SECTION 3 STUDY APPROACH

What is the study area and how was it determined?

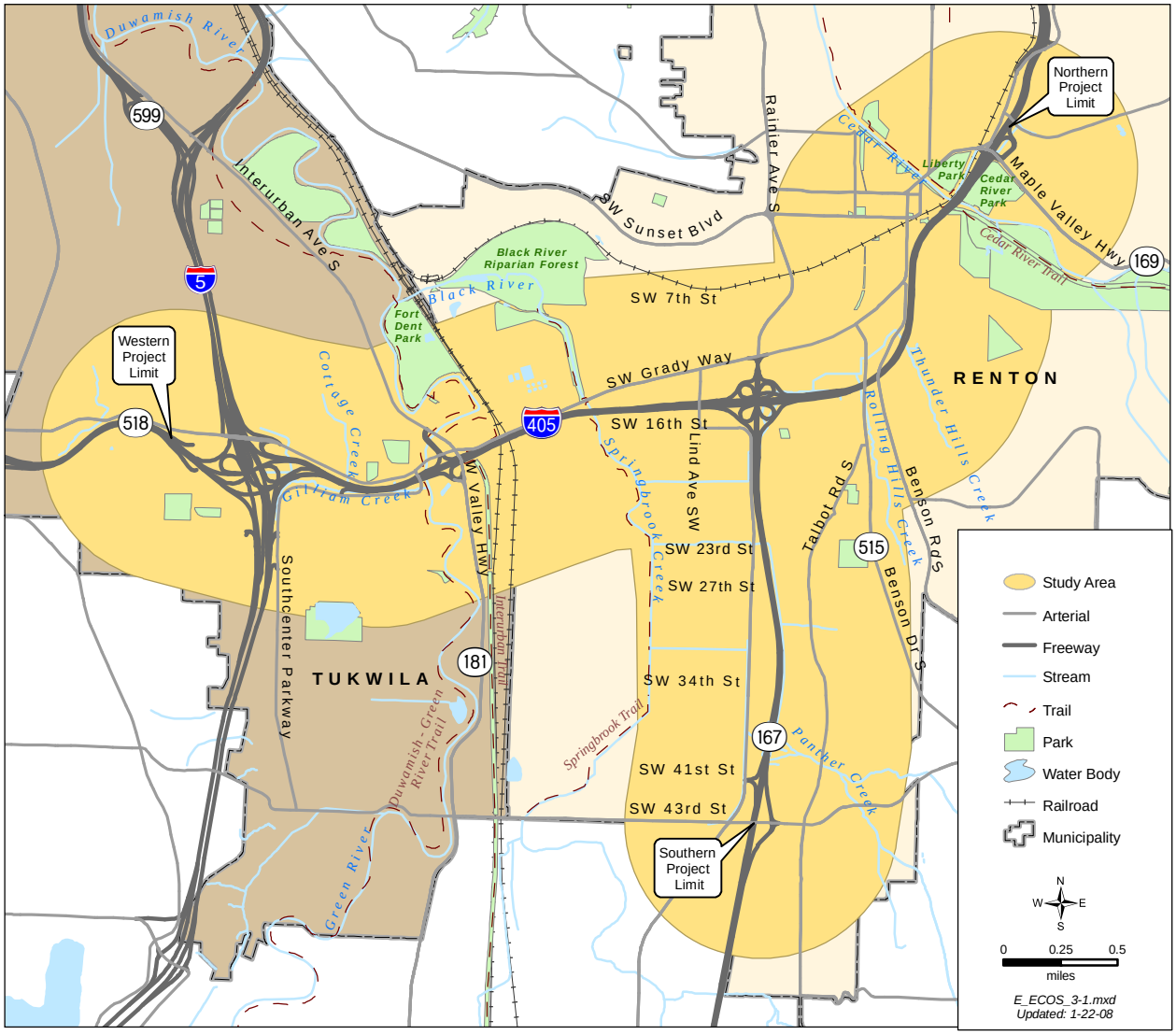
The I-405 Team identified a study area surrounding the project footprint within which aquatic resources, wetlands, and wildlife habitat were evaluated. The study area originates at the anticipated construction footprint of the Tukwila to Renton Project and includes areas where temporary or permanent effects to ecosystem elements from the project may occur. The study area baseline condition includes the built alternative detailed in the previously released *I-405 Renton Nickel Improvement Project, I-5 to SR 169, Environmental Assessment,*[1] which has already been evaluated and environmentally cleared.

