4. Wildlife and Habitat

Wildlife and habitat are important components of ecosystem health and function. Some of the ways in which wildlife affect ecosystems include consuming vegetation, insects, or other wildlife; providing a source of prey and nutrients to other animals; and serving as a mechanism of seed dispersal. In the Lake Washington area, the wildlife also helps attract large numbers of visitors, which supports the local economy. Wildlife is protected under federal, state, and local regulations.

Affected Environment

Collecting Wildlife and Habitat Information

The ecosystems analysts generally looked for the occurrence of wildlife and wildlife habitat up to 0.25 mile from the proposed project alignment, as well as the route over which pontoons would be towed from Grays Harbor to Lake Washington. The proposed project could generally affect wildlife and habitat within 0.25 mile of the alignment. However, because nesting bald eagles (a federally protected species under the Bald and Golden Eagle Protection Act) have the potential to be affected by steel pile driving up to 1 mile from a given nest site, the ecosystems analysts documented the occurrence of bald eagle nest sites within 1 mile of the proposed project alignment. The analysts also identified basic landscape-cover types and the specific wildlife habitats within each cover type for all areas within 0.25 mile of the project corridor. For example, they identified Parks and Other Protected Areas as a cover type, and noted deciduous forest, coniferