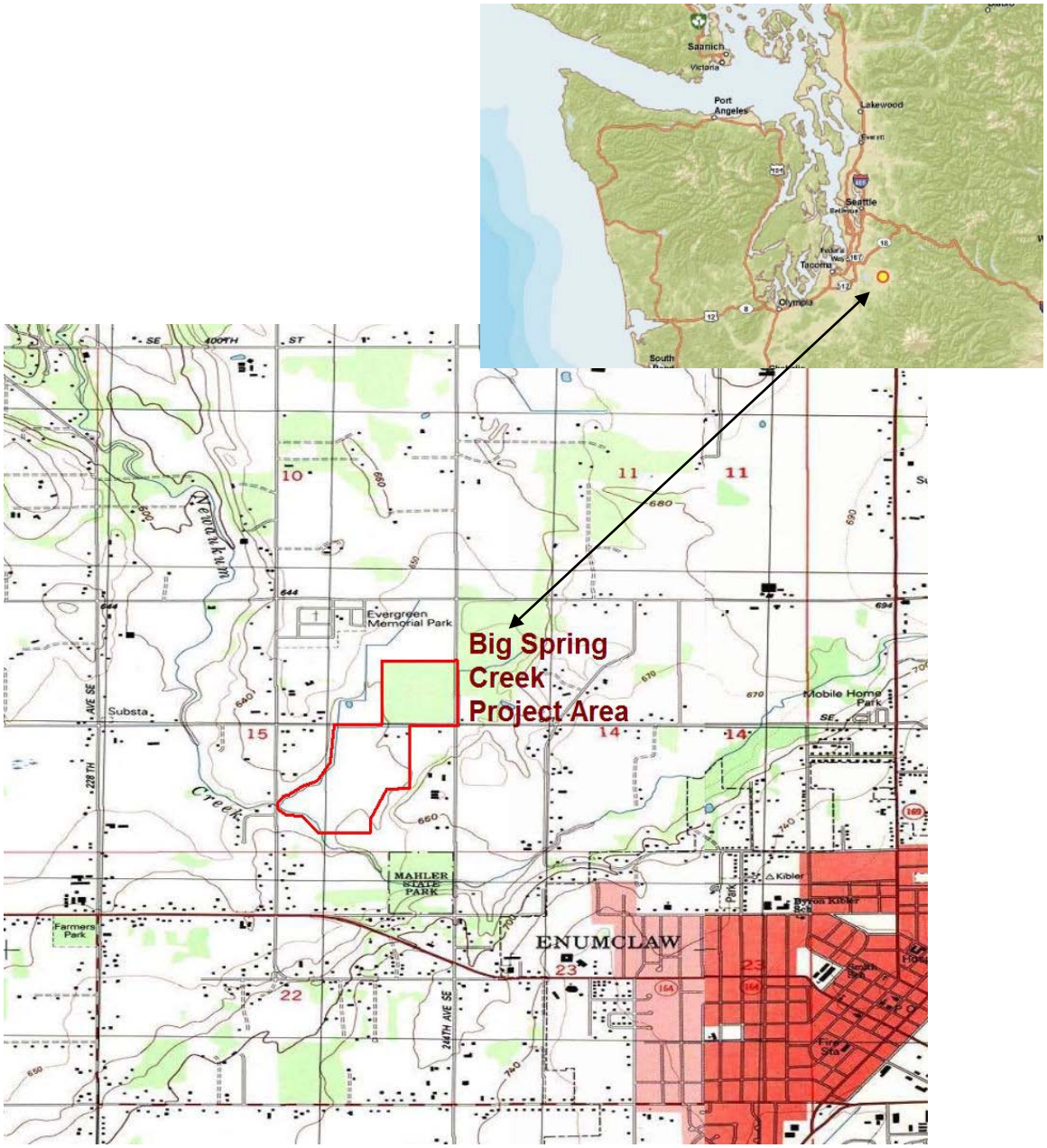

Figure 1. Big Springs Creek stream restoration project area, northwest of Enumclaw, King County, Washington.

3.2 PROJECT AREA AND ACTION AREA

The project area consists of the areas where construction is to occur, as described above under Project Location.

According to 50 CFR 402.02, "*Action area* means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The action area in this case consists of the project area as well as any locations downstream above a point where effects would become undiscernable. That would include 300 feet of stream, to the head of a water quality mixing zone.

3.3 PURPOSE AND NEED

The project purpose is to restore functionality of rearing habitat for coho salmon, steelhead, and cutthroat trout from its present highly impacted state. The clearing of the wetland riparian buffer, grading, and livestock access to Big Spring Creek and the source wetlands has resulted in bank erosion, siltation, and degraded water quality which has ultimately affected Newaukum Creek (King County, 2000). The road fill has disrupted hydrologic connectivity and function within the wetlands and between stream and wetland. These impacts have also affected both stream and anadromous salmonids. Vegetative structure and diversity is very poor, especially downstream (south) of SE 424th Street where invasive reed canary-grass dominates the landscape.

3.4 PROJECT DESCRIPTION AND CONSTRUCTION TECHNIQUES

The Big Spring Creek Restoration Project was originally intended to be constructed in two phases over two summers. However, due to timing constraints, the project will now be constructed in a single season. The project is still divided into two areas separated by SE 424th Street (Figure 2). The two areas represent distinctly different habitat environments. The southern segment, Area I, is currently comprised of pasturelands dominated by reed canary-grass. The northern segment, Area II, is predominately a second-growth forest and shrubby parcel. The construction of both areas is expected to start in early summer and be completed in late fall. A majority of the proposed work would be in the dry; however, connection to Newaukum Creek and diverting the actual flow of Big Spring Creek into the new streambed would be completed during the August 1st through 31st work window.

3.4.1 AREA 1

Construction in the parcel south of SE 424th Street, "Area 1," would create a new stream channel, approximately 2,800 lineal feet long, running southwards from SE 424th St. to Newaukum Creek. The construction footprint would be approximately 200 feet wide to include the new stream bed and a newly planted riparian corridor.

This width would allow all construction access. The new stream bed would have an average bottom width of approximately 6 feet, with varying side slopes and top width. Maximum depth would be approximately 4 feet. Four off-channel excavated embayment areas would be constructed and connected to the main channel. A typical embayment area would be approximately 100 feet long and up to 4 feet in depth. In addition, three flow-through side pools, approximately 120 feet long would be constructed and the inside

bends in the main channel. Two on-line pools, 100 feet diameter, would be constructed in the main channel. The stream would meander, hydrologically connecting to existing wetland pools. During construction, the new channel would be isolated from the flowing stream by plugs at the upstream and downstream ends of the new channel. These plugs would be substantial enough to prevent flood flows from entering the new channel.

Existing ditches would remain and would continue to receive runoff from roads and pastures. The roadside ditches would continue to be maintained by King County Department of Transportation, which includes periodic clearing and grubbing.

Approximately 280 pieces of large wood would be placed in and along the newly-created stream channel and side pools. The large wood structures would consist of fir, cedar, or other coniferous species[1]. Earthen material removed from the stream channel excavation would be deposited within the project boundaries to create small hillocks no more than 5 feet high. Any additional earthen material would be disposed in designated upland areas and revegetated, or used to fill part of the abandoned ditch.

Wetlands buffers would be planted with native emergent plants such as sedges (*Carex* spp.), rushes (*Juncus* spp.), and bulrush (*Scirpus microcarpus*). The riparian corridor would be planted with fast growing species such as willows (*Salix* spp.) and cottonwoods (*Populus trichocarpa*) as well as native conifers such as Sitka spruce (*Picea sitchensis*) and red cedar (*Thuja plicata*). To help control weeds, all bare ground would be covered with approximately 6 inches of mulch. Plantings would be maintained or replaced as necessary for three years to ensure 80 percent or greater survival of each species or contingency species. Fences would be repaired and/or constructed along the easement boundary to exclude livestock.

[1] Washington Department of Fish and Wildlife recommended species.

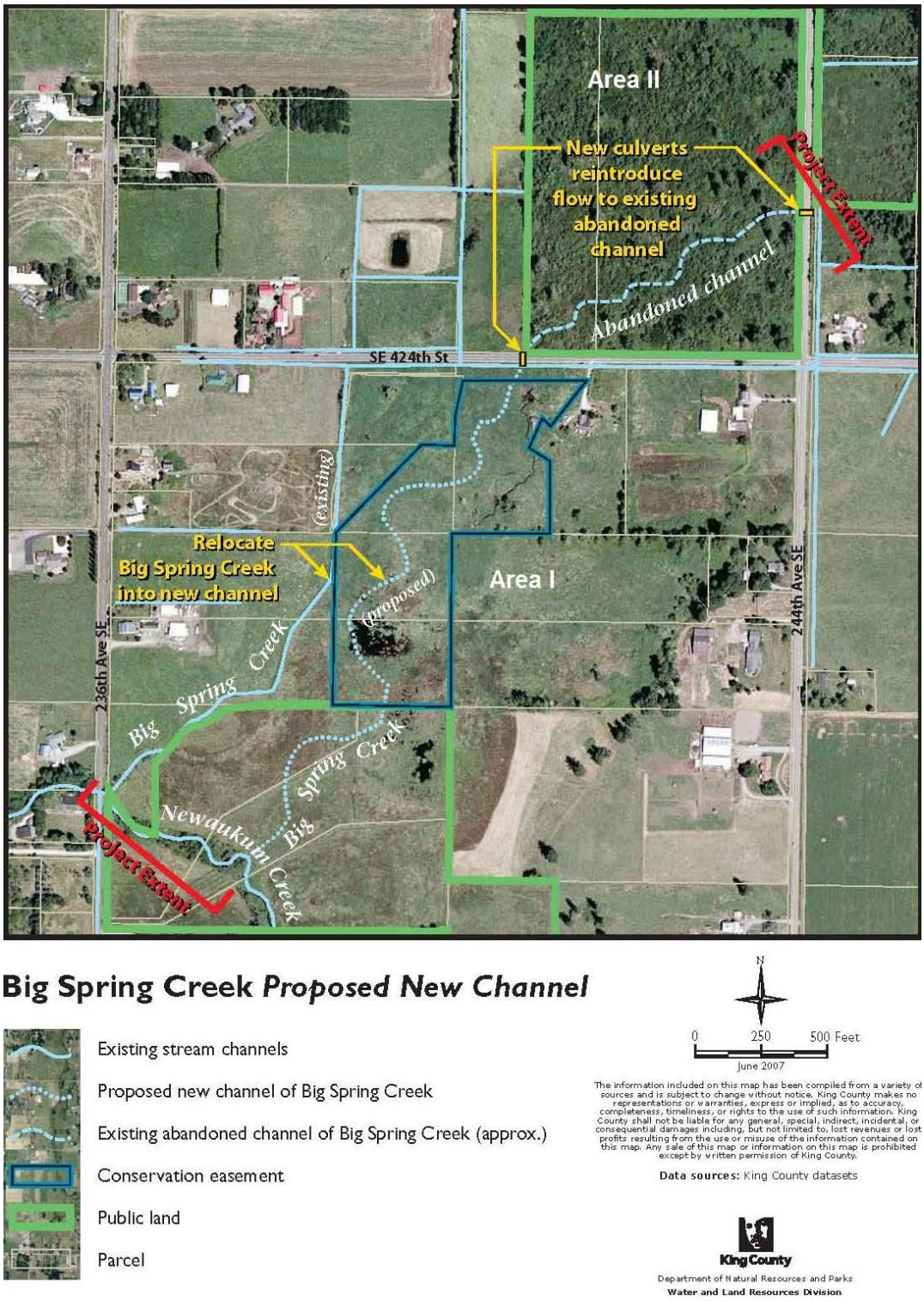

Figure 2. Proposed restoration of Big Springs Creek, Area I and Area II locations

Temporary construction access and staging would take place on either an approximate 12 acre parcel of pasture that is owned by King County on the southern boundary of the project area off 244th Avenue SE, or on an approximate 2 acre parcel off SE 424th Street (Figure 3) which would require a temporary real estate easement from the land owner. If the larger southern parcel was utilized, a temporary road would be required for access. In all likelihood the entire parcel wouldn't be used for construction staging, and the area chosen would be such to have the least impacts to wet meadows. Once construction is completed, the staging areas would be returned to natural conditions.

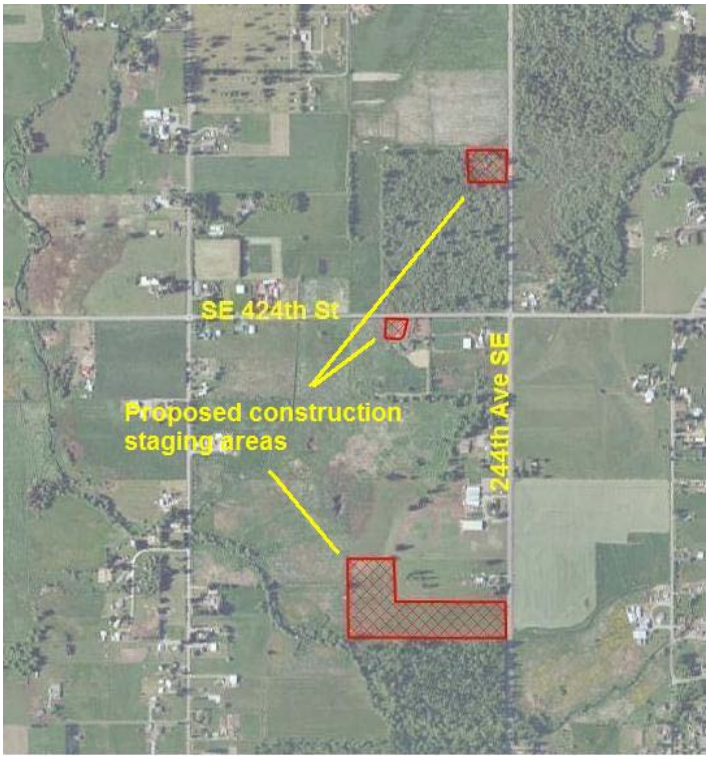

Figure 3. Proposed construction staging areas.

3.4.2 AREA II

Work in this area is intended to create a new stream bed through the forested parcel, "Area II," north of SE 424th Street. Once the streambed is constructed, it would be connected to the headwaters east of 244th Ave SE and the newly constructed channel south of SE 425th Street. The new streambed in Area II would be sited in the approximate location of the historic abandoned streambed (Figure 2).

Area II construction would be similar in design as the Area I design described previously, but would be 1,500 lineal feet long, and would extend from 244th Avenue SE southwestwards to SE 424th Street. The stream channel would be placed to avoid impacts to existing coniferous trees to the greatest extent practical. Excavated materials from construction of the project would not be utilized to form hillocks as in Area I, but would be removed.

Temporary construction access and staging may include the northeast corner of the Area II parcel adjacent to 244th Avenue SE (Figure 3). This corner is slightly higher in elevation and would limit impacts to wetlands. Existing scrub/shrub vegetation would be cleared using chainsaws or other equipment to make the area safe. Once construction is complete, the staging area would be returned to natural conditions.

Two new fish passable culverts, approximately 10 to15 feet wide and 5 to 7 feet high would be installed at 244th Avenue SE and SE 424th Street to complete the conveyance of the stream from its current location in roadside ditches to the newly constructed streambed. The culverts would be armored with clean, angular rock, and built to withstand the 100-year peak flow. Existing roadside ditches would remain hydrologically connected to the new stream bed where they intersect.

3.5 CONSERVATION MEASURES

To minimize potential negative effects on salmonids BMPs for this project shall be followed, including:

- Apply standard BMPs to prevent erosion and sediment from entering the water and maintain erosion control measures until vegetation has been re-established.
- A Spill Prevention and Control and Countermeasures (SPCC) plan will be developed and followed to avoid the delivery of chemical contaminants from machinery and equipment to surface waters.
- A Stormwater Pollution Prevention Plan (SWPPP) will be developed to address stormwater management and prevention of water pollution.
- Channel excavation and habitat feature construction shall occur in the dry channel prior to inundation by stream water.
- Limit in-water work to July 2 through March 2 when aquatic species are at least risk.
- New riparian plantings will be monitored, and replanted as necessary, for a minimum of 3 years following project completion.
- Utilization of “marsh mats” to minimize impacts to wetlands in staging areas.
- Utilization of coffer dams, weighted silt fences, sumps and pumps to control turbidity and water flow.
- During the water diversion process, maintain adequate stream flow at the downstream end of the project (236th Avenue SE).
- Any temporary roads or staging areas and associated matting constructed for the project will be removed and the area restored to pre-existing or enhanced conditions upon project completion.
- All equipment that is used for in-water work shall be cleaned to remove external oil, grease, dirt and mud prior to placing the equipment in the water.

4.0 PROJECT AREA ENVIRONMENTAL BASELINE

4.1 HABITAT CONDITIONS

The Big Spring Creek project area has two habitat types and land use areas. South of SE 424th Street the land was cleared, ditched, and drained in the past to convert it to agricultural pasturelands. As a result, the site is largely open, dominated by pasture grasses with little woody vegetation except along the perimeter of Newaukum Creek where native trees and shrubs have been installed as part of previous restoration efforts. North of SE 424th Street, the parcel is heavily vegetated with a combination of trees and shrubs. The forested portion north of SE 424th Street (construction Area II site) is part of the King County Spring Creek/Newaukum Creek Natural Area. The creek itself is channeled into roadside and pasture drainage ditches. The southern portion of the creek re-enters in a more natural channel with a willow overstory. Fish habitat within the stream channel is in a degraded state due to the straightened nature of the channel, lack of overhanging vegetation, poor pool-riffle structure, and surface water runoff it receives from the two adjacent roads; all of which limit the amount of in-stream micro-habitat and refuge. Although there are some areas where suitable spawning gravel for coho exists within the current channel, it is likely hatching success and juvenile survival is limited.

4.1.1 AREA I AREA

The wetland directly south of SE 424th Street is largely reed canary-grass (*Phalaris arundinacea*) with some areas of cattails (*Typha latifolia*) in localized depressions. Soft rush (*Juncus effucus*), spirea (*Spirea douglasii*), buttercub (*Ranunculus repens*), red fescue (*Festuca rubra*), velvet grass (*Holcus lanatus*), and other pasture grasses are also found on site. Previous native plantings installed by King County near Newaukum Creek include Pacific willow (*Salix lasiandra*), Sitka willow (*Salix sitchensis*), red alder (*Alnus rubra*).

From visual observations, reed canary-grass constitutes approximately 70 percent of the wetland in the project area. This wetland within the project area was rated according to the Washington Department of Ecology (WDOE) wetland rating system. The rating exercise resulted in a Class II wetland rating. This depressional wetland scored highest for the Water Quality function, secondly the Hydrologic function, and lastly the Habitat function. Since the site is bordered by some grazed pastures and drainage from farm fields and a road, the wetland has the potential to improve water quality. It also has the potential to improve water quality because of the persistent ungrazed vegetation and organic soil found on the site. The potential to reduce flooding and erosion is high because water is able to pond in some areas. Habitat is degraded by the heavy grazing buffers, low vegetative diversity, and the lack of undisturbed, unbroken vegetated corridors to other wetland areas outside of the project area.

4.1.2 AREA II AREA

The wetland complex located on the 30-acre parcel is unique in that it has diverse native plant communities; including several large Sitka spruce (*Picea sitchensis*) trees. The surrounding properties were historically modified for agricultural use and are dominated

by reed canary-grass. Access to the interior of the site is difficult due to dense vegetative growth, predominately Himalayan blackberries (*Rubus armeniacus* Focke).

Field investigations and study of aerial photos found less than 30 mature Sitka spruce on the parcel, some of these were down due to storm events. About 15 cottonwood (*Populus balsamifera*), red alder (*Alnus rubra*), birch (*Betula spp*.), and a big-leaf maple (A*cer macrophylum*) over 50 feet in height are found scattered across the site. Collectively, the trees cover approximately 10 percent of the surface of the site. Other native plants 30 to 35 feet in height include Pacific and Sitka willows, red alder, birch, and Pacific crabapple (*Pyrus fusca*). They occupy approximately 20 percent of the project site. Dominant native and non-native shrubs include spirea (*Spirea douglasii*), Nootka rose (*Rosa nutkana*), vine maple (*Acer circinatum*), red-twig dogwood (*Cornus sericea*), twinberry (*Lonicera involucrata*), and Himalayan and evergreen blackberry (*Rubus armeniacus* and *R. lacinatus*). The shrubs, all less than 20 feet in height, are found growing over 70 percent of the site. False lily of the valley (*Mianthemum dilitatum*) covers much of the ground. Mosses are found on much of the woody vegetation as well as the ground.

From visual observations and examination of aerial photos, vegetation over 20 feet in height is found to constitute, at most, 30 percent of the forested wetland. Some of this tall woody vegetation is scattered throughout the site and some is found in distinct areas. While the areas covered in trees are scattered, they are cumulatively large enough to be considered an individual class. Although there are individual trees and small clusters that exceed 50 feet in height, none of the communities meet the definition of a mature forested wetland. In the areas identified as forested, the cover of evergreen or deciduous trees, and the cover of trees greater than 50 feet in height are both less than 50 percent.

This wetland area was rated according to the WDOE wetland rating system resulting in a Class III wetland rating. This depressional wetland scored highest for the Water Quality function, secondly the Habitat function, and lastly the Hydrologic function. Since the site is bordered by agricultural fields on two sides, it has the opportunity to improve water quality, and because of the persistent ungrazed vegetation and organic soil found on the site, the wetland also has the potential to improve water quality. The potential to reduce flooding and erosion is low because there is no obvious natural outlet with the only outlet being a manmade ditch. The terrain is very flat and water is not ponded to any great extent. Habitat is degraded by the lack of vegetated buffers, and undisturbed, unbroken vegetated corridors to other wetlands; but does possess special features such as large downed woody debris, standing snags, and growth of non-native plants below the threshold.

4.2 WATER AND SEDIMENT QUALITY

Big Spring Creek begins at the spring just east of 244th Ave SE and is in a more natural stream bed only until it reaches the road. From there it is in manmade ditches flowing south to the intersection of SE 424th Street and 244th Ave SE; across in a diagonal culvert under the intersection, continues in manmade ditches on the south side of SE 424th Street, then southward along the west portion of wet pasture land. Aerial photos from 1936 (King County, 2011), the earliest available, indicate the roads in the area already in place and Big Spring Creek flowing in its current alignment. There is no visible evidence in the 1936 aerial photo (Figure 4) of the original stream bed. Water quantity in the ditches and the lower segment of Big Spring Creek would greatly diminish once water is diverted into the new stream bed.

Figure 4. Project vicinity, 1936 aerial photo (map courtesy of King County imap)..

4.2.1 TEMPERATURE

Big Spring Creek is typically in the range of 9 to 13.5ºC in the late summer and is considered to be properly functioning for a salmonids stream.

4.2.2 SEDIMENT

Much of the basin of Big Spring Creek is vegetated pasture, forest, or rural homes therefore fluctuations in sediments are not expected. Disturbance from construction would be short-term and temporary. There could be a pulse of sedimentation following diversion of the stream into the restored streambed, resulting in short term turbidity

increases as the streambed adjusts to the new flow, and localized shifting of sediments would continue sporadically as the new stream recovers and adjusts.

4.2.3 CHEMICAL CONTAMINATION/NUTRIENTS

Much of the basin of Big Spring Creek is in agricultural use, raising the risk of nutrient and chemical contamination. Big Spring Creek is a tributary to Newaukum Creek, which has similar agricultural land use. Water chemistry measurements in Newaukum Creek continue to demonstrate that the stream does not meet state water quality standards on at least one occasion for the following parameters: fecal coliform, dissolved oxygen, and total phosphates (WDOE, 2008). In Feist et al., runoff of vehicle deposits on roads is one of the sources of toxics that kill returning salmon (Fiest, *et al.*, 2011). Similar water chemistry is anticipated in Big Spring Creek, so this reach is functioning at risk.

5.0 SENSITIVE, THREATENED AND ENDANGERED SPECIES THAT MAY OCCUR IN THE ACTION AREA, AND EFFECTS OF ACTION

Endangered Species coordination with the US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) for the Green-Duwamish PEIS was completed in 2001. The USFWS and NMFS Northwest Region web sites[2] were consulted in November 2011 to determine which species under their respective jurisdictions could occur in the project area. Currently, fifteen species with status under the ESA, as amended, potentially occur in the project vicinity or at least in King County, nine of which are listed as either threatened or endangered. Since 2001, Puget Sound steelhead has been added as a threatened species; critical habitat has been added for three species; and four species were added as candidate. In 2009, King County updated endangered species coordination for those species under the jurisdiction of NMFS (letter dated January 13, 2009) as part of their permitting efforts for the proposed project. The following sections briefly summarize relevant life history information on the listed and other species, synthesize current knowledge on the presence and utilization of the project and action areas by these species, and then evaluate how the proposed project may affect the species and critical habitat, concluding with a determination of effect for listed species.

No bald or golden eagles have been observed in the project area. WDFW had a previous record of a bald eagle nest in a black cottonwood tree adjacent to Newaukum Creek about half a mile west of the proposed project. The nest was observed in 2000; when the site was checked in 2001 and 2005, no eagles were present. It is unknown if they have renested elsewhere nearby (Vanderhoof, 2010). An active red-tailed hawk nest is in the northwest corner of Area II. The proposed stream alignment will be beyond the 660 ft buffer required by King County Critical Area Ordinance.

[2] *http://www.fws.gov/wafwo/speciesmap.html* and *http://www.nwr.noaa.gov/species-lists.cfm* respectively.

Table 1. Protected species potentially occurring in the project area.

SPECIES	LISTING STATUS	CRITICAL HABITAT
Bull Trout, Coastal/Puget Sound DPS (*Salvelinus confluentus*)	Threatened	Designated (2010) – not in project area
Chinook Salmon, Puget Sound/Strait of Georgia DPS (*Oncorhynchus tshawytscha*)	Threatened	Designated (2005)
Steelhead, Puget Sound DPS (*O. mykiss*)	Threatened (2007)	-
Canada lynx (*Lynx canadensis*)	Threatened	Designated (2009) – not in project area
Gray wolf (*Canis lupus*)	Endangered	-
Grizzly bear (*Ursus arctos horribilis*)	Threatened	-
Marbled murrelet (*Brachyramphus marmoratus)*	Threatened	Designated – not in project area
Northern spotted owl (*Strix occidentalis caurina)*	Threatened	Designated – not in project area
Golden paintbrush (*Castilleja levisecta*)	Threatened	-
Coho salmon, Puget Sound/Strait of Georgia DPS (*O. kisutch*)	Species of Concern (2004)	-

5.1 BULL TROUT (*SALVELINUS CONFLUENTUS*)—COASTAL/PUGET SOUND DPS

The Coastal/Puget Sound bull trout (*Salvelinus confluentus*) distinct population segment (DPS) was listed in October 1998 as a threatened species (USFWS, 1998). Bull trout populations have declined throughout much of the species' range; some local populations are extinct, and many other stocks are isolated and may be at risk (Rieman & McIntyre, 1993). Combinations of factors including habitat degradation, expansion of exotic species, and exploitation have contributed to the decline and fragmentation of indigenous bull trout populations.

Although both resident and migratory forms of bull trout are present in the Coastal/ Puget Sound bull trout DPS, it is the only known segment of bull trout in the United States that includes the anadromous life history form (spawns in freshwater, migrates to saltwater and returns to freshwater to spawn). Technically, Coastal/Puget Sound bull trout are "amphidromous"-- unlike strict anadromy, amphidromous individuals often return seasonally to freshwater as sub-adults, sometimes for multiple years, before returning to their natal tributary to spawn.

5.1.1 CRITICAL HABITAT

Critical habitat for bull trout was revised effective November 2010 (USFWS, 2010c); however, designated habitat for this species does not occur in the project area. The closest designated habitat is the Green River, approximately 5 miles downstream of Big Spring Creek.

5.1.2 Utilization of the Action Area

Previous coordination work King County has done for the Newaukum Creek watershed has indicated that there have been no reported observations of bull trout in the watershed. Bull trout have been caught downstream at the confluence of Newaukum Creek and the Green River and in Green River itself. Trap data from Mid-Puget Sound Fisheries Enhancement Group (MPSF) does not show captures of bull trout in their trap on the lower reach of Big Spring Creek (Mid-Puget Sound Fisheries Enhancement Group, 2011).

5.1.3 Effects of the Proposed Action

Restoration of Big Spring Creek is expected to improve habitat for salmonids, although bull trout have not been captured in Newaukum Creek so it is unknown if bull trout would migrate there in the future. Decreasing the direct impacts of road run-off into Big Spring Creek should improve water quality, which indirectly will improve fisheries habitat.

5.1.4 Effects Determination

Because bull trout are not known to be in Big Spring or Newaukum Creeks, restoration of Big Spring Creek would have **no effect** on this species or their designated critical habitat. Indirectly, the cumulative impacts of improved water quality could improve conditions downstream in the designated critical habitat.

5.2 Chinook Salmon (*Oncorhynchus tshawytscha*) – Puget Sound/Strait of Georgia ESU

The Puget Sound Chinook salmon (*Onchorhynchus tshawytscha*) evolutionarily significant unit (ESU) was listed in March 1999 (NMFS, 1999), and reaffirmed in June 2005 as a threatened species. Combinations of factors including habitat degradation and exploitation have contributed to the decline and fragmentation of the Puget Sound Chinook salmon ESU (Good, Waples, & Adams, 2005).

Although some Puget Sound Chinook apparently spend their entire life within Puget Sound, most migrate to the ocean and north along the Canadian coast. The migratory pattern of Puget Sound origin Chinook along the coast, rather than the open ocean, makes them particularly vulnerable to recreational and commercial fishing. Fisheries catch data indicate that most Puget Sound Chinook are caught in the Strait of Juan de Fuca, Strait of Georgia, Puget Sound, and off of the west coast of Vancouver Island. Less than one percent was caught to the south of Cape Flattery, off of the west coast of Washington and Oregon (NMFS, 2005a).

The patterns for rearing and outmigration within the life history cycle of Chinook salmon vary widely, and scientists have identified four patterns just for juvenile Chinook. Juvenile Chinook salmon may move out of the freshwater area from their river of birth within 1 to 10 days after emerging from the streambed gravel, and spend many months rearing in the Puget Sound estuary, or they may reside in freshwater for a full year, spending relatively little time in the estuary area before migrating to sea.

5.2.1 CRITICAL HABITAT

Critical habitat for the Puget Sound population was designated in September 2005 (NMFS, 2005b) including inland freshwater streams. Although Big Spring Creek specifically is not included as part of the critical habitat, Newaukum Creek at the southern (downstream) end of the project area is included.

Of the six critical habitat PCEs for Chinook, the proposed project could potentially affect the following three:

(1) *Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development*. Big Spring Creek, in its existing alignment is not known to be a successful spawning site for Chinook (Mid-Puget Sound Fisheries Enhancement Group, 2011). Short-term effects to Newaukum Creek from excess turbidity is expected when the plug is removed to connect the new stream alignment to Newaukum Creek and as the new Big Springs Creek streambed adjusts to the new flow. Effects of turbidity to spawning grounds and larval fish will be lessened by maintaining the in-water work window of the August 1st through 31st.

(2) *Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks*. The new alignment of Big Springs Creek includes large wood as structure, mainly in Area I, and will be planted with trees and shrubs to shade the new streambed. In Area II, the new alignment will avoid existing larger trees and will be planted with additional riparian plants to improve the habitat.

(3) *Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival*. The proposed project includes fish passable culverts to connect Areas I and II, and to connect with the headwaters east of 244th Ave SE. Large wood will be placed to provide structure to the new stream alignment.

The other three PCEs address estuarine, nearshore, and marine environments, and the proposed project will have no effect on those as they do not occur in the project action area.

5.2.2 (EFFECTS DETERMINATION

Puget Sound Chinook salmon are present seasonally in Newaukum Creek but are not documented as being present in Big Spring Creek (Mid-Puget Sound Fisheries Enhancement Group, 2011). With restoration of the creek to more natural conditions, Chinook may utilize the stream once again. There could be a pulse of sedimentation following diversion of the stream into the restored streambed, resulting in short term turbidity increases as the streambed adjusts to the new flow, and localized shifting of sediments would continue sporadically as the new stream recovers and adjusts. In the letter dated January 13, 2009, the NMFS concurred that the proposed project **may affect,**

but is not likely to adversely affect Chinook salmon in Newaukum Creek. The proposed action **is not**] **likely to adversely affect** designated critical habitat for Chinook salmon based on analysis of the PCEs.

5.3 STEELHEAD (*ONCORHYNCHUS MYKISS*) – PUGET SOUND POPULATION

The Puget Sound DPS of steelhead (*Oncohrynchus mykiss*) was listed as a threatened species in May 2007 (NMFS, 2007). The DPS includes all naturally spawned anadromous winter-run and summer-run steelhead populations, in streams in the river basins of the Strait of Juan de Fuca, Puget Sound, and Hood Canal, Washington, bounded to the west by the Elwha River (inclusive) and to the north by the Nooksack River and Dakota Creek (inclusive), as well as the Green River natural and Hamma Hamma winter-run steelhead hatchery stocks. Critical habitat has not been designated for this species to date.

5.3.1 UTILIZATION OF THE ACTION AREA

Puget Sound steelhead may be present year-round at low numbers in the action area with all life history stages expected, including eggs, fry, smolts, and adults. MPSF has captured steelhead smolts in their lower Big Spring Creek in 2003-2010, numbering approximately 30 per trapping season (Mid-Puget Sound Fisheries Enhancement Group, 2011).

5.3.2 EFFECTS OF THE PROPOSED ACTION

The new stream channel will provide additional habitat for various life history stages of salmonids present in the watershed. The project addresses limiting factors identified in the Salmon and Steelhead Habitat Limited Factors Report for the Green-Duwamish Basin (King County, 2000) and will likely provide continued benefits to all salmonids species. There could be a pulse of sedimentation following diversion of the stream into the new streambed, resulting in short term turbidity increases as the streambed adjusts to the new flow, and localized shifting of sediments would continue sporadically as the new stream recovers and adjusts.

5.3.3 EFFECTS DETERMINATION

As low numbers of steelhead inhabit the Big Spring Creek project area, and the project will improve habitat, this project **may affect, but is not likely to adversely affect** Puget Sound steelhead. In their letter dated January 13, 2009, the NMFS concurred with this determination.

5.4 CANADA LYNX (*LYNX CANADENSIS*)

The Canada lynx, contiguous U.S. Distinct Population Segment, was listed as a threatened species in March 2000 (USFWS, 2000). The lynx is a medium-sized cat with long legs, large well-furred paws, long tufts on the ears, and a short black-tipped tail. The winter pelage of the lynx is dense and has a grizzled appearance with grayish-brown mixed with buff or pale brown fur on the back, and grayish-white or buff-white fur on the belly, legs and feet. Summer pelage of the lynx is more reddish to gray-brown. The lynx's long legs and large feet make it highly adapted for hunting in deep snow. The distribution of lynx in North America is closely associated with the distribution of North

American boreal forest. The range of lynx populations extends south from the classic boreal forest zone into the subalpine forest of the western United States, and the boreal/hardwood forest ecotone in the eastern United States. Forests with boreal features extend south into the contiguous United States along the North Cascade and Rocky Mountain Ranges in the west, the western Great Lakes Region, and northern Maine. Within these general forest types, lynx are most likely to persist in areas that receive deep snow and have high-density populations of snowshoe hares, the principal prey of lynx (USFWS, 2009c).

5.4.1 Critical Habitat

In 2009 critical habitat was designated for this species (USFWS, 2009c). In Washington State, the 4,000 ft elevation contour was used to delineate the critical habitat boundary because the features essential to the conservation of lynx, the majority of lynx records, the evidence of reproduction, and the boreal forest types are found above the 4,000 ft contour line (USFWS, 2009c).

5.4.2 Effects Determination

Because the listed threatened Canada lynx has a preference for boreal forests, they are not expected to be found in the action area. The preferred habitat is above 4,000 ft elevation and the project area is approximately 630 ft elevation. The closest designated critical habitat is in north central Washington. Therefore the proposed project would have **no effect** to the Canada lynx or its designated critical habitat.

5.5 Gray Wolf (*Canis lupus*)

Gray wolves were listed as an endangered species in March 1967 (USFWS, 1967). In 2009 the Northern Rocky Mountain Population was listed as a Distinct Population Segment (USFWS, 2009b). The wolf population in eastern Washington was delisted; however, that delisting does not include King County (USFWS, 2011b). Critical habitat has been designated for this species only in the states of Michigan and Minnesota. Gray wolves are not expected to be found in the project area; however, if they occurred at all; the likelihood of that is considered discountable.

5.5.1 Effects Determination

Gray wolves have not been sighted in the lower elevations of the Puget Trough geographic region. The project would not affect habitat of gray wolves nor would it affect prey species populations. For these reasons, this project would have **no effect** on the gray wolf or its designated critical habitat.

5.6 Grizzly Bear (*Ursus arctos horribilis*)

In 1975, the USFWS listed the grizzly as a threatened species in the Lower 48 States under the ESA, as amended (USFWS, 1975). Remnant population remains in the North Cascades Ecosystem. Grizzly bears are generally larger and more heavily built than other bears. They can be distinguished from black bears, which also occur in the lower 48 States, by longer, curved claws, humped shoulders, and a face that appears to be concave. Guard hairs are often pale in color at the tips; hence the name "grizzly." In the lower 48

States, the average weight of grizzly bears is generally 400 to 600 pounds for males and 250 to 350 pounds for females (USFWS, 2011c).

Grizzly bears have a very large home range (50 to 500 sq mile for females, 200-500 sq miles for males), encompassing diverse forests interspersed with moist meadows and grasslands in or near mountains. In the spring, bears usually range at lower elevations and go to higher altitudes for winter hibernation.

Many of the current threats to the survival of grizzly bears are associated with degradation of habitat due to rural or recreational development, road building, energy and mineral exploration. Habitat destruction in the valley bottoms and riparian areas is particularly harmful to grizzlies because they use these linkage habitats to travel from one area to another when they are searching for food. The biggest threat to the grizzly is human-caused mortality.

5.6.1 Utilization of the Action Area

A remnant population of grizzlies, numbering less than 20 animals, is found in the North Cascades Ecosystem (USFWS, 2011c) and the project area is in the foothills of this ecosystem. Due to the large home range of the grizzly, they could potentially range into the project area; however, they are not known to be in the lower elevations of western Washington, and would be transient if they occurred at all; the likelihood of that is considered discountable.

5.6.2 Effects Determination

As grizzly bears are not known to occur in the project area, remaining in the more remote areas of the Cascade Mountains, the proposed project would have **no effect** on this species.

5.7 Marbled Murrelet (*Brachyramphus marmoratus*)

The marbled murrelet (*Brachyramphus marmoratus*) was listed as a threatened species in October 1992 (USFWS, 1992a). Primary causes of population decline include the loss of nesting habitat, and direct mortality from gillnet fisheries and oil spills.

Marbled murrelets forage in the near-shore marine environment and nest in inland old-growth coniferous forests of at least seven acres in size. Marbled murrelets nest in low-elevation forests with multi-layered canopies; they select large trees with horizontal branches of at least seven inches in diameter and heavy moss growth. April 1 through September 15 is considered nesting season; however in Washington, marbled murrelets generally nest between May 1 and August 5 (EvansMack *et al*, 2003). Adult murrelets feeding their young fly between terrestrial nest sites and ocean feeding areas primarily during the dawn and dusk hours.

Marbled murrelets spend most of their lives in the marine environment, where they forage in areas within two miles from shore. Murrelets often aggregate near localized food sources, resulting in a clumped distribution. Prey species include herring, sand lance, anchovy, osmerids, seaperch, sardines, rockfish, capelin, smelt, as well as euphausiids, mysids, and gammarid amphipods. Marbled murrelets also aggregate, loaf, preen, and exhibit wing-stretching behaviors on the water.

Although marine habitat is critical to marbled murrelet survival, USFWS' primary concern with respect to declining marbled murrelet populations is loss of terrestrial nesting habitat. In the marine environment, USFWS is primarily concerned with direct mortality from gillnets and spills of oil and other pollutants (USFWS, 2009a).

5.7.1 Critical Habitat and Utilization of the Action Area

Critical habitat was designated for the marbled murrelet effective June 1996 (USFWS, 1996). The critical habitat designation included only terrestrial nesting habitat and associated forest stands. Throughout the forested portion of the species' range, marbled murrelets typically nest in forested areas containing characteristics of older forest (USFWS, 1996). The critical habitat unit nearest to the project site is approximately 10 miles to the southeast in Mt. Baker - Snoqualmie National Forest and Mt. Rainier National Park.

The proposed project area does not contain preferred nesting habitat. Due to the foraging habits of the murrelet, the only birds expected in the project area would be transient between their nesting grounds in the mountains and their feeding grounds in Puget Sound.

5.7.2 Effects Determination

Since construction activities would have no effect on nesting habitat, and the effects of any noise disturbance during construction are expected to be minor as the birds commute between their nesting grounds and feeding grounds, the proposed project would have **no effect** to the marbled murrelet or their designated critical habitat.

5.8 Northern Spotted Owl (*Strix occidentalis caurina*)

The northern spotted owl was federally listed as a threatened species throughout its range in June 1990 (USFWS, 1990). The primary reason for this listing was the reduction and fragmentation of habitat that was projected to continue under the forest practices utilized at the time of listing. The northern spotted owl nests in tree cavities, on debris platforms, and in the old nests of other large birds. In Washington, nesting occurs between March 1 and July 31, and fledging occurs between August 1 and September 30. Dispersal of juvenile owls begins in the early fall. Usually juveniles move from their natal area to a breeding site, and occasionally adults move from one breeding site to another.

Spotted owls prey on a broad array of species, such as insects, birds, and small mammals; however, primary prey items are wood rats (*Neotoma fuscipes* and *N. cinerea*) and flying squirrels (*Glaucomys sabrinus*). Although spotted owls are nocturnal, during the day they forage opportunistically and may move short distances to change roosting position in response to changes in ambient temperature or exposure to direct sunlight.

5.8.1 Critical Habitat

Critical habitat was designated for this species in January 1992 (USFWS, 1992b), and revised in August 2008 (USFWS, 2008).

The proposed project area does not include critical habitat for northern spotted owl. The closest designated critical habitat is approximately 10 miles away to the east in Mt. Baker - Snoqualmie National Forest and Mt. Rainier National Park.

5.8.2 Utilization of the Action Area

In Washington, the northern spotted owl occurs in the old growth forested regions of the Olympic Peninsula, in the western lowlands, and in the Cascades, generally below elevations of 4200 feet. These forests types are primarily spruce/fir, mixed conifer and mixed evergreen, and the moist end of the ponderosa pine coniferous forest zones up to approximately 3,900 ft near the northern edge of the range and up to approximately 6,000 ft at the southern edge. Northern spotted owl habitat does not include lower non-forested elevations of the river valleys; therefore, no critical habitat exists on the project site. As spotted owls are dependent on forested habitat, they are not expected to occur in the project area.

5.8.3 Effects Determination

The northern spotted owl is documented to occur in the Cascades and occurs in the higher elevations of King County. As the owl is dependent on dense forests, it is not expected to occur in the lower deforested elevations of Puget Sound. Its closest designated critical habitat is approximately 10 miles to the east in the Mt. Baker – Snoqualmie National Forest and Mt. Rainier National Park. This project would not affect nesting or foraging habitat of the northern spotted owl and would not affect prey species populations. Thus, the proposed project would have **no effect** on the northern spotted owl or its designated critical habitat.

5.9 Golden Paintbrush (*Castilleja levisecta*)

The golden paintbrush was listed as a threatened species in 1997 (USFWS, 1997a). Golden paintbrush, a member of the figwort family, is described as a perennial herb approximately 12 inches in height, with soft somewhat sticky hairs, with a flower mostly hidden by the overlapping bracts. It is distinguished from other *Castilleja* species within its range by brilliant golden to yellow floral bracts. The plant tends to grow in clumps in open grasslands at elevations below 330 ft (100 m) around the periphery of the Puget Trough. Most populations occur on glacially derived soils, either gravelly glacial outwash or clayey glacio-lacustrine sediments. Historically, periodic fires in the Puget Trough were instrumental in maintaining native grassland habitat by limiting successional encroachment of trees and shrubs. The species once occurred from Oregon to Vancouver Island in British Columbia, Canada. Ten populations of this plant now exist in open grasslands ranging from south of Olympia in Thurston County, Washington, north through the Puget Trough to southwest British Columbia. Threats to the species include competition with encroaching native and non-native plant species; habitat modification through succession in the absence of fire; and grazing by large herbivores. Direct human-caused threats include conversion to agriculture, and possible damage associated with road maintenance.

5.9.1 Utilization of the Action Area

This plant is not currently known to occur in King County.

5.9.2 Effects Determination

As the southern part of the project area tends to be a wet maintained (mowed) meadow, and the northern project area has a closed canopy, remnant populations are not expected,

nor have they been found during field surveys. The proposed project will have **no effect** on the golden paintbrush.

5.10 COHO (*ONCOHRYNCHUS KISUTCH*) – PUGET SOUND/STRAIT OF GEORGIA DPS

In July 1995, NMFS determined that listing was not warranted for the Puget Sound/Strait of Georgia ESU coho salmon (*Onchorhynchus kisutch*), but it was classified as a Species of Concern in April 2004 (NMFS, 2004). Lack of basis for listing was reconfirmed in 2010 (NMFS, 2010). The ESU includes all naturally spawned populations of coho salmon from drainages of Puget Sound and Hood Canal, the eastern Olympic Peninsula (east of Salt Creek), and the Strait of Georgia from the eastern side of Vancouver Island and the British Columbia mainland (north to and including the Campbell and Powell Rivers), excluding the upper Fraser River above Hope.

Coho salmon within this ESU are abundant and, with some exceptions, run sizes and natural spawning escapements have been generally stable. However, artificial propagation of coho salmon appears to have had a substantial impact on native, natural coho salmon populations, to the point that it is difficult to identify self-sustaining, native stocks within this region. In addition, continuing loss of habitat, extremely high harvest rates, and a severe recent decline in average size of spawners indicate that there are substantial risks to whatever native production remains (Weitkamp, et al., 1995).

5.10.1 UTILIZATION OF THE ACTION AREA

The MPSF has continued to catch out-migrant coho smolts in their fish trap at the lower reach of Big Springs Creek (Table 2) during their April through June monitoring season. Most years, the trap was set up to catch down-migrant fish; however, in 2010 they also added an up-migrant trap. In both 2010 and 2011 seasons different trap construction materials were used and trap failures resulted. This was especially true in the 2011 season where the trap filled with floating aquatic vegetation. Visual observations of the stream indicate that coho are actively using Big Spring Creek, but unfortunately the quantative data does not actively reflect this (Mid-Puget Sound Fisheries Enhancement Group, 2011).

Table 2. Coho smolt trap data, from Mid-Puget Sound Fisheries Enhancement Group (2011)

Year	Coho smolts trapped
2003	2006
2004	2103
2005	569
2006	989
2010	697 (down migrant trap)
	7 (up migrant trap)
2011	12

Restoration of the creek into a more natural stream bed should improve rearing habitat for salmonids, with the expectation of increasing population numbers in the future. The new stream channel will provide improved habitat conditions over the existing conditions, with increased structure from placement of large wood and improved cover from the replanted riparian corridor. The project addresses limiting factors identified in the Salmon and Steelhead Habitat Limited Factors Report for the Green-Duwamish Basin (King County, 2000) and will likely provide continued benefits to all salmonids species.

6.0 CUMULATIVE EFFECTS

Cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). As such they include future restoration projects constructed or planned within the lower Green-Duwamish River watershed, as well as other non-Federal future activities.

Multiple restoration projects are ongoing in the Green-Duwamish basin, both associated with the Corps and the Green-Duwamish Ecosystem Restoration Project and associated with other efforts. Additional projects include invasive species removal, gravel nourishment, removal of fish barriers, culvert replacements, levee realignment, limiting livestock access to creeks, and public outreach efforts to educate the public about land use impacts. All of these efforts would result in long-term, cumulative benefits to the amount and functional value of restored habitat, improvements in the overall watershed condition, and would ultimately increase the ability of the watershed to support critical life history stages of native fish and wildlife populations. Other less beneficial activities in the watershed include ongoing levee and dam repairs and continued development and ongoing land use practices, all of which perpetuate the degraded condition of the Green River.

Negative effects of the Big Spring Creek Restoration project add to the cumulative negative effects by development and activities in the watershed. However, these negative effects are temporary and are associated only with the actual construction of the project, concentrated mainly in the channel, construction in the forested and herbaceous wetlands, and when the new stream channel is hydraulically joined to Newaukum Creek. The combination of best management practices (BMPs) reduce the cumulative, short-term (*i.e*. construction related) impacts of these projects to an insignificant level. More significantly, the long-term beneficial effects generated by the project compensate for these short-term negative effects. Thus, the proposed restoration project would have beneficial cumulative effects within the watershed and would incrementally offset adverse impacts on habitats from past, present, and future redevelopment projects along Big Spring Creek.

7.0 INTERDEPENDENT AND INTERRELATED EFFECTS

"Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent

utility apart from the action under consideration" (50 CFR 402.02). Restoration of Big Springs Creek is a component of the greater Green-Duwamish Ecosystem Restoration Project which includes multiple other ongoing associated projects and other efforts. Specifically, other projects proposed for implementation in the near future include but are not limited to: Riverview Park Side Channel Construction, Upper Russell Road Levee Realignment in Kent, Meridian Creek Outlet and Wetland Restoration in Kent, and Mill Creek Wetland Restoration in Auburn

8.0 CONCLUSIONS

Improved stream habitat should increase recruitment and survival of salmonid species including the threatened Puget Sound Chinook salmon, and Puget Sound DPS steelhead. Chinook salmon are known to exist in Newaukum Creek and could potentially recolonize the restored Big Springs Creek. As indicated in Table 3, the proposed project is expected to **not likely adversely affect** salmonids, would have **no effect** to the designated critical habitat for bull trout does as it does not exist within the project area, and would **not likely adversely affect** critical habitat for Chinook. The project would have **no effect** to Canada lynx, gray wolves, grizzly bears, marbled murrelet, spotted owls and the golden paintbrush; or their designated critical habitats.

Table 3. Determination summary table

SPECIES	SPECIES EFFECT DETERMINATION	CRITICAL HABITAT EFFECT DETERMINATION
Bull Trout	Not likely to adversely affect	No effect
Chinook Salmon, Puget Sound/Strait of Georgia DPS	Not likely to adversely affect	Not likely to adversely affect
Steelhead, Puget Sound DPS	Not likely to adversely affect	-
Canada lynx	No effect	No effect
Gray wolf	No effect	-
Grizzly bear	No effect	-
Marbled murrelet	No effect	No effect
Northern spotted owl	No effect	No effect

9.0 EFH ASSESSMENT

Under the Magnuson-Stevens Fishery Conservation and Management Act, Section 305(b)(2), "Each Federal agency shall consult with the Secretary [of Commerce] with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any essential fish habitat identified under this Act." The Act further established eight regional fishery

management councils with the Pacific Fishery Management Council (PFMC) serving Washington, Oregon, Idaho, and California.

The project area has been designated as Essential Fish Habitat (EFH) for various life stages of two species of Pacific salmon, the coho and Chinook. Essential Fish Habitat (EFH) for the Pacific coast salmon fishery is those waters and substrate necessary for salmon production needed to support a long-term sustainable fishery and salmon contributions to a healthy ecosystem (Table 4). Salmon EFH and potential adverse impacts to EFH has been identified by NMFS and the PFMC. Important features of freshwater EFH for salmon are: (1) adequate water quality, (2) adequate temperature, (3) adequate spawning substrate, (4) adequate summer and winter rearing habitat, and (5) adequate food source consisting of larval and adult insects (PFMC, 1999).

Table 4. Essential Fish Habitat for species found in the project vicinity

Common Name	Scientific Name	EFH
Coho salmon	*Onchorynchus kistuch*	Adults - freshwater systems, pelagic and nearshore waters on migration back to freshwater Juveniles - marine, estuarine, nearshore to pelagic, associated with all bottom types; 0-240 ft Larval Stage - gravel and shallow water in streambeds Spawning - freshwater Egg Stage - gravel and shallow water in streambeds
Chinook salmon	*O. tshawytscha*	Adults - freshwater systems, pelagic and nearshore waters on migration back to freshwater Juveniles - estuary and oceanic, associated with all bottom types; 2-240 ft Larval Stage - gravel and shallow water in streambeds Spawning - freshwater rivers Egg Stage - gravel and shallow water in streambeds

The proposed action would improve rearing habitat by removing the main flow of Big Springs Creek from roadside ditches and restoring it to a more natural stream bed. The newly constructed stream bed will be designed to have meanders, pools, backwaters, large woody debris, and connection to existing wetland pools to provide habitat for juvenile fish. In a 2009 coordination letter this project, NMFS provided the following conservation recommendation in regards to EFH:

> *Because the habitat requirements (i.e., EFH) for the MSA-managed species in the action area are similar to that of the ESA-listed species, and because conservation measures that NMFS has included as part of the proposed actions to address ESA concerns are also adequate to avoid,*

minimize, or otherwise offset potential adverse effects to designated EFH, conservation recommendations pursuant to (MSA section 305(b)(4)(A)) are not necessary. Since NMFS is not providing conservation recommendations at this time, no 30-day response is required (MSA section 305(b)(4)(B)).

The Corps has determined that freshwater EFH should improve as a result of the proposed action and no adverse impacts are expected.

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11.0 ACRONYMS AND ABBREVIATIONS

cm	centimeter
Corps	US Army Corps of Engineers
ESA	Endangered Species Act
ESU	evolutionarily significant unit
dbh	diameter breast height
in	inch(es)
MPSF	Mid-Puget Sound Fisheries Enhancement Group
NMFS	National Marine Fisheries Service

PCE	primary constituent element(s)
PFMC	Pacific Fishery Management Council
PNW	Pacific northwest
USFWS	U.S. Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife

12.0 APPENDICES

USFWS 2001 letter

NMFS 2001 letter

NMFS 2009 letter

Appendix F

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish and Wildlife Office
510 Desmond Dr. SE, Suite 102
Lacey, Washington 98503

In Reply Refer To:
01EWFW00-2012-I-0225
X Ref. 1-3-01-I-0906

JUN - 7 2012

Evan Lewis, Chief E&CR Branch
Seattle District, Corps of Engineers
ATTN: E&CR Branch (McCasland/Nguyen)
P.O. Box 3755
Seattle, Washington 98124-3755

Dear Mr. Lewis:

Subject: Big Spring Creek Restoration Project (Green-Duwamish ERP)

This cover letter and checklist is in response to your May 7, 2012, letter requesting our concurrence with your determination that the proposed action in King County, Washington, "may affect, but is not likely to adversely affect" federally listed species.

Specifically, you requested informal consultation pursuant to section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) for the federally listed species identified below (See Enclosure).

☒ Bull trout (*Salvelinus confluentus*)

The proposed action is part of the Corps of Engineer's larger Green-Duwamish Ecosystem Restoration Program. The action would improve fish passage, restore and enhance instream, wetland, and riparian habitats, and thereby provide measurable long term benefits for anadromous fish. The U.S. Fish and Wildlife Service previously consulted on this action during 2001 (X Ref. 1-3-01-I-0906). To our knowledge, except for a minor change to timing and sequence of construction, there have been no significant changes to the proposed action.

Based on the information provided in and/or with your cover letter and any additional information, we have concluded that effects of the proposed action to the above-identified federally listed resources would be insignificant and/or discountable. Therefore, for the reasons identified in the enclosures to this letter, we concur with your determination that the proposed action is "not likely to adversely affect" the above-identified federally listed resources. This letter and its enclosures constitute a complete response of the U.S. Fish and Wildlife Service to your request for informal consultation.

This concludes consultation pursuant to the regulations implementing the Endangered Species Act (50 CFR 402.13). This project should be re-analyzed if new information reveals effects of the action that may affect listed species or critical habitat in a manner, or to an extent, not considered in this consultation. The project should also be re-analyzed if the action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this consultation, and/or a new species is listed or critical habitat is designated that may be affected by this project.

Our review and concurrence with your effect determination is based on the implementation of the project as described. It is the responsibility of the Federal action agency to ensure that projects that they authorize or carry out are in compliance with the regulatory permit and/or the ESA, respectively. If a permittee or the Federal action agency deviates from the measures outlined in a permit or project description, the Federal action agency has the obligation to reinitiate consultation and comply with section 7(d).

If you have any questions about this letter or our joint responsibilities under the Endangered Species Act, please contact the consultation biologist identified below, of this office.

U.S. Fish and Wildlife Service Consultation Biologist(s):

☒ Ryan McReynolds (360/ 753-6047)

Sincerely,

Martha C. Jensen

for Ken S. Berg, Manager
Washington Fish and Wildlife Office

Enclosure
Appendix 1 Checklist (Bull Trout)

U.S. FISH AND WILDLIFE SERVICE
WASHINGTON FISH AND WILDLIFE OFFICE

BULL TROUT
ENDANGERED SPECIES ACT
SECTION 7 INFORMAL CONSULTATION CONCURRENCE RATIONALE

Project Name: Big Spring Creek Restoration Project (Green-Duwamish ERP)

COE Number: NO COE No. Identified (FWS No. 01EWFW00-2012-I-0225 & 1-3-01-I-0906)

DIRECT EFFECTS

1. Bull trout are not expected to be in the action area either because of the location of the action or because the action would occur during the recommended work window when bull trout are not anticipated to occur in the project area. Therefore, direct effects to bull trout from the proposed project would be discountable because of the following:

   ☒ The proposed action would occur during the recommended work window for the project area (June 16 to September 15), when bull trout are extremely unlikely to be present.

   ☒ Other: The action area includes portions of Big Spring Creek and Newaukum Creek; Newaukum Creek enters the Green River at approx. river mile 40.7; the action area supports anadromous fish, but Washington State Department of Fish and Wildlife has no reports of bull trout from Big Spring or Newaukum Creeks; the Green-Duwamish River does not support local bull trout populations.

INDIRECT EFFECTS

1. Bull trout occur in the action area; however, with regard to other indirect effects

   ☒ The proposed action is part of the U.S. Army Corps of Engineer's larger Green-Duwamish Ecosystem Restoration Program (ERP). The action would improve fish passage, and restore and enhance instream, wetland, and riparian habitats. The action will provide measurable long term benefits for anadromous fish, including bull trout and their prey.

Consulting Biologist: Ryan McReynolds, FWS Project Biologist — Date: June 4, 2012

Concurrence approved by: Martha C. Jensen, Federal Activities Branch Supervisor — Date: 6/7/12

Note: The rationale expressed in this informal section 7 concurrence rationale checklist represents our current understanding of the effects of some commonly permitted federal actions to bull trout. This document does not express all possible rationale for insignificant or discountable effects to bull trout. This document is subject to change at any time due to the collection of new information or the need to clarify our rationale. However, any future changes to this concurrence rationale document would not be expected to necessitate reinitiation on previously completed consultations. Please see the "reinitiation" paragraph of the cover letter for a discussion of reinitiation triggers.

From:	Randy McIntosh
To:	Mccasland, Elizabeth NWS
Subject:	Re: Big Spring Creek - ES coordination (UNCLASSIFIED)
Date:	Thursday, May 10, 2012 2:26:30 PM

Elizabeth:

NMFS prepared a Letter of Concurrence (LOC) on January 13, 2009 (NMFS Tracking No. 2008/07849) for this project in which we concurred with the COE determinations that effects of the proposed action were discountable and Not Likely to Adversely Affect PS Chinook salmon and their designated critical habitat and PS steelhead. We also concurred with your determination that the project would not adversely affect EFH for Chinook and coho salmon. Because the action has not changed significantly, our analysis of effects and our NLAA determinations remain the same as previously set forth in our January 13 LOC.

We understand that the COE is now the lead on the project. NMFS expects that all BMPs discussed in the Jan. 2009 LOC will be followed. Please let me know if any further changes occur. Thanks for contacting us regarding these changes, and good luck with the project.

Randy

Randy McIntosh
Salmon Habitat Biologist
Habitat Conservation Division
National Marine Fisheries Service
randy.mcintosh@noaa.gov
360-534-9309

On Tue, May 8, 2012 at 10:51 AM, Mccasland, Elizabeth NWS <Elizabeth.L.Mccasland@usace.army.mil> wrote:

Classification: UNCLASSIFIED
Caveats: NONE

Randy,

Thank you for calling back. As we discussed, the Big Spring Creek project is a tier off the Green/Duwamish Ecosystem Restoration Program (ROD signed in 2002). King County proposed and completed the permit process for the project in 2009. Since then, they have sought federal funds and have partnered with the Corps to complete the project design and to construct the project. Corps, Seattle District, is now the lead on the proposed project.

The project area is bounded by SE 416th Street to the north, SE 436th Street to the south, 244th Way SE to the east, and 236th Avenue SE to the west and lies in areas with two distinctly different habitat environments. The southern segment, Area I, is comprised of pasturelands dominated by reed canary-grass. The northern segment, Area II, is predominately a second-growth forest and shrubby parcel. The project would create a new stream channel, rebuild stream habitat with large woody debris and riparian plants, and install culverts under two roads to connect the new restored stream bed with the headwaters and wetlands east of 244th Avenue SE. Construction is expected start this summer and is would take approximately six months to complete.

The project now will be constructed in one season instead of phased over two seasons. Culvert opening will take place in the approved in-water work window of August 1-31. King County had proposed to let the new channel “season” over several months before admitting water, but the current proposal is to water up the channel in the same season as it is excavated.

As the project has changed lead and construction timing has changed slightly, we have reevaluated the impacts of this project on protected species under NMFS jurisdiction, including the Puget Sound Chinook salmon (Onchorhynchus tshawytscha) , Puget Sound / Strait of Georgia coho salmon (O. kisutch), and Puget Sound steelhead (O. mykiss). The Corps has determined that this project may affect, but is not likely to adversely affect Chinook salmon, steelhead, and coho salmon. The project may affect, not likely to adversely affect the critical habitat of Chinook salmon. Short-term impacts from construction-related disturbance may occur, but are not expected to be significant.

We request your concurrence with the effects determination. Attached are the previous consultation letters for your reference.

Beth McCasland
Biologist
US Army Corps of Engineers
Seattle District
206-746-3641

Classification: UNCLASSIFIED
Caveats: NONE

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

NMFS Tracking No.:
2008/07849

January 13, 2009

Ms. Diane Concannon
Ecological Services Unit and Biological Review Panel Lead
King County Department of Natural Resources and Parks
Capital Projects Section
201 South Jackson Street, Suite 600
Seattle, WA 98104-3855

RE: Endangered Species Act Section 7 Informal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Big Spring Creek Habitat Restoration Project, City of Enumclaw, King County, WA. HUC 1711001303

Dear Ms. Concannon:

This correspondence is in response to your request for consultation under the Endangered Species Act (ESA). Additionally, this letter serves to meet the requirements for consultation under the Magnuson-Stevens Fishery Conservation and Management Act (MSA Section 305(b)).

Following is our record of informal consultation for ESA review on this project for Puget Sound (PS) Chinook salmon (*Oncorhynchus tshawytscha),* Chinook critical habitat, and Puget Sound (PS) steelhead (*O. mykiss*), ESA threatened.

Endangered Species Act

The National Marine Fisheries Service (NMFS) has reviewed your December 2008 Concurrence Request Letter and Biological Evaluation (BE) for the Big Spring Creek Habitat Restoration Project received on December 4, 2008. King County proposes to issue a COE permit, under authority of §404 of the Clean Water Act, for habitat restoration in Big Spring Creek. This consultation is conducted under section 7(a)(2) of the ESA, and its implementing regulations, 50 CFR Part 402.

The proposed project area is located on the Enumclaw Plateau northwest of the City of Enumclaw in King County, Section 15 of Township 20N, Range 06E. Big Spring Creek is a tributary of Newaukum Creek in the Green River basin, HUC 1711001303. The action area is riverine and wetland habitats of Big Spring Creek within the described project area to its confluence with Newaukum Creek and downstream 300 ft.

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Initial ESA consultation was conducted in 2001 for a suite of 50 projects planned over a period of ten years as part of the Green Duwamish Ecosystem Restoration Program. NMFS concurred that this project was *"not likely to adversely affect"* Puget Sound Chinook salmon in an April10, 2001 letter (NMFS Tracking No. WSB-00-423). We are revisiting that concurrence for this specific project, and since that time, Puget Sound Chinook salmon critical habitat was designated in 2006 and PS steelhead were listed as ESA threatened in 2007.

The project will construct 2,800 feet of new stream channel and a series of off-channel ponds and wetlands. The new stream channel will meander several hundred feet east of the existing straightened channel through a wetland which has been degraded due to past poor agricultural and land use practices. Additionally, 280 pieces of large wood will be placed, 1.7 acres of off-channel rearing habitat will be created, and 65.4 acres of wetland and riparian habitat will be enhanced and revegetated. Most work will be completed in the dry, with flow from Big Spring Creek diverted into the new channel after a "seasoning-in" period of from one to two years after construction.

Additional project detail can be found in the 2008 Biological Evaluation. To minimize potential negative effects on steelhead, all appropriate BMPs as noted in the BE shall be followed, including:

1) Apply standard BMPs to prevent erosion and sediment from entering the water and maintain erosion control measures until vegetation has been re-established.

2) Channel excavation and habitat feature construction shall occur in the dry channel prior to inundation by river water.

3) Limit in-water work to June 16 – August 15 when aquatic species are at least risk.

4) Apply standard BMPs to prevent contaminant spills.

5) New riparian plantings will be monitored, and replanted as necessary, for a minimum of 3 years following project completion.

6) Follow all relevant technical guidance from Washington Dept. of Fish and Wildlife.

Species Determination

Puget Sound Chinook salmon
Puget Sound steelhead

Puget Sound Chinook salmon are present seasonally in Newaukum Creek but are not documented as being present in Big Spring Creek. No Chinook salmon will be in the action area during the construction window of June 16 through August 15. Following all BMPs and technical guidance will minimize potential effects to this species to the point of being discountable.

NMFS has reanalyzed the proposed action for potential effects on PS Chinook and concurs that this project *"may affect, not likely to adversely affect"* Chinook in the Green River.

Puget Sound steelhead may be present year-round at low numbers in the action area with all life history stages expected, including eggs, fry, smolts and adults. Very few steelhead currently use the creek, and it is expected that post-project conditions will be more suitable for fish use. Appropriate use of BMPs as listed above will ensure that project effects are insignificant for this species. NMFS concurs that this project *"may affect, not likely to adversely affect"* Puget Sound steelhead.

Overall, this new stream channel will provide additional habitat for various life history stages of salmonids present in the Big Spring Creek. It addresses a limiting factor identified in the Salmon and Steelhead Habitat Limiting Factors Report for the Green-Duwamish Basin (Water Resource Inventory Area 9, Kerwin 2000) and will likely provide continued benefits to all salmonid species.

Critical Habitat Determination

Puget Sound Chinook salmon

The final rule designating critical habitat for Puget Sound Chinook salmon was published on September 2, 2005 (70 FR 52630) and became effective on January 2, 2006. Newaukum Creek is designated as critical habitat for Puget Sound Chinook salmon. In the action area, the primary constituent elements (PCEs) are for freshwater migration and rearing. While there may be slight sediment disturbance to the PCEs for a year or so during construction, there would not be any adverse effects on the PCEs.

This concludes informal conference pursuant to the regulations implementing the ESA, 50 CFR 402.10. This project should be reanalyzed by King County or the COE if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this consultation. The project should also be reanalyzed if the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this consultation, and/or if a new species is listed or critical habitat for another species is designated that may be affected by this project.

Magnuson-Stevens Fishery Conservation and Management Act

Federal agencies are required, under section 305(b)(2) of the MSA and its implementing regulations (50 CFR 600 Subpart K), to consult with NOAA Fisheries regarding actions that are authorized, funded, or undertaken by that agency that may adversely affect Essential Fish Habitat (EFH). The MSA section 3 defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity". If an action would adversely affect EFH, the Federal action agency is required to provide EFH conservation recommendations (MSA section 305(b)(4)(A)).

This consultation is based, in part, on information provided by the Federal action agency and descriptions of EFH for Pacific salmon contained in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (August 1999) developed by the Pacific Fishery Management Council and approved by the Secretary of Commerce (September 27, 2000).

The proposed action and action area are described in this letter and in the BE. The action area includes habitat which has been designated as EFH for various life stages of Chinook salmon (*Oncorhynchus tshawytscha*) and coho salmon (*O. kisutch*).

EFH Conservation Recommendations: Because the habitat requirements (*i.e.*, EFH) for the MSA-managed species in the action area are similar to that of the ESA-listed species, and because the conservation measures that NMFS has included as part of the proposed actions to address ESA concerns are also adequate to avoid, minimize, or otherwise offset potential adverse effects to designated EFH, conservation recommendations pursuant to (MSA section 305(b)(4)(A)) are not necessary. Since NMFS is not providing conservation recommendations at this time, no 30-day response is required (MSA section 305(b)(4)(B)).

This concludes consultation under the MSA. If the proposed action is modified in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations, the COE will need to reinitiate EFH consultation in accordance with implementing regulations for EFH at 50 CFR 600.920(k).

The efforts of the COE and the King County to design, construct and maintain this project to minimize environmental impacts are appreciated. If you have any questions, please contact Randy McIntosh at 360-534-9309 or randy.mcintosh@noaa.gov.

Sincerely,

D. Robert Lohn
Regional Administrator

cc: Karen Walter, Muckleshoot Indian Tribe
Don Finney, King County
Amy Klein, USACOE
Larry Fisher WDFW

Appendix G

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

June 25, 2012

Beth McCasland
U.S. Army Corps of Engineers
PO Box 3755
Seattle, WA 98124

RE: U.S. Army Corps of Engineers (Corps) Reference #PL-12-08
Big Spring Creek Stream Relocation and Wetland Restoration Project, Enumclaw, King County, Washington

Dear Ms. McCasland:

Ecology has determined that the above project meets the requirements for Washington State 401 Water Quality Certification and Coastal Zone Management Act Consistency under NWP #27. Therefore, an individual 401 certification will not be required for this project.

Any changes to your project that would impact water quality should be submitted in writing to Ecology before work begins for additional review.

This letter does not exempt you from other requirements of federal, state, and local agencies.

Please contact me if you have any questions regarding this letter at (425) 649-7129 or e-mail Rebekah.Padgett@ecy.wa.gov.

Sincerely,

Rebekah R. Padgett
Federal Permit Manager
Shorelands and Environmental Assistance Program

e-cc: Patrick McGraner, Ecology
ecyrefedpermits@ecy.wa.gov

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 3755
SEATTLE, WASHINGTON 98124-3755

REPLY TO
ATTENTION OF

Environmental Resources Branch June 12, 2012

Ms. Rebecca Padgett
Washington Department of Ecology
3190 160th Ave S.E.
Bellevue, Washington 98008

Dear Ms. Padgett:

The U.S. Army Corps of Engineers, Seattle District (Corps) is proposing relocate Big Spring Creek from its current location in roadside and pasture ditches to a more natural stream alignment. The project area is northwest of Enumclaw, King County, Washington. Construction is planned to be in two phases with Phase 1 commencing in summer 2013 and continue for approximately 6 months, and Phase 2 likely commencing in summer 2014 for 6 months. King County completed the permit process in 2009 for Phase 1 of the project under a Nationwide Permit #27 (Reference No. NWS-2008-1369); however, since then the project has been expanded to include more area upstream. The Corps is requesting a 401 Water Quality Certification (WQC) and concurrence with our Washington Coastal Zone Management consistency determination for the Big Spring Creek Stream Relocation and Wetland Restoration Project (Public Notice PL-12-08). As per 33 CFR 336.1(b)(8)(ii), enclosed is documentation for the WQC request, including the following:

(1) JARPA form, with Attachments C, and D
(2) Project Plans
(3) 404(b)(1)
(4) Environmental Assessment for the Big Spring Creek project
(5) Water Quality Monitoring Plan
(6) Restoration, Maintenance and Monitoring Plan
(7) Correspondence from USFWS and NMFS

Below is a summary of compliance with the six enforceable laws:

Shoreline Management Act. – A Coastal Zone Consistency determination has been prepared as a portion of the proposed project is within the jurisdiction of the Shoreline Management Act. The Corps has determined that the *Big Spring Creek Restoration Project* is consistent to the maximum extent practicable within the enforceable policies of the Washington State Coastal Zone Management Program.

State Environmental Policy Act. – The Corps of Engineers, Seattle District is the lead federal agency for this project, and has prepared a NEPA document (Environmental Assessment). SEPA is pre-empted by federal law.

Clean Water Act. – When the Corps constructs a civil works project like this, it does not issue permits to itself as compliance with Section 404. In a parallel process, we have prepared a 404(b)(1) analysis to determine substantive compliance with section 404. The Corps of Engineers is requesting an individual water quality certification for the proposed project in compliance with Section 401 of the Clean Water Act. A NPDES permit will be obtained by the construction contractor for compliance with section 402 of the Clean Water Act.

Clean Air Act. – Impacts to air quality are addressed in the NEPA document.

Energy and Facility Site Evaluation. – Not applicable

Ocean Resource Management Act. – Not applicable

If you have any questions, please contact, Ms. Beth McCasland, 206-764-3641 or Elizabeth.l.mccasland@usace.army.mil.

Sincerely,

Evan R. Lewis
Chief, Environmental Resources Branch

Appendix H

STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

July 18, 2012

Mr. Evan Lewis
Environmental Resources Branch
Seattle District, Corps of Engineers
PO Box 3755
Seattle, Washington 98124-3755

RE: Big Spring Creek Phase II Project
Log No.: 070708-08-COE-S

Dear Mr. Evans:

Thank you for contacting our department. We have reviewed the professional archaeological survey report you provided for the proposed Big Spring Creek Phase II Stream Relocation Project King County, Washington.

We concur with your determination of No Historic Properties Affected based upon the stipulation for professional archaeological monitoring. Please provide the draft monitoring plan when available.

We also would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

These comments are based on the information available at the time of this review and on the behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act, as amended, and it's implementing regulations 36CFR800. Should additional information become available, our assessment may be revised. Thank you for the opportunity to comment on this undertaking and a copy of these comments should be included in subsequent environmental documents.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360) 586-3080
email: rob.whitlam@dahp.wa.gov

STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

March 3, 2009

Ms. Deborah J. Johnston
Environmental Resources Section
Seattle District, Corps of Engineers
PO Box 3755
Seattle, Washington 98124-3755

Re: Big Spring Creek Relocation Project
Log No.: 030209-12-COE-S
COE: NWS-2008-1369-NO

Dear Ms. Johnston:

Thank you for contacting our department. We have reviewed the materials you provided for the proposed Big Spring Creek Relocation Project near Enumclaw, King County, Washington.

We concur with your determination of No Historic Properties Affected. We concur with your proposed stipulations for professional archaeological monitoring. Please provide the monitoring report when available.

We also would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

These comments are based on the information available at the time of this review and on the behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act, as amended, and it's implementing regulations 36CFR800. Should additional information become available, our assessment may be revised. Thank you for the opportunity to comment on this undertaking and a copy of these comments should be included in subsequent environmental documents.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360) 586-3080
email: rob.whitlam@dahp.wa.gov

Appendix I

US Army Corps of Engineers®
Seattle District

30 Day Notice of Availability of Draft Environmental Assessment & Clean Water Act Analysis

Environmental & Cultural Resources Branch
P.O. Box 3755
Seattle, WA 98124-3755
ATTN: Elizabeth McCasland

Public Notice Date: May 22, 2012
Expiration Date: June 22, 2012
Reference: PM-ER-12-08

Project Name: Big Spring Creek Restoration

Interested parties are hereby notified that the U.S. Army Corps of Engineers, Seattle District (Corps) has prepared, pursuant to the National Environmental Policy Act, a draft environmental assessment (EA) for the Big Spring Creek Restoration Project. The Corps proposes to relocate Big Spring Creek away from its straightened roadside and pasture ditches and into a more natural stream channel. The relocated stream would flow into a constructed streambed that would meander through a forested and reforested wetland. This project would increase available spawning habitat for adult fish, and would enhance rearing, foraging, and refuge habitat for juvenile salmonids and resident fish in Newaukum and Big Spring Creeks by creating off-channel habitat areas, removing the stream from a source of potential water quality contamination, through provision of a riparian buffer, and by allowing access to the spring's headwaters. Documents pertaining to NEPA compliance and Clean Water Act can be found at the following website: http://www.nws.usace.army.mil/ers/doc_table.cfm under "Big Spring Creek Restoration.

AUTHORITY

Congress initially authorized the Green/Duwamish River Ecosystem Restoration Project in the 1996 Energy and Water Development Appropriations Act as part of a General Investigation study under Section 209 of Public Law (PL) 87-874, Puget Sound and Adjacent Waters. Authorization for construction of the Green/Duwamish River Ecosystem Restoration Project was authorized by Section 101(b)(26) of WRDA 2000. The Record of Decision for the Green/Duwamish River Basin Programmatic Environmental Impact Statement (PEIS) was signed in April 2002. The proposed Big Spring Creek Ecosystem Restoration Project is a separable element tiering off of the 2002 Green/Duwamish River Basin Ecosystem Restoration Project.

PURPOSE AND NEED

The goal of the project is to restore salmonid habitat complexity and process-based ecological functions by removing Big Spring Creek from the roadside ditch to its original wetland location. A more robust and higher-surviving population of Coho salmon, steelhead, and cutthroat trout can be encouraged by restoring off-channel rearing and refuge pools that are connected to Big Spring Creek, thus creating a greater complexity of habitats for juvenile fish.
The clearing of the wetland riparian buffer, grading, and livestock access to Big Spring Creek and the source wetlands has resulted in bank erosion, siltation, and degraded water quality which has ultimately affected Newaukum Creek. The road fill has disrupted hydrologic connectivity and function within the wetlands and between stream and wetland. These impacts

have also affected both the stream and anadromous salmonids. Vegetation structure and diversity is very poor, especially downstream (south) of SE 424th Street, where reed canary-grass (*Phalaris arundinacea*) dominates the landscape.

PROPOSED ACTION

The Corps evaluated four alternatives for the restoration of Big Spring Creek, three variations of alignment for the stream and the no action alternative. Under the no action alternative, Big Spring Creek would remain in its current location, flowing through roadside and pasture ditches. Although the no-action alternative does not meet authorized project objectives, it is carried forward for comparison purposes.

The preferred alternative would move Big Spring Creek from the ditched system of 244th Avenue SE and SE 424th Street, and reroute the stream into an approximate 4,600-foot constructed meandering channel from 424th Avenue SE to Newaukum Creek. Two new culverts would be installed to connect the new stream channel with the headwaters east of 244th Avenue SE and under SE 424th Street to connect the northern parcel with the southern parcel. The newly constructed channel would separate the stream from pollution sources, roads, and the adjacent dairy. Six off-channel hydrologically connected pools would be constructed to provide larval fish rearing areas. Earthen material (spoils) removed from excavating the stream channel would be utilized to create small hillocks within the southern portion of the project area (south of SE 424th Street). Large woody debris would be placed to promote stream process formation and improve in-stream habitat complexity. The large woody debris should form areas of hydraulic complexity that would create additional pools, side channels, and juvenile salmon refuge. A 200-foot wide riparian corridor buffer would be planted with native conifers and deciduous trees for additional habitat. A fence would be constructed along project boundaries to exclude livestock and encourage a riparian buffer.

The Big Spring Creek Restoration Project was originally intended to be constructed in two phases over two summers. However, due to timing constraints, the project will now be constructed in a single season. The project is still divided into two phases or areas separated by SE 424th Street and are distinctly different habitat environments. The southern segment, Area I, restoration is the southern parcel that is currently pasturelands dominated by reed canary-grass (*Phalaris arundinacea*). The northern segment, Area II, is comprised of second-growth forest and shrubby habitat. Construction of the entire project is expected to take approximately six months.

ANTICIPATED IMPACTS

The Corp's preliminary analyses of the principal effects the relocation of Big Spring Creek and restoration of adjacent forest and wetlands to the surrounding area.

The Big Spring Creek watershed, as an upper part of the greater Green River watershed supports several threatened and endangered species and their designated critical habitat as well as species that are candidates for listing. The Corp has determined that the project **may affect, but not likely to adversely affect** bull trout, Chinook salmon, steelhead, and coho salmon. The project **may affect, but not likely to adversely affect** the critical habitat of Chinook salmon. The project would have **no effect** on Canada lynx, gray wolf, grizzly bear, marbled murrelet, northern spotted owl, golden paintbrush, fisher, wolverine, Oregon spotted frog, yellow-billed cuckoo, and whitebark pine. The proposed project would have **no effect** on the critical habitat of bull trout, marbled murrelet, northern spotted owl, and Canada lynx.

The project is expected to cause temporary disruptions to nearby fish and wildlife as a result of construction activities. To lessen the potential impacts to threatened, endangered, and sensitive species, in-water work would take place during the work window of August 1 through August 31. Implementation of best management practices (BMPs), will also minimized impacts to fish and wildlife habitats.

During construction, there may be water quality impacts such as temporary and localized increase in turbidity. Implementation of BMPs would ensure such impacts are minimal and dissipate quickly. No long term effects to water quality are expected to occur.

Although the project will result in the loss of approximately 2.9 acres of pasture (1.8 acres) and forested (1.1 acres) wetlands to restore Big Spring Creek to a more natural streambed, the gain in habitat value and ecosystem function from moving the stream away from the road, meandering it through a forested wetland, and planting approximately 22.6 acres of native vegetation will exceed this loss.

Unavoidable adverse effects of the proposed project include: (1) noise disturbance to wildlife and home owners in the vicinity due to operating heavy machinery during excavation and construction of the restoration site; (2) disruption of local traffic in the project vicinity during construction; (3) excavation of approximately 1.1 acres of existing forested wetland and 1.8 acres of pasture wetlands to create the streambed; and (4) impacts to turbidity during the connection of the newly aligned stream to the upstream culverts and the downstream existing channel. Given the temporary, localized, and minor nature of these effects, the Corps has determined that the proposed restoration project would not result in significant adverse environmental impacts.

EVALUATION

The Corps has made a preliminary determination that the environmental impacts of the proposal can be adequately evaluated under the National Environmental Policy Act through preparation of an environmental assessment (EA).

The project will involve a discharge of fill material into waters of the United States. The Corps does not issue permits for its own civil works activities. Under the Corps Regulatory Program, Nationwide Permit (NWP) 27 applies to the Aquatic Habitat Restoration, Establishment, and Enhancement Activities. The Corps has concluded that the Big Spring Creek Restoration Project is functionally analogous to the restoration and enhancement of non-tidal streams and non-tidal wetlands, as the proposed project would result in a net increase in aquatic resource functions and services, as in accordance with NWP 27. The Corps will obtain a water quality certification under CWA Section 401 through the Washington Department of Ecology prior to construction.

Pursuant to the CZMA, the Corps' actions are also required to be consistent to the maximum extent practicable with the approved State Coastal Zone Management Program. Since the work is functionally analogous to work covered by NWP 27: restoration, enhancement, and establishment of tidal and non-tidal wetlands and riparian areas and the restoration and enhancement of non-tidal streams and other non-tidal open waters, provided those activities result in net increases in aquatic resource functions and services, the NWP CZMA consistency determination applies to this work and the work is in compliance with CZMA. Therefore, restoration of Big Spring Creek is consistent to the maximum extent practicable with the Washington State Coastal Zone Management Program.

In accordance with Section 7(a)(2) of the Endangered Species Act of 1973, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed or proposed threatened or endangered species and their critical habitats. A Biological Evaluation was prepared and Section 7 ESA consultation is in process of being completed. In an email dated May 10, 2012, the NMFS concurred with the finding for the three species of fish under their jurisdiction. Coordination with the USFWS is on-going and will be completed prior to finalization of the NEPA process.

PUBLIC REVIEW PROCESS

Any person who has an interest or that may be affected by the relocation of the stream and restoration of adjacent forest and wetlands may request a public hearing. The request must be submitted in writing to the District Engineer within the comment period of this notice, and must clearly set forth the following: the interest that may be affected, the manner in which the interest may be affected by this activity, and the particular reason for holding a public hearing regarding this activity.

The decision whether to conduct the project will be based on an evaluation of the probable impact on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit, which reasonably may be expected to accrue from the proposal, must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered; among these are: conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, flood plain values, land use, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership and, in general, the needs and welfare of the people.

The Corps invites submission of factual comment on the environmental impact of the proposal. Comments will also be considered in determining whether it would be in the best public interest to proceed with the proposed project. The Corps will consider all submissions received before the expiration date of this notice. The nature or scope of the proposal may be changed upon consideration of the comments received. The Corps will initiate an Environmental Impact Statement (EIS), and afford public participation opportunities attendant to an EIS, if significant effects on the quality of the human environment are identified and cannot be mitigated.

Submit comments to this office, Attn: Environmental Resources Branch, no later than to ensure consideration. In addition to sending comments via mail, comments may be e-mailed to Elizabeth.L.Mccasland@usace.army.mil. Requests for additional information should be directed to Elizabeth McCasland at 206-764-3641, or the above e-mail address.

Honorable Norman Dicks
Representative in Congress
1019 Pacific Avenue, Suite 806
Tacoma, Washington 98402-4486

Honorable Dave Reichert
Representative in Congress
2732 – 78th Avenue Southeast, Suite 202
Mercer Island, Washington 98040-2843

Honorable Jay Inslee
Representative in Congress
18560 1st Ave NE, Ste E800
Shoreline, Washington 98155-2148

Honorable Jay Inslee
House of Representatives
308 Cannon House Office Building
Washington, D.C. 20515-4701

Honorable Rick Larsen
Representative in Congress
2930 Wetmore Avenue, Suite 9E
Everett, Washington 98201-4070

Honorable Jim McDermott
House of Representatives
1107 Longworth House Office Building
Washington, D.C. 20515-0001

Honorable Adam Smith
Representative in Congress
3600 Port of Tacoma Road, Suite 106
Tacoma, Washington 98424-1040

U.S. Department of the Interior
Bureau of Indian Affairs
Puget Sound Agency
2707 Colby Avenue, Suite 1101
Everett, Washington 98201-3528

King County Water District #54
Mr. Eric Clark
922 South 219th
Des Moines, Washington 98198

A.H. Powers, Inc.
5800 – 40th Avenue West
Seattle, Washington 98199

Mrs. Joseph Pompeo
434 Southwest 186th Street
Seattle, Washington 98166-3960

Mr. Keith Fabing
4816 South Alaska Street
Seattle, Washington 98118-1851

Mr. Frederick R. Sandborg
13501 Puget Sound Boulevard
Edmonds, Washington 98026-3215

Port of Everett
Mr. Graham Anderson
Post Office Box 538
Everett, Washington 98206

Tulalip Tribes
6700 Totem Beach Road
Marysville, Washington 98270-9694

Swinomish Tribe
Swinomish Indian Senate
Chairperson
11404 Moorage Way
LaConner, Washington 98257-9450

Puyallup Tribe
3009 E Portland Ave
Tacoma, Washington 98404-4926

Dorian Tramaine
10645 Sand Point Way Northeast
Seattle, Washington 98125

Randi Redick
Washington State Department of Ecology
Post Office Box 47775
Olympia, Washington 98504-7775

Ken Bowe
Box 1727
Westport, Washington 98595

Honorable Maria Cantwell
United States Senator
915 Second Avenue, Suite 3206
Seattle, Washington 98174-1011

Honorable Maria Cantwell
United States Senate
717 Hart Senate Office Building
Washington, DC 20510

Honorable Patty Murray
United States Senator
2988 Jackson Federal Building
915 Second Avenue
Seattle, Washington 98174-1011

National Park Service
Environmental Compliance
909 – 1st Avenue
Seattle, Washington 98104-1060

U.S. Coast Guard
Aids to Navigation Branch
915 Second Avenue
Seattle, Washington 98174-1067

U.S. Department of the Interior
Bureau of Indian Affairs
Environmental Coordinator
Post Office Box 632
Toppenish, Washington 98948-0632

Marina Power and Lighting
1419 Warwick Court
Williamsburg, Virginia 23185-5777

Sales Manager
Marine Sanitation, Inc.
1900 North Northlake Way, #121
Seattle, Washington 98103-9051

J. Richard Aramburu
Jeffrey M. Eustis
Attorneys at Law
505 Madison Street, Suite 209
Seattle, Washington 98104-1138

Seaborn Pile Driving Company
9311 Southeast 36th Street, Suite 204
Mercer Island, Washington 98040-3741

South Park Marina
Mr. Guy Crow
8604 Dallas Avenue South
Seattle, Washington 98108

Vincent Morasco
300 Washington Ave
Batavia, New York 14020-2315

Nisqually Tribe
Nisqually Indian Community Council
Chairperson
4820 She Nah Num Drive Southeast
Olympia, Washington 98513-9199

Shoalwater Bay Tribe
Shoalwater Bay Tribal Council
Post Office Box 130
Tokeland, Washington 98590-0130

Umatilla Confederated Tribes
Post Office Box 638
Pendleton, Oregon 97801

Ms. Liz Greenhagen
14906 29th Avenue West
G103
Lynnwood, Washington 98087

Paul Marczin
Snohomish County Public Works
3000 Rockefeller Avenue
Everett, Washington 98201

Department of Archaeology & Historic Preservation
Allyson Brooks
Post Office Box 48343
Olympia, Washington 98504-8343

Congressman Adam Smith
2209 Pacific Ave #B
Tacoma, WA 98402-3005

Mr. Bill Sullivan
Puyallup Tribe of Indians
Environmental/Natural Resource Director
3009 E. Portland Ave

Muckleshoot Indian Tribe
Fisheries Division
39015 – 172nd Ave SE
Auburn, WA 98092-9763

Tulalip Tribes
6406 Marine Drive
Tulalip, WA 9872

Washington Department of Natural Resources
Aquatic Resources
PO Box Olympia, WA 98504-7027

Confederated Tribes of the Umatilla
46411 Timine Way
Pendleton, OR 97801-9467

Stan Walsh
Skagit River System Cooperative
PO Box 368
LaConner, WA 98257