For wetlands and aquatic resources, the study area is the portions of I-405, SR 167, local streets, and other WSDOT right-of-way within the project limits. The areas where road widening is proposed are shown on Exhibit 3-1.

The wildlife habitat study area differs from the study area for wetlands and aquatic resources, as the effects to wildlife habitat from the project have the potential to extend further from the project footprint than the effects to wetlands and aquatic resources. For wildlife habitat, the study area extends 0.5 mile from the I-405 and SR 167 centerlines within the project limits, as shown on Exhibit 3-1. In total, the wildlife habitat study area encompasses approximately 5,785 acres.

[1] *WSDOT, 2006a*

Exhibit 3-1: Ecosystems Study Area



What policies or regulations are related to effects on ecosystem elements?

Wetlands, aquatic resources, and wildlife habitat are protected by federal, state, and local laws because of their ecological functions and social value. The laws, regulations, and associated government agencies that govern the ecosystem elements in the study area are detailed in this section.

Wetlands

Federal, state, and local regulations govern development and other activities in or near wetlands. Four agencies have

jurisdiction over wetlands in the Tukwila to Renton Project study area:

- U.S. Army Corps of Engineers (Corps)
- Washington State Department of Ecology (Ecology)
- City of Tukwila (Tukwila)
- City of Renton (Renton)

The federal Clean Water Act (CWA) is the principal piece of legislation that regulates activities that may affect wetlands. The CWA grants both the Corps and a designated state agency (Ecology, in Washington) the authority to regulate certain activities in wetlands and other types of waterbodies. At the local (city and county) level, Washington State's Growth Management Act (GMA) requires that wetlands be protected under local zoning codes or other regulations developed specifically to manage wetlands and other environmentally critical areas.

Aquatic Resources

The main federal regulations or statutes regulating fisheries and aquatic resources in the study area are the CWA Sections 401 (water quality) and 404 (discharge of materials to waters of the U.S., including wetlands), the Endangered Species Act (ESA), the Rivers and Harbors Act (Section 10), and the Coastal Zone Management Act (CZMA). State laws that regulate these resources include the State Hydraulic Code, Water Quality Standards for Surface Waters of the State of Washington, and the Shoreline Management Act (SMA) implemented through the Revised Code of Washington (RCW) (Chapters 77.55, 90.48, and 90.58 RCW, respectively). Local critical areas ordinances (CAOs) and shoreline management plans are also in place to regulate effects to these resources. In general, these regulations protect aquatic habitats and the species, both aquatic and terrestrial, that depend on these areas.

What is the Endangered Species Act (ESA)?

An Act of Congress passed in 1973 that governs how animal and plant species whose populations are dangerously in decline or close to extinction will be protected and recovered.

Wildlife Habitat

Wildlife habitat is primarily regulated by local CAOs and shoreline management plans, with certain species receiving additional protections under state and federal statutes. For example, bald eagles (*Haliaeetus leucocephalus*) are protected by both state (Bald Eagle Protection Rules, Washington

Administrative Code [WAC] 232-12-292) and federal law (Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act). Other federally listed upland plant and animal species are also regulated under the ESA.

How did we collect information on ecosystem elements for this report?

Biologists on the I-405 Team collected existing information on ecosystems resources in the study area by reviewing available literature and previous WSDOT studies; performing internet searches; and conducting interviews with various state, county, and local agencies. The biologists collected additional information on the quantity and quality of baseline ecosystems resources by delineating wetlands, surveying streams and rivers, and identifying vegetation types and wildlife habitat in the study area. Additional general information was collected during a series of interdisciplinary team (IDT) site visits where experts from the I-405 Team in the fields of fisheries, wetlands, wildlife, water resources, road design, drainage design, and permitting reviewed the natural and manmade features located in the study area. The IDT site visits were performed in December of 2004, January of 2005, and July and August of 2006.

