

3.7 Vegetation, Wildlife, Fish, and Threatened and Endangered Species

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3.7.1 Studies and Coordination

This section is based on previous reports, including the *SR 509/South Access Road EIS Discipline Report: Vegetation, Wildlife, and Fisheries* (CH2M HILL March 2000), the *SR 509/South Access Road EIS Discipline Report: South Airport Link* (CH2M HILL August 2001), the *SR 509/South Access Road EIS: I-5 Improvements Report* (CH2M HILL October 2001). These reports are included in this FEIS by reference.

To identify and evaluate vegetation, wildlife, fish, and associated habitats within the project area, information was gathered from a variety of sources. USFWS, NMFS, and the WDFW were contacted to provide information on federal and state threatened, endangered, proposed, and candidate species that may occur in or near the project area. The Washington State Department of Natural Resources (WDNR) Natural Heritage Program (NHP) was consulted regarding priority habitats and sensitive plant and wildlife species that may occur in or near the project area. The King County *Sensitive Areas Map Folio* (King County 1990) and the *Catalog of Washington Streams and Salmon Utilization* (Williams et al. 1975) were reviewed for information regarding fisheries resources.

Analysis of agency information and aerial photographs along with environmental studies prepared for the proposed project allowed for development of an inventory and assessment of resources that could be affected by the proposed project. A field reconnaissance of the project area was conducted on August 24, 2001, to verify information collected on vegetation communities, wildlife, fish, and general wildlife use of the project area. Habitats within approximately 500 feet of the proposed build alternatives were assessed. Wetlands within the project area are identified and documented in Section 3.6, *Wetlands*.

In accordance with Section 7 of the Endangered Species Act (ESA), a Biological Assessment (BA) was prepared to provide a detailed evaluation for all listed, proposed, and candidate species, and species of concern identified by USFWS and NMFS as potentially occurring in the project area. Consultation with USFWS and NMFS resulted in an agreement for preparation of a BA and associated Section 7 coordination on the preferred alternative (Alternative C2) (Grettenberger pers. comm. 1998, Nelson pers. comm. 2000). USFWS and NMFS concurred with the findings of the BA, and Section 7 consultation has been completed (concurrence letters are included in Appendix A of this FEIS). The threatened and endangered

species discussion in this section includes summary information from the BA prepared for the proposed project, as well as a discussion of state-listed species that are not under jurisdiction of USFWS and NMFS.

3.7.2 Affected Environment

The discussion is divided into three elements—vegetation and wildlife, fish, and threatened and endangered species. Vegetation and wildlife describes upland plant communities and potential wildlife use in the project area. Vegetation and wildlife of the project area are discussed together because of the close interaction between these two natural resources. The *Vegetation and Wildlife* section also discusses wetlands, but in the context of wildlife habitat. A detailed description of wetlands in the project area and an analysis of the proposed project's effects on wetlands are presented in Section 3.6, *Wetlands*. The *Fish* section discusses the freshwater habitat and potential fish use of the project area. The *Threatened and Endangered Species* section discusses listed threatened and endangered wildlife, fish, and plant species that are regulated under the ESA.

Vegetation and Wildlife

Vegetation communities within the project area consist of mowed and unmowed grassland areas; shrubland; mixed deciduous/coniferous forest; commercial and residential areas containing a fragmented mixture of native, nonnative, and ornamental plant species; and wetlands.

The project area is located within a densely populated urban area of western King County that is dominated by commercial and residential development. As a result, the majority of vegetation communities located within the project area are fragmented and associated with roads or located between residential and commercial development. The Tyee Valley Golf Course, Sea-Tac Airport, and facilities associated with the airport, are the significant features in the northern portion of the project area. The I-5 improvements, which account for 6.7 miles of the project length, are the significant feature in the southern portion of the project area.

Grassland areas are common throughout the project area. Portions of the project area that are dominated by grassland habitat include the Tyee Valley Golf Course and habitat adjacent to I-5. Plant species within the grassland habitat include a variety of native and nonnative grasses and herbaceous species that are common within King County. Grassland areas associated with the Tyee Valley Golf Course are fairways that are frequently mowed. Grassland habitat adjacent to I-5 generally consists of a mosaic of mowed and unmowed grassland areas interspersed with parcels of shrubland, mixed deciduous/coniferous forest, and wetlands. Various combinations of native and nonnative tree and shrub species occur adjacent to I-5. The majority of

these vegetation communities are located within 100- to 200-foot-wide tracts of land between the roadway and residential and commercial development.

Fragmented stands of mixed deciduous/coniferous forest are also located in several areas in the northern portion of the project area, including south of South 192nd Street and the Des Moines Creek Park area. Mixed deciduous/coniferous forest habitat is dominated by an assemblage of species typical of Puget Sound lowland forests. Nonnative, invasive species such as English ivy (*Hedera helix*), Scot's broom (*Cytisus scoparius*), and Himalayan blackberry (*Rubus procerus*) are frequent components of the shrub and forested habitats. Forested habitat in the project area is typically relatively young, second growth forest. No stands of old growth forest habitat are located within the project area.

Commercial and residential areas often include a combination of mowed grasses and a fragmented mixture of native, nonnative, and ornamental trees and shrubs. Most of the habitat associated with residential and commercial development is located south of Tye Valley Golf Course and north of the project area associated with the I-5 corridor.

The South Airport Link design options H0, H2-A, and H2-B are located in the northeast portion of the project area, in a densely populated urban area dominated by residential and commercial development. The dominant features of this portion of the project area are buildings, parking lots, and paved roads, primarily associated with Sea-Tac Airport facilities.

Riparian habitat within the project area is limited to areas associated with Des Moines Creek. South of South 200th Street the riparian habitat of Des Moines Creek includes high quality shrub and forested habitat within Des Moines Creek Park. North of South 200th Street, the riparian habitat of Des Moines Creek is dominated by fairways with mowed grasses within the Tye Valley Golf Course. Tree canopy and bank vegetation are largely absent in this area. Des Moines Creek also flows through several ponds in the Tye Valley Golf Course that function as wetland habitat.

Several wetland communities were identified along the alignments of the build alternatives. These wetlands are all palustrine systems and include open water, emergent, scrub-shrub, and forested wetland systems. A detailed discussion of these wetlands is presented in Section 3.6, *Wetlands*.

The mosaic of vegetation communities within the project area provides habitat for a variety of terrestrial and aquatic wildlife. Wildlife diversity is generally related to the structure and composition of plant species within vegetative communities. Wetlands and forested areas with well-developed shrub layers are likely to support the greatest number of species and populations of wildlife (Brown 1985). Wildlife habitats in the project area range in quality from low in commercial and residential areas, to high in the

wetland habitat and forested riparian habitat associated with Des Moines Creek Park.

A moderate variety of native birds, mammals, reptiles, and amphibians are expected to inhabit shrubland, forested, and wetland habitats in the project area.

Areas of mixed deciduous/coniferous forest in the northern portion of the project area provide valuable habitat for native wildlife species. These areas are likely to provide breeding habitat for edge species, interior-dependent wildlife species, and migrant songbirds.

Ponds located in the Tye Valley Golf Course, other wetlands in the project area, and riparian areas associated with Des Moines Creek provide habitat for a variety of amphibians, reptiles, mammals, and birds that depend on water for foraging and breeding habitat. Open-water sections of the ponds and wetlands in the project area are also expected to provide habitat for wintering and migratory waterfowl.

Urbanized areas near Sea-Tac Airport, SR 99, and I-5, and along roadways with adjacent businesses and residences offer the least valuable wildlife habitat in the project area because of their fragmented and disturbed nature. The relatively narrow habitats and the proximity between areas with high levels of human activity limits the value of available wildlife habitat to species that are not sensitive to human disturbance. Additionally, wildlife species that typically prefer interior forest habitat or require large areas of unbroken habitat to forage and reproduce are unlikely to regularly occur in these portions of the project area. These areas likely support an assemblage of native wildlife species typically found in western Washington and King County that have adapted to disturbance associated with populated urban areas, as well as nonnative wildlife species. No evidence of rare, uncommon, or unique wildlife or wildlife habitat is apparent within the project area (Guggenmos pers. comm. 2001, Moody pers. comm. 2001).

Fish

The project area is located within the Lower Duwamish River Basin (Water Resource Inventory Area [WRIA] 9). Freshwater and marine resources that support fisheries and other aquatic biota within WRIA 9 include Puget Sound, Duwamish River, Green River, and a variety of streams, tributaries, and lakes. The proposed project passes through five stream basins (Des Moines Creek, Miller Creek, Lower Green River, Lower Puget Sound, and Mill Creek). Basin boundaries and stream locations are shown in Figure 3.5-1.

Des Moines Creek is the only fish-bearing aquatic resource that would be crossed by the proposed project. No additional aquatic resources with

potential fish habitat are located within 0.2 mile of the project build alternatives. Aquatic resources located more than 0.2 mile from the proposed project would not be directly affected by construction activities, but could be affected by stormwater runoff.

Des Moines Creek Basin

Des Moines Creek is the main drainage course in the Des Moines Creek Basin. Originating from Bow Lake north of South 192nd Street, Des Moines Creek generally flows south to southwest and eventually empties into Puget Sound near South 222nd Street.

A Catalog of Washington Streams for the Puget Sound Region (Williams, et al. 1975) lists coho salmon and possibly chum salmon as the primary salmonid species using Des Moines Creek. WDFW considers cutthroat to be the dominant trout species in Des Moines Creek, although steelhead and rainbow trout have also been observed (Parametrix 1994, Phillips pers. comm. 1998). The WDFW Priority Habitat and Species (PHS) data system identifies the reach of Des Moines Creek from Puget Sound to RM 1.0, as providing an anadromous fish presence and priority anadromous/resident fish presence (Guggenmos pers. comm. 2001). King County and WDFW have not detected spawning activity upstream of RM 1.0 (Masters pers. comm. 1999, Phillips pers. comm. 1998, Schnieder pers. comm. 1999).

WSDOT and King County identify the box culvert at Marine View Drive, at approximately RM 0.4, as a fish barrier that “appears to limit all anadromous fish passage” (King County 1997). Replacement of the box culvert with a bridge is a project identified in the Des Moines Creek Basin Plan, and is scheduled to be completed prior to completion of the SR 509 project. Therefore, anadromous fish use in Des Moines Creek is assumed to extend up to RM 1.0 in this FEIS.

From Puget Sound to South 200th Street (RM 2.1), Des Moines Creek flows in a natural channel through forested habitat that provides nearly unbroken shade cover. Portions of this reach contain good spawning habitat; however, rearing habitat is limited (Johnson 1989, Shapiro 1999). Upstream of South 200th Street the creek contains little or no salmon spawning or rearing habitat. In this reach the creek flows through the Tyee Valley Golf Course. The final 3,600-foot reach of the creek is culverted and channelized up to Bow Lake.

Miller Creek, Lower Green River, Lower Puget Sound, and Mill Creek Basins

Natural resource information identifies the location of the nearest fish bearing streams in these basins with fish use by resident or anadromous fish as more than 0.2 mile from the project area (Guggenmos pers. comm. 2001, King County 1990, Williams et al. 1975). Potential fish-bearing aquatic resources

located between 0.2 and 0.5 mile of the proposed project include Mill Creek (Mill Creek Basin), Star Lake (Lower Green River Basin), Steel Lake (Lower Puget Sound Basin), and Lake Dolloff (Mill Creek Basin).

Mill Creek flows to the south from the outlet at the southeast end of Lake Dolloff for about 8.4 miles before flowing into the Green River. From Lake Dolloff to about RM 4.0, Mill Creek is unclassified by King County. From RM 4.0 to its confluence with the Green River, Mill Creek is classified by King County as a Class 2 stream with salmonids (King County 1990). The WDFW PHS database identifies Mill Creek as supporting anadromous fish runs up to about RM 7.0, the location of impassable cascades (Williams et al. 1975, WDFW 2001). RM 7.0 is located more than 1.2 miles east of the project.

The *Catalog of Washington Streams and Salmon Utilization* (Williams et al. 1975) and the WDFW PHS database (WDFW 2001) identify salmon use of Mill Creek to include coho salmon up to the location of impassable cascades at about RM 7.0, which is more than 1.2 miles east of the proposed project. These sources do not identify chinook salmon in Mill Creek. Additional analysis of fish habitat and fish use within these basins is presented in the technical reports previously prepared for the proposed project (see Section 3.7.1, *Studies and Coordination*).

Threatened and Endangered Species

According to correspondence with state and federal agencies, wildlife and fish species that are listed as threatened or endangered may occur near the project area. Table 3.7-1 shows the federally listed species under the jurisdiction of USFWS or NMFS that could occur near the project area; these species were evaluated in the BA prepared for the project. Species under USFWS jurisdiction include bald eagle, marbled murrelet, and the Coastal-Puget Sound Distinct Population Segment (DPS) of bull trout (Berg pers. comm. 2001). NMFS indicated that Puget Sound chinook salmon, listed as threatened, could occur near the project area, and identifies the project area as occurring within the designated critical habitat for Puget Sound chinook salmon. NMFS also identified one candidate species for listing, coho salmon, as potentially occurring near the project area (Kirkpatrick pers. comm. 2001).

A review of the WDFW PHS data system and nongame data system revealed that no federal or state-listed sensitive, threatened, endangered, or proposed wildlife species regularly occupy, breed, or forage within 1 mile of the project area (Guggenmos pers. comm. 2001).

Table 3.7-1 USFWS and NMFS Listed Endangered, Threatened, Proposed, and Candidate Species Evaluated in the Project Biological Assessment			
Common Name	Scientific Name	Federal Status	State Status
USFWS			
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened	Threatened
Bull Trout (Coastal/Puget Sound DPS)	<i>Salvelinus confluentus</i>	Threatened	Candidate
Marbled Murrelet	<i>Brachyramphus marmoratus marmoratus</i>	Threatened	Threatened
NMFS			
Chinook Salmon (Puget Sound ESU)	<i>Oncorhynchus tshawytscha</i>	Threatened	Candidate
Chinook Salmon Critical Habitat (Puget Sound ESU)	NA	Critical Habitat	None
Coho Salmon (Puget Sound/ Straight of Georgia ESU)	<i>Oncorhynchus kisutch</i>	Candidate	None

Source: Berg pers. comm. (2001), Kirkpatrick pers. comm. (2001).

ESU = Evolutionary Significant Unit

NA = not applicable

WDFW identified four bald eagle nests and/or breeding territories located within 3 miles of the project area. None of these nests are located within 1 mile of the project area. One nest is located along the northeast corner of Angle Lake, more than 1 mile north of the project area. A second nest is located south of North Lake, more than 1 mile south of the project area. The third and fourth nests are located along the shoreline of Puget Sound, more than 2 miles west of the project area. A fifth nest is located south of Seahurst Park, more than 4 miles northwest of the project area (Guggenmos pers. comm. 2001).

Wintering populations of bald eagles use shoreline areas along Puget Sound for foraging and perch sites. Bald eagles may perch near the project area; however, quality breeding and foraging habitats typically associated with bald eagles are not located adjacent to the proposed project, and no bald eagle breeding, nesting, or winter roosting is documented within 1 mile of the project area (Guggenmos pers. comm. 2001).

Marbled murrelets occur in many areas of western Oregon and Washington, where suitable forested habitat occurs within approximately 50 miles of Puget Sound or the Pacific Ocean (Hamer et al. 1991). Potential murrelet habitat has been described as mature coniferous forest, coniferous forest with an old growth component, old growth forest, or younger coniferous forests that have deformations or structures suitable for nesting.

WDFW has not documented any marbled murrelet occupancy sites within at least 5 miles of the project area (Guggenmos pers. comm. 2001). Potentially suitable marbled murrelet nesting habitat is not located within 5 miles of the project area. Old-growth forest communities typically associated with marbled murrelet habitat are not located in western King County.

On October 29, 1999, the Coastal-Puget Sound DPS of bull trout was listed by the federal government as a threatened species because of habitat degradation, dams and diversions, and predation by nonnative fish. Freshwater and anadromous populations of bull trout have been documented in Washington. While USFWS has indicated that the species may be present in the project area, it does not provide specific habitat use information (Berg pers. comm. 2001). A 1999 distribution map by USFWS does not identify current or historic spawning areas for bull trout within 1 mile of the project area (USFWS 1999). A 1993 report on the distribution and status of bull trout and Dolly Varden in Washington does not identify any drainages within 1 mile of the project area as having populations of bull trout (Washington State Department of Wildlife [WDW] 1993). Bull trout have not been documented and are very unlikely to occur in Des Moines Creek (Schnieder pers. comm. 1999, Phillips pers. comm. 1998, Masters pers. comm. 1999).

On March 24, 1999, the Puget Sound chinook salmon Evolutionary Significant Unit (ESU) was listed by NMFS as a threatened species. Juveniles and adults of Puget Sound populations of chinook salmon migrate through Puget Sound. Adult chinook salmon returning to Puget Sound rivers to spawn typically pass through Puget Sound between July and October (NMFS 1999).

On February 16, 2000, NMFS designated critical habitat of the Puget Sound chinook salmon ESU as protected under the ESA (50 CFR Part 226). The rule was effective March 17, 2000. Critical habitat for the Puget Sound chinook salmon includes all marine, estuarine, and fresh waters that are accessible to chinook salmon.

According to NMFS, Puget Sound chinook salmon may occur in the vicinity of the proposed project. NMFS does not provide specific habitat use data. The NMFS data system identifies potential species occurrence in a project area based on the Township and Range where the project is proposed. NMFS' reference to chinook salmon is likely in regard to the Puget Sound and Green River habitat. Puget Sound chinook salmon are not documented and are unlikely to occur in Des Moines Creek (Guggenmos pers. comm. 2001, Masters pers. comm. 1999, Schnieder pers. comm. 1999). Chinook salmon are not documented to occur in Mill Creek (Williams et al. 1975, WDFW 2001).

NMFS has received petitions to list Puget Sound/Straight of Georgia coho salmon as threatened, though they are not protected under the ESA at this

time (Kirkpatrick pers. comm. 2001). Coho salmon are documented in Des Moines Creek from the outlet at Puget Sound to RM 1.0. Coho salmon are documented in Mill Creek up to the location of impassable cascades at about RM 7.0, which is more than 1.2 miles east of the project.

WDFW documented the presence of pileated woodpeckers more than 1 mile northwest of the project area (Guggenmos pers. comm. 2001). This species is currently considered a candidate for state listing as threatened or endangered. Pileated woodpeckers are typically found in dense, mature forests.

The WDFW PHS data system and the WDNR NHP were consulted regarding rare plants and priority habitats within the project area. No federal or state-listed sensitive, threatened, or endangered plant species or high quality native plant communities are located within the areas that would be directly affected by the proposed alignments (Guggenmos pers. comm. 2001, Moody pers. comm. 2001).

3.7.3 Environmental Impacts

Alternative A (No Action)

Under the No Action Alternative, impacts on vegetation and wildlife, fish, and threatened and endangered species associated with the proposed project would not occur. No impacts or construction would occur that would entail removal or alteration of existing vegetation communities, wildlife, or fish habitats within the project area.

Impacts Common to All Build Alternatives

The section below describes long-term impacts associated with construction of the proposed project. Short-term impacts associated with construction of the proposed project are described in Section 3.7.5, *Construction Activity Impacts and Mitigation*.

Vegetation and Wildlife

Potential impact area estimates are based on aerial photo analysis and preliminary engineering plans prepared for the proposed project and represent the maximum extent of clearing that would occur under each of the build alternatives. Construction elements include lane construction, intersection construction, on-ramp and off-ramp construction, access roads, bridges, laydown and equipment storage areas, and stormwater detention facilities. Actual clearing or disturbance would likely be less than the total area shown on Table 3.7-2.

Habitat Type	Alternative B	Alternative C2 (Preferred)	Alternative C3
Mixed Deciduous/Coniferous Forest	106.5	48.2	67.3
Shrubland	40.5	28.1	33.3
Grassland	37.7	30.9	24.1
Residential and Commercial Development	15.3	19.1	19.5
Wetlands	7.7	0.3	5.4
Total	207.7	126.6	149.6

Operation impacts on vegetation communities would be limited to shading associated with the bridges that would cross Wetlands A, B, and D and Des Moines Creek. (Refer to Section 3.6 for a discussion of wetland shading impacts.) Other than those communities shaded by bridges, operation of the project would not affect existing vegetation communities.

The proposed project would result in audible and visual disturbances to wildlife following construction. Species particularly sensitive to such disturbances would likely avoid the project area. Operation-related impacts on wildlife are expected to be relatively minor and related principally to ambient noise levels associated with vehicular traffic. Wildlife not tolerant of traffic disturbance would attempt to relocate to quieter areas. This avoidance behavior requires individuals to find new food sources and/or nesting areas. Such areas are usually already occupied, and the increased stress of competition for limited resources could cause displaced wildlife to perish. Other behavioral reactions include altered migration patterns and changes in individual's home ranges (Informatics 1980). Noise effects primarily would be limited to the immediate vicinity of roadways. The portion of the project associated with I-5 is an existing roadway that has been in place for several decades. Noise levels associated with vehicular traffic on I-5 following construction are expected to be consistent with current traffic noise. Noise impacts associated with operation of the SR 509 freeway extension are unlikely to be significant because it is located within a populated urban area.

Wildlife mortality from vehicles would likely increase in areas where new roads are constructed. Fragmentation of habitat would affect wildlife movement and restrict species home ranges. Animals that would most likely be affected are black-tailed deer and small mammals such as raccoon, opossum, and skunk (Informatics 1980). Mortality rates for mammals may be greatest during spring and early summer when young animals disperse from nesting locations (Leedy 1975).

Fish

In evaluating risks to fish habitat, water quality in receiving waters is the primary concern. Des Moines Creek is the only fish-bearing aquatic resource that would be crossed by the proposed project. None of the build alternatives would include stream crossings within the Miller Creek, Lower Green River, Lower Puget Sound, and Mill Creek basins. Potential operation impacts on Des Moines Creek include water quality degradation from operation and maintenance activities associated with stormwater runoff from new and existing impervious surfaces near the creek. The extent of the impacts would depend on several factors, including the amount of new impervious surfaces and increased pollutant loading in stormwater runoff, the types and locations of stormwater treatment facilities, and the pollutant-removal efficiencies of the facilities. Significant water quality degradation is not expected as long as stormwater management plans, facilities, and related BMPs are installed and maintained to comply with the King County *Surface Water Design Manual* (King County 1998) and WSDOT's *Highway Runoff Manual* (WSDOT 1995). Section 3.5, *Water Quality*, contains more detailed information on water quality impacts.

Worn rubber from tires, lubricants, heavy metals in the fine sediments, and fuel on the road would wash off with the rain and possibly flow into receiving waters, including Des Moines Creek and the Green River. These impacts, relative to existing effects from nonpoint source pollution, would not be significant because all runoff from new impervious surfaces would be treated under the build alternatives.

At the completion of the project, all stormwater runoff generated from new impervious surfaces created by the project would be collected and treated for quality. Where feasible, collected stormwater would be treated and infiltrated. Where subsurface conditions do not allow for infiltration, collected stormwater would be detained and receive enhanced treatment prior to discharge. Proposed stormwater collection, detention, and treatment facilities include infiltration vaults, detention ponds, infiltration ponds, biofiltration trenches, filter strips, and constructed wetlands. These facilities would be located within existing WSDOT right-of-way or right-of-way acquired for the project (see Section 3.5, *Water Quality*, for a more detailed description of proposed water quality treatment and impacts). All stormwater collection and treatment facilities would be constructed and operated to manage expected stormwater volumes related to the project.

Within the Des Moines Creek Basin, stormwater that is not infiltrated would discharge to Des Moines Creek or wetland systems with connections to Des Moines Creek. (See Section 3.5 for a description of stormwater design criteria.) The proposed stormwater facility design, in conjunction with the Des Moines Creek Basin Plan flow control project, would reduce project peak flows in the basin for the 2-, 10-, 50-, and 100-year events to 40 to 43

percent of 1994 peak flows (Olympic Associates Company October 2002) stormwater releases to the creek would be significantly reduced, no increase in erosion potential to the existing stream banks is anticipated.

Within Miller and Mill Creek basins, treated stormwater would discharge to wetland systems that have no known fish use or surface water connections to fish-bearing streams.

Within the Lower Puget Sound and Lower Green River basins, most of the facilities would discharge to wetland systems that have no known fish use or surface water connections to fish-bearing streams. Four stormwater facilities within the Lower Puget Sound and Lower Green River basins would discharge to drainage systems that eventually reach Midway Creek and McSorley Creek. Midway Creek and McSorley Creek are located more than 1 mile from the project area. Prior to reaching these creeks, stormwater would be diverted through more than 6,000 feet of drainage ditches, culverts, and storm drain systems that do not provide habitat for fish species.

Another potential operational impact could result from accidental spills of deleterious or hazardous substances. Such impacts would likely be reduced to insignificant levels by existing stormwater management plans and future mitigation stipulated in regulatory permits. The proposed build alternatives would provide a transportation corridor designed under current regulatory safety standards, which would result in a lower frequency of accidents compared with existing roads designed to earlier standards. Thus, the risk of accident-related spills would be expected to be lower than existing conditions because the new roadway would improve the overall safety of the road system.

Operation of the build alternatives could affect potential salmon and resident fish habitat in Des Moines Creek and marine receiving waters of Puget Sound. Potential impacts would depend on pollutant loads in stormwater runoff, runoff volumes and rates, and the configuration and effectiveness of stormwater management facilities (see Section 3.5, *Water Quality*). Currently, there are no water quality treatment facilities located within the proposed project area to treat stormwater runoff of impervious areas. The addition of stormwater detention and treatment facilities would improve the quality of stormwater runoff from the project area compared to existing conditions. With mitigation, potential unavoidable impacts on fish habitat are unlikely to be significant.

Threatened and Endangered Species

No federal- or state-listed sensitive, threatened, or endangered wildlife species regularly breed, forage, or regularly occupy the project area of the build alternatives. For this reason, and reasons discussed above for fish, no impacts on threatened and endangered species are anticipated.

These species were addressed in the BA prepared for the project in accordance with Section 7 of the ESA. USFWS and NMFS have concurred with the BA findings of “may affect/not likely to adversely affect” for bald eagle, bull trout, Puget Sound chinook salmon, and coho salmon; “no effect” for marbled murrelet; and “not likely to significantly impact” chinook salmon critical habitat.

South Link Design Options H0, H2-A, and H2-B

Because of the similarity of the proposed alignments associated with the South Airport Link portion of the project area (design options H0, H2-A, and H2-B), impacts on vegetation and wildlife, fish, and threatened and endangered species would be the same for each design option under all build alternatives. Vegetation habitats in this portion of the project area are limited to fragmented patches of grassland communities adjacent to roads and parking lots and isolated ornamental shrubs and trees associated with commercial development. Because of the low quality habitat, fragmented nature, and high degree of disturbance in this portion of the project area, the South Airport Link design options would have no significant impact on vegetation and wildlife.

Des Moines Creek is culverted below street level in this portion of the project area. The South Airport Link design options would not occur where the culvert is located. Based on the current engineering design, there would be no net gain or loss in impervious surface area under Option H0. Option H2-A would result in a net gain of 0.1 acre of impervious surface. Option H2-B (the preferred option) would result in a net gain of 0.5 acre of impervious surface. Potential impacts on Des Moines Creek would be limited to water quality impacts. Water quality impacts on Des Moines Creek from stormwater runoff, relative to existing effects from nonpoint source pollution, would not be substantial because all runoff from new impervious surfaces would be treated under Options H0, H2-A, and H2-B. Some pollutant loading would be unavoidable with proposed stormwater treatment. These impacts would not likely be significant because concentrations of pollutants would be below Washington State water quality standards, which are protective of aquatic life. See Section 3.5, *Water Quality*, for more discussion.

Alternative B

Vegetation and Wildlife

Alternative B would have greater impacts on vegetation communities than Alternatives C2 and C3 (Table 3.7-2). Under Alternative B, approximately 0.5 acre of forested and riparian habitat in Des Moines Creek Park would be acquired for roadway right-of-way. This area is located at the park’s narrowest point, in the area of South 209th Street. The roadway would span the park on a bridge, and little or no vegetation would be removed. Riparian

areas that would be affected under Alternative B occur within the Tye Valley Golf Course and Des Moines Creek Park. Alternative B would result in less clearing of vegetation communities associated with residential and commercial development than Alternatives C2 and C3. Under Alternative B a significantly greater amount of forested and wetland habitat would be cleared than under Alternatives C2 and C3.

Fish

Alternative B would cross Des Moines Creek on one bridge near South 209th Street, at about RM 1.7. Alternative B would also cross the East Fork of Des Moines Creek at four locations north of South 200th Street in the Tye Valley. An existing culvert beneath South 200th Street would be extended. No other alterations of existing stream crossings would occur. While anadromous fish runs do not occur in the reach of Des Moines Creek crossed by Alternative B, Des Moines Creek upstream and downstream of South 209th Street does contain quality stream and riparian habitat. Anadromous fish runs are located in the downstream reach of Des Moines Creek below about RM 1.0 and in the receiving waters of Puget Sound. Alternative B would not involve any additional stream crossing and would not include any construction activity on streams within the Des Moines Creek, Miller Creek, Massey Creek, Lower Green River, Lower Puget Sound, and Mill Creek basins.

Threatened and Endangered Species

No federal- or state-listed sensitive, threatened, or endangered wildlife species regularly breed, forage, or occupy the Alternative B project area. For this reason, and reasons discussed above for fish, no impacts on threatened and endangered species are anticipated.

Alternative C2 (Preferred)

Vegetation and Wildlife

Alternative C2 would have less impact on vegetation communities than Alternatives B and C3 (Table 3.7-2). Alternative C2 would encroach into the northeast corner of Des Moines Creek Park, requiring the acquisition of 4.7 acres of mixed deciduous/coniferous forest habitat within the park for roadway right-of-way. The roadway would be on a bridge structure within the park, and vegetation removal would be limited to clearing for construction access and bridge piers. Riparian areas that would be affected under Alternative C2 occur in the Tye Valley Golf Course and the northern area of Des Moines Creek Park. No large habitat tracts would be fragmented.

Fish

Alternative C2 would bridge Des Moines Creek at one location in Des Moines Creek Park, at the northern portion of the park directly south of South 200th Street, at about RM 2.1. Four bridge crossings of the East Fork of Des Moines Creek would occur in the Tyee Valley Golf Course north of South 200th Street. An existing culvert beneath South 200th Street would be extended. No other alterations of existing stream crossings would occur. Aquatic habitat in the golf course area does not provide quality habitat for fish. While anadromous fish runs do not occur in the reach of Des Moines Creek that would be crossed by the proposed alignment, Des Moines Creek downstream of South 200th Street does contain quality stream and riparian habitat. Anadromous fish runs are located in the downstream reach of Des Moines Creek below about RM 1.0 and in the receiving waters of Puget Sound. Alternative C2 would not involve any additional stream crossing and would not include any construction activity on streams within the Des Moines Creek, Miller Creek, Lower Green River, Lower Puget Sound, and Mill Creek basins.

Threatened and Endangered Species

No federal- or state-listed sensitive, threatened, or endangered wildlife species regularly breed, forage, or occupy the Alternative C2 project area. For this reason, and reasons discussed above for fish, no impacts on threatened and endangered species are anticipated.

Alternative C3

Vegetation and Wildlife

Alternative C3 would disturb less vegetation than Alternative B and more than Alternative C2 (Table 3.7-2). Alternative C3 would encroach into the northeast corner of Des Moines Creek Park, requiring the acquisition of approximately 3.9 acres of parkland for roadway right-of-way. Similar to Alternative C2, the roadway would be on a bridge structure within the park, and vegetation removal would be limited to clearing for construction access and bridge piers. Riparian areas affected by Alternative C3 would be in the Tyee Valley Golf Course and the northern portion of Des Moines Creek Park. No large habitat tracts would be fragmented.

Fish

Alternative C3 would cross Des Moines Creek south of South 200th Street within Des Moines Creek Park at about RM 2.1. Alternative C3 would also cross the East Fork of Des Moines Creek at four locations north of South 200th Street within the Tyee Valley Golf Course. An existing culvert beneath South 200th Street would be extended. No other alterations of existing stream crossings would occur. Fish and wildlife habitat in the golf course area is low

quality. While anadromous fish runs do not occur in the reach north of South 200th Street, the reach of Des Moines Creek south of South 200th Street does contain high quality fisheries resources. Alternative C3 would not involve any additional stream crossing and would not include any construction activity on streams within the Des Moines Creek, Miller Creek, Lower Green River, Lower Puget Sound, and Mill Creek basins.

Threatened and Endangered Species

No federal- or state-listed sensitive, threatened, or endangered wildlife species regularly breed, forage, or occupy the Alternative C3 project area. For this reason, and reasons discussed above for fish, no impacts on threatened and endangered species are anticipated.

3.7.4 Mitigation Measures

Mitigation measures for operation impacts would be similar for all build alternatives. Mitigation measures for construction impacts are discussed in Section 3.7.5. No mitigation measures are necessary for the No Action Alternative.

Vegetation and Wildlife

Establishment of native plant communities to replace exotic, invasive species would be an important component in mitigation. Covering, seeding, and/or revegetating disturbed soils with native species would follow construction and final grading to help reduce soil erosion and colonization by nonnative species. Maintenance practices following construction of the proposed project could include a variable mowing schedule for grassy rights-of-way to create a diversity of grassland habitat over time. A post-construction monitoring program would be conducted and include measures to ensure mitigation effectiveness. If mitigation performance standards are not met during post-construction monitoring, additional mitigation would be required and implemented as appropriate.

Fish

Potential operational impacts on water quality and fisheries resources would be mitigated through compliance with drainage and erosion-control requirements and implementation of stormwater BMPs. More detailed discussion of measures used to mitigate potential impacts on water quality are presented in Section 3.5, *Water Quality*. These mitigating measures would reduce increases in pollutant loading to waters receiving stormwater runoff and reduce potential impacts on aquatic resources from water quality degradation.

Measures used to mitigate water quality degradation and associated impacts on fisheries include designing the preferred alternative to minimize

impervious surface area. Additional measures could include exceeding drainage control requirements and maximizing opportunities for infiltration. Potential habitat impacts on anadromous and resident fish habitat at stream crossings would be mitigated by the project Hydraulic Project Approval (HPA) conditions. Potential baseflow impacts could be reduced by infiltrating stormwater runoff and recharging shallow groundwater to the maximum extent practicable. Federal, state, and local agencies will review plans to ensure proposed stormwater management designs avoid or minimize potential impacts that would otherwise adversely affect fish habitat in offsite streams. These mitigation requirements are expected to prevent significant impacts on water quality resulting from operation of the proposed build alternatives.

Mitigation measures related to water quality and hydrology impacts completed for operation impacts would be monitored after the proposed project is completed to determine their overall effectiveness and appropriateness. Roadway maintenance would be conducted in accordance with the BMPs outlined in the *Regional Road Maintenance Endangered Species Act Program Guidelines* (NMFS 2001).

Threatened and Endangered Species

No operation-related mitigation measures are necessary for terrestrial species. Fish and water quality-related design guidelines will comply with various federal, state, and local permit requirements. Implementation of these measures will protect aquatic resources outside the project area. Mitigation for threatened and endangered aquatic species will be the same as those described above for fish.

3.7.5 Construction Activity Impacts and Mitigation

Construction Activity Impacts

Vegetation and Wildlife

The primary impact associated with project construction would be vegetation removal and loss of wildlife habitat. The extent of impact would depend on the type and quantity of affected vegetation for each alternative. Loss of plant communities that provide limited wildlife habitat, such as commercial and residential areas, would have a minor adverse effect, while more complex vegetation associations, such as forested areas and wetlands, would be of greater consequence.

Habitats associated with the proposed project that would be cleared include mowed and unmowed grassland areas; shrubland; mixed deciduous/coniferous forest; commercial and residential areas containing a fragmented mixture of native, nonnative, and ornamental plant species; and

wetlands. An element of each of these habitat types would be cleared under each of the build alternatives.

Construction of the proposed project would create an environment conducive to the establishment of invasive and exotic species in native areas unless appropriate plant restoration and maintenance methods are implemented. Exposed, unvegetated, and/or compacted soils that result from land conversion would be susceptible to colonization by invasive species. Generally, construction would most likely promote the establishment of invasive weeds along the perimeter of undeveloped vegetation communities.

Construction also would result in soil compaction from the use of heavy equipment on the site. Soil compaction might cause direct damage to plants with shallow root systems and might reduce the infiltration of water and nutrients into the soil.

Clearing native vegetation during the proposed construction would eliminate and modify existing wildlife habitat (Table 3.7-2). Such impacts on habitats would displace and/or eliminate wildlife that currently depends on this vegetation. Loss of snags and coarse woody debris negatively affects primary and secondary cavity nesters. Removing the overstory adversely affects mammals and birds that use the canopy and it decreases thermal cover. Decreases in understory adversely affect ground-dwelling species. The loss of existing vegetation eliminates protective cover, nesting areas, and food for animals. Birds, small mammals, amphibians, and reptiles currently using the project area would be adversely affected by this loss of habitat. Most wildlife species (such as birds and mammals) would be able to move away from areas of disturbance. Wildlife with limited mobility, such as amphibians, reptiles, and some small mammal species would be directly affected by road construction. While it is anticipated that some individuals of these species would perish during construction, it is not possible to accurately predict the actual number of wildlife that would be affected.

Wildlife populations are generally considered to be at or near carrying capacity in all habitat types (Krebs 1994, Morrison et. al. 1992, Miller 1990, Robinson and Bolen 1989, Wallace 1987). Once vegetation has been removed, wildlife displaced into adjacent habitats may be unsuccessful in colonizing nearby suitable habitats because these areas are usually already occupied. The increased stress of competition for limited resources and susceptibility to predation may cause displaced animals to perish or to displace other individuals that in turn might perish. Heavy equipment use during clearing and grading would cause the greatest audible and visual disturbance to wildlife.

Disturbances caused by road construction on the project site may affect wildlife in adjacent habitats by disrupting feeding and nesting activities. Forested habitats in the project area are used for breeding by migrant and

resident songbirds. Increased noise levels created by operation of heavy machinery could cause birds to abandon their nests and may temporarily displace wildlife during construction. Many wildlife species, particularly mammals, are nocturnal and are relatively inactive during daylight hours. They typically retreat to burrows and other resting areas and generally would not be affected by construction noise during the day. Once construction activities are complete, wildlife might resume use of the site.

Waterfowl concentrations near airports are typically deterred to avoid potential collisions with aircraft. Stormwater facilities constructed within the Des Moines Creek and Miller Creek basins would be subject to Sea-Tac Airport requirements to minimize potential wildlife attractants. WSDOT and the Port of Seattle will coordinate with the FAA regarding appropriate covers over open-water ponds to prevent bird attraction.

Wildlife species that typically prefer interior forest habitat or require large areas of unbroken habitat to forage and reproduce are unlikely to regularly occur in the project area. No large habitat tracts would be fragmented. No evidence of rare, uncommon, or unique wildlife or wildlife habitat is apparent within the project area. No critical or priority habitat would be affected.

Fish

Each of the build alternatives would include construction of bridge crossings over Des Moines Creek but would not require in-water work. One culvert in Des Moines Creek under South 200th Street would be extended. This existing fish barrier will remain in accordance with FAA policy that no anadromous fish be allowed to travel north of South 200th Street because they may attract raptors, which would create a bird strike risk for airplanes. No other streams occur within 0.2 mile of the proposed alternatives.

Construction impacts are generally proportional to the amount of clearing and grading and the effectiveness of structural and nonstructural BMPs. Some nonpoint chemical pollution would be expected to result from general construction practices, even with BMPs employed. With the implementation and maintenance of BMPs, there is a low likelihood for adverse impacts on fish habitat associated with the build alternatives. Construction practices resulting in soil compaction and tree removal might increase the rates of surface water runoff during storms. Impacts on offsite fish and fish habitat are not anticipated because stormwater will be managed using best available technology for detention and infiltration systems.

Exposing soil, removing vegetation, clearing, and grading associated with construction could result in increases in erosion and sedimentation and temporarily elevated levels of TSS. Adverse effects on streams associated with clearing and grading are well documented (Leedy 1975). Water quality is impaired and fisheries habitat is degraded when fine sediments less than

0.85 mm in diameter are released during uncontrolled major erosion events. Large volumes of fine sediments can collect in pools and low-gradient reaches to reduce stream capacity for fish rearing. Sediments can also decrease production of fish food organisms by embedding in stream substrates. Des Moines Creek is the only fish-bearing stream within 2,000 feet of the project area. Spawning habitat is not located in the reach of Des Moines Creek within the project area; however, adverse effects on water quality in the project area could harm downstream habitats (Puget Sound).

Construction equipment, materials, and waste generated onsite could be sources of pollutants, including oil and grease, hydraulic fluid, concrete leachate, and polynuclear aromatic hydrocarbons (PAHs). Accidental spills and releases of these materials could contaminate water resources. Water quality degradation from temporary increases in suspended solids and accidental spills could adversely affect fish and other aquatic biota. Degradation could occur through reduced light transmittance, photosynthesis, and primary productivity. Additionally, increased TSS could reduce feeding success, increase stress, and modify the behavior of fish using these areas, increasing susceptibility to disease or mortality.

If appropriate buffers and construction setbacks are not established in the location of the bridge crossings, trees and riparian vegetation might be removed, which would impair the function of the riparian zone. Des Moines Creek, upstream of South 200th Street does not have quality, native riparian vegetation and is frequently ditched or flows through culverts. For cover and prey organisms, fish need large woody debris that comes from the riparian zone and overhanging vegetation along stream banks.

Water quality impacts related to construction are expected to be short term and would be minimized to the extent possible with proper management. Construction activities would occur outside of stream channels, and the period of construction activity would be limited according to recommendations from WDFW, NMFS, and USFWS. Section 3.5, *Water Quality*, contains more information on potential water quality impacts.

Threatened and Endangered Species

No federal- or state-listed sensitive, threatened, or endangered wildlife species regularly breed, forage, or occupy the project area. For this reason, and reasons discussed above for fish, no impacts on threatened and endangered species are anticipated.

Mitigation Measures

Mitigation measures for construction impacts would be similar for all build alternatives. No mitigation measures are necessary for the No Action Alternative.

Vegetation and Wildlife

Road construction would avoid significant forested areas, wetlands, and riparian areas, where possible. Construction of any of the build alternatives would require the clearing of mixed deciduous/coniferous woodland. Where possible, snags, brush piles, and downed trees would be left in forested and wetland areas, where they provide a variety of wildlife habitats, such as perch sites for raptors, nesting areas for passerine birds, den habitat for small mammals, and cover for amphibians and reptiles. Snags would be left standing where consistent with safety requirements, particularly when associated with wetlands (Leedy 1975). Construction activities would be scheduled to take into account timing recommendations from WDFW and other agencies to avoid disturbing breeding wildlife in sensitive habitats such as wetlands. While no construction timing restrictions are anticipated as conditions of project permits, land clearing of woody vegetation would be scheduled, to the extent possible, so that it does not occur in early spring when most bird species are nesting (Brown 1985).

Construction procedures would be used that would minimize damage to existing vegetation, avoid habitat loss, and minimize soil compaction and erosion.

Monitoring would be conducted during construction to ensure mitigation measures are successfully implemented and that performance standards are achieved.

Fish

Several measures are proposed to reduce or eliminate construction impacts on aquatic habitats by maintaining good water quality in the project area.

WSDOT is initiating several mitigation measures for the SR 509: Corridor Completion/I-5/South Access Road Project. Mitigation commitments based on the results of the 404 Merger Process would include:

- All streams would be crossed with bridges to minimize impacts on streams and fish habitat from the project.
- If the SR 509 project is approved and funded, WSDOT would contribute \$1.8 million toward the construction of a replacement bridge across Des Moines Creek at Marine View Drive (RM 0.3), and provide stream restoration and riparian zone enhancement in the vicinity of Marine View Drive. This bridge would replace an existing box culvert, which is identified in the Des Moines Creek Basin Plan as the major fish barrier in the Des Moines Creek system (King County 1997). While partial fish barriers are also located near the Midway Sewage Treatment Plant (RM 1.0), replacing the culvert at Marine View Drive would potentially

significantly improve anadromous fish access up to RM 1.0 within the Des Moines Creek system.

- Enhancement opportunities for Des Moines Creek in the vicinity of the project area are being investigated. The type of mitigation could be enhancement or restoration of the stream or the riparian buffer in locations that are currently biologically or topographically deficient.

Additionally, the build alternatives would require fish and water quality-related design guidelines and other forms of mitigation to comply with various federal, state, and local permit requirements and applicable regulations defined in local comprehensive plans. Requirements or conditions of permits and government approvals might include conditions to provide specific protection of aquatic resources. Such conditions of permits or government approvals would include erosion and sediment control plans, stormwater management plans, limitations on the timing of construction, and BMPs (e.g., mulching, hydroseeding, check dams, biofiltration swales, phased clearing, silt fencing, and sediment ponds). Specifically, a spill control and containment plan (SCCP), a TESC plan, and a Stormwater Pollution Plan (SPP) would be developed prior to construction. Additionally, the design of the alternative would comply with the King County *Surface Water Design Manual* (King County 1998) and WSDOT's *Highway Runoff Manual* (WSDOT 1995). These mitigation requirements are expected to prevent significant impacts on water quality resulting from construction and operation of the proposed build alternatives.

In developing the SCCP, TESC, and SPP plans, appropriate construction BMPs would be selected for construction activities. Implementing BMPs would prevent or reduce potential impacts on surface water quality. At a minimum, BMPs involving state and local jurisdictions would include the following: (1) phasing construction to minimize the amount of earth exposed to erosive forces; (2) designing construction entrances, exits, and parking areas to reduce tracking of sediment onto public roads; (3) implementing various types of sediment, erosion control, and water quality protection measures; (4) preserving the permeability of pervious areas within the project site to the greatest extent; and (5) monitoring and maintaining erosion, sediment, and water quality control BMPs.

In addition, project BMPs would include treatment of surface runoff from new impervious surfaces that are either approximately the same or slightly larger than the existing impervious surfaces. Thus, the BMPs would yield a net reduction in overall pollutant loading compared to existing conditions. This was discussed further in Section 3.5, *Water Quality*.

Where road construction includes stream crossings, WDFW would require an HPA. The HPA permit would likely require that construction in and over streams occur during a specified time, typically between July 1 and September 1. NMFS and USFWS might also provide construction window

recommendations. Water-related construction would be timed to avoid critical migratory, spawning, and rearing periods of anadromous and important resident fish. In addition, a detailed erosion and sedimentation control plan would be prepared and implemented to prevent exposed soil or construction material from reaching the stream.

Impediments to fish passage would be averted by proper design and installation of bridges at stream crossings. The use of bridges for stream crossings could improve fish passage and reduce disturbance to benthic flora and fauna. Bridges would be designed to comply with WDFW criteria for safe fish passage.

In affected reaches of the stream, the goal of mitigation would be to create stable, usable stream channels that would function in a manner and quality consistent with properly functioning habitat. Efforts would be made to retain downed logs, overhanging banks, and streamside vegetation for shade, whenever possible. Habitat enhancement structures such as spawning gravel, boulders, root wads, and streamside cover could be used to add to the diversity of the channel. Root wads and boulders provide low-level or instream cover for fish, reduce water velocities, and encourage the formation of pools. Such channel features could provide areas for fish spawning, feeding, hiding, and holding, and thereby increase the productivity of the creek.

Mitigation measures related to water quality and hydrology impacts completed for construction impacts would be monitored after the project is completed to determine their overall effectiveness and appropriateness.

Threatened and Endangered Species

No construction-related mitigation measures are necessary for terrestrial species. Fish and water quality-related design guidelines will comply with various federal, state, and local permit requirements. Implementation of these measures will protect the aquatic resources of Des Moines Creek and other aquatic resources outside the project area. Mitigation for threatened and endangered aquatic species will be the same as those described above for fish.

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