What is an interdisciplinary team?

An interdisciplinary team (IDT) is a team of individuals with skills from different disciplines that focus on the same task or project. IDTs provide multiple perspectives in evaluating and avoiding effects to wildlife and wetlands from construction activities.

Wetlands

The I-405 Team conducted a review of existing wetland information based on Ecology's delineation manual[2] prior to proceeding with any wetland fieldwork. We reviewed recent aerial photographs of the study area, the National Wetlands Inventory (NWI),[3] King County Natural Resource Maps,[4] Draft City of Tukwila Wetland/Watercourse Buffer Maps,[5] Renton's CAO,[6] and Washington State Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) database.[7] We obtained additional information about the

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[2] *Ecology, 1997*

[3] *U.S. Department of Interior and USFWS, 1987, 1988*

[4] *King County, 2006*

[5] *Tukwila, 2006*

[6] *Renton, 2005*

[7] *WDFW, 2006*

location of known hydric soils by using maps published by the Natural Resources Conservation Service (NRCS).[8]

The team also reviewed the WSDOT Renton Nickel Improvement Project Wetlands Discipline Report[9] and Wetlands Biology Report[10] to evaluate the wetlands delineated for that project. Since these delineations were completed between February and December 2004 and the reports were issued in February and May of 2005, the wetland delineation and functions information contained in those reports is still relevant for this project.

What is the Cowardin system?

The Cowardin system is used to characterize wetland habitats. The four freshwater wetland habitat types found in the project site are forested, scrub-shrub, emergent, and aquatic bed. The system was adopted by the USFWS for use in federal wetland databases and is recognized by state and local jurisdictions.

Wetland Classification

Wetlands were classified in the study area according to the Cowardin classification system. This system, published in 1979 by a team of U.S. Fish and Wildlife Service (USFWS) scientists led by L.M. Cowardin[11], bases the classification of wetlands on their physical characteristics, such as the general type of vegetation in the wetland (trees, shrubs, grass, etc.). Specifically, the I-405 Team assigned each wetland to one or more of the following Cowardin classes: palustrine emergent, palustrine scrub-shrub, and palustrine forested.

What is an emergent wetland?

An emergent wetland is a wetland comprised of non-woody, herbaceous plants that are rooted in shallow water or saturated soil but have foliage that extends out of the water or above the ground surface.

Wetland Ratings

At the state level, wetlands are categorized by applying the most current version of the Washington State Wetlands Rating System – Western Washington[12], and the Washington State Wetland Rating Form – Western Washington.[13] Ecology developed this system to differentiate wetlands based on their sensitivity to disturbance, their significance in the watershed, their rarity, our ability to replace them, and the beneficial functions they provide to society.

What is a scrub-shrub wetland?

A scrub-shrub wetland is a wetland dominated by woody vegetation less than 20 feet tall. The vegetation may include shrubs, young trees, and trees or shrubs that may be stunted because of environmental conditions.

The Ecology rating system requires the user to collect specific information about the wetland in a step-by-step process. Three major functions are analyzed: flood and erosion control,

What is a forested wetland?

A forested wetland is a wetland characterized by woody vegetation that is 20 feet tall or taller.

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[8] *NRCS, 1998*

[9] *WSDOT, 2005a*

[10] *WSDOT, 2005b*

[11] *Cowardin et al., 1979*

[12] *Ecology, 2004*

[13] *Ecology, 2006*

water quality improvement, and wildlife habitat. Ratings are based on a point system that assigns points to a wetland if it meets specific criteria related to its potential and opportunity to provide certain benefits.

- Category I wetlands represent a unique or rare wetland type, or are more sensitive to disturbance, or are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime.
- Category II wetlands are difficult, though not impossible, to replace, and provide high levels of some functions.
- Category III wetlands have a moderate level of function. They have been disturbed in some ways, and are often less diverse or more isolated from other natural resources in the landscape than Category II wetlands.
- Category IV wetlands have the lowest levels of functions and are often heavily disturbed.

Local jurisdictions within the study area, the cities of Renton and Tukwila, have CAOs that allow them to prioritize wetland protection.[14] Some wetlands may be rated differently under these local jurisdictions' rating system as compared to the state system. Differences between the local and state rating systems typically are the result of a different number of tiers in the local jurisdictions' rating systems. For example, Renton and Tukwila rate wetlands on a three tiered system, as opposed to Ecology's four tiered system. Therefore, a wetland may be classified as a Type 3 wetland by a local jurisdiction and a Category IV under the state system; however, they would both be rated as the lowest category of each rating system. Local jurisdictions' CAOs also establish buffers around wetlands to protect the wetlands from encroachment that could affect the wetlands' viability.

Wetland Functions

The functional values of wetlands in the study area were rated according to the most current version of Ecology's Washington State Wetlands Rating System[15] and Washington State Wetland Rating Form.[16] Using Ecology's system, wetlands were rated

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[14] *Renton, 2005; Tukwila, 2006*

[15] *Ecology, 2004*

[16] *Ecology, 2006*

based on a point system that assigns points to a wetland based upon three functional value categories: water quality, hydrologic value, and wildlife habitat. To determine an accurate assessment of a wetland's functional values, function scores were calculated based on entire wetland systems, when applicable, not just the delineated portion of wetlands within the study area. Appendix C includes wetland rating forms for all wetlands in the study area, including the rating forms previously completed for the Renton Nickel Improvement Project.

As part of Ecology's rating system, Ecology determined the hydrogeomorphic classification of wetlands. Each hydrogeomorphic wetland class has specific rating criteria for water quality and hydrologic functions. Habitat functions rating criteria are the same for each of the hydrogeomorphic wetland classes (see Appendix E for details about wetland function values).

What is a wetland hydrogeomorphic classification?

The hydrogeomorphic classification of a wetland is based on the three fundamental factors that influence how wetlands function: geomorphology, water source, and hydrodynamics. Hydrodynamics is the motion and action of water and other liquids and the study thereof. Geomorphology relates to the structure and development of the earth's physical surface.

Aquatic Resources

The I-405 Team worked with local, state, and federal permitting agencies and other resource agencies to identify baseline information on the fisheries and aquatic resources in the study area. Biologists collected additional information on fisheries and aquatic resources in the field by conducting surveys on the streams and rivers in the study area to determine the quantity and quality of existing riparian habitat. During March, April, and May of 2005, biologists surveyed and characterized the in-stream and riparian habitats of 10 streams and rivers where they crossed or flowed near the study area:

- Gilliam Creek
- An unnamed tributary to Gilliam Creek
- Cottage Creek
- The Green River
- Springbrook Creek
- Panther Creek
- Rolling Hills Creek
- An unnamed tributary to Rolling Hills Creek
- Thunder Hills Creek

What is riparian habitat?

Riparian habitat is defined as the aquatic and terrestrial habitat adjacent to streams, lakes, estuaries, or other waterways. Riparian habitat areas are also commonly referred to as stream buffers.

- The Cedar River

Biologists also performed stream surveys during June and July of 2006 on two additional streams located within the study area:

- An unnamed tributary to the Cedar River
- An unnamed tributary to Thunder Hills Creek

Biologists performed the stream surveys to measure and quantify stream characteristics such as length, width, and depth of the waterbody; the quantity and quality of in-stream habitat; the nature and type of riparian vegetation; substrate composition; the presence and size of large woody debris (LWD); and any observed fish use. The stream surveys were conducted from 300 feet upstream and 1,320 feet downstream of the construction footprint for each stream or river. The stream surveys followed specific methodologies, which are summarized in Appendix A. Additional surveys were performed to quantify and qualify large woody debris recruitment for streams in the study are. The results are summarized in Appendix F.

To assess existing fish passage conditions in the study area, the I-405 Team also examined existing culverts. Field work associated with this culvert assessment was completed in July and August of 2006. Based on the results of the fish passage barrier investigation, WSDOT has determined that 10 culverts convey waters of the state, are fish bearing, and will be affected by the project. Of these 10 culverts, WSDOT has determined that seven of them are existing fish passage barriers.[17] The remaining three culverts are presently fish passable. WSDOT will address fish passage at the culverts per the Memorandum of Agreement between WSDOT and WDFW.

Wildlife Habitat

The I-405 Team used land cover geographic information system (GIS) data received from King County, WSDOT, and from the Renton Nickel Improvement Project to identify the types and condition of upland vegetation and habitat resources within the study area.

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[17] *WSDOT, 2007a*

Using aerial photography from 2002[18], an impervious surface GIS dataset,[19] and a land cover GIS dataset,[20] the I-405 Team mapped four land cover types within the study area. The team mapped the land cover types by overlaying the impervious surface and land cover datasets on the aerial photography. The team then edited the land cover dataset based on aerial photo interpretation (at a scale of 1:1000 to 1:4000) and vegetation communities observed during reconnaissance-level surveys of the study area.

Using aerial photo interpretation and information collected from reconnaissance-level surveys, the team verified land cover types identified in the GIS datasets with actual upland vegetation communities found in the study area.

In addition, the I-405 Team collected information on wildlife habitat in the study area by reviewing plant and animal databases, including:

- Washington State Department of Natural Resources (WDNR) Natural Heritage Program (NHP), which details known records of rare plants and rare plant communities[21]
- PHS Program administered by WDFW, which details wildlife PHS information[22]

Additionally, the biologists worked with local regulators and WDFW and USFWS staff to verify the presence of sensitive upland plant and animal species in the study area.

How did we evaluate effects on ecosystem elements?

The project has the potential to affect existing wetlands, aquatic resources, and wildlife habitat. Potential effects to these resources could be either temporary or permanent.

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[18] *USGS, 2002*

[19] *King County DNR, 2004*

[20] *WSDOT, 2003*

[21] *WDNR, 2006*

[22] *WDFW, 2006*

Wetlands

The I-405 Team evaluated potential effects to wetlands using wetland information gathered in the field, coupled with an overlay of the project footprint. The I-405 Team surveyed and mapped wetlands in the study area based on the boundaries identified by team members in the field. Project engineers reviewed the wetland mapping, compared it to the project footprint, and calculated wetland loss using computer-aided design (CAD) software. In addition to calculating direct (permanent) wetland loss from the project, areas of temporary wetland loss during project construction were also calculated. Effects to wetland buffers were calculated by evaluating the project's temporary and permanent construction effects that will occur within the regulated wetland buffers. If a wetland is wholly filled, it is not considered to incur buffer effects. In addition, the team evaluated each affected wetland to determine whether the extent of the effects will alter the overall function and viability of each wetland.

Aquatic Resources

The I-405 Team evaluated the effects on aquatic resources by reviewing information gathered on aquatic resources in the study area and by assessing project design data and WSDOT construction practices. This information was then reviewed to identify potential changes to the study area's aquatic resources' size and functions during and following project construction.

What are indirect effects?

Indirect effects are effects that occur later in time or are removed in distance from the proposed action, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems.

Similar to wetlands, potential permanent and temporary effects to aquatic resources from the project were calculated by overlaying the project footprint with the streams and rivers in the study area. Using this information, the I-405 Team determined the streams and stream habitat that will likely be affected by the project. Stream habitat that may be lost or gained was also identified. In addition to permanent and temporary effects, indirect effects from the project were also evaluated, including shading from new structures and increases in stormwater flow.

Wildlife Habitat

The I-405 Team evaluated the effects of the project on wildlife habitat by comparing the project's temporary and permanent construction areas to wildlife and vegetation information collected from the WDNR NHP and WDFW PHS Program

databases, from resource agency biologists, and from reconnaissance-level field surveys. A GIS-based land cover analysis, including reconnaissance-level surveys to verify the accuracy of the GIS data, was performed to determine the extent of existing upland vegetation and impervious surface in the study area. Data from these sources were converted into a single land cover GIS map.

The team then overlaid the project footprint with the land cover GIS dataset to quantify the amount of upland vegetation and documented sensitive wildlife species that the project will affect. In addition to direct effects, the team also worked with noise and stormwater experts to determine the extent of any potential effects to wildlife species and habitat as a result of any noise or stormwater effects from the project.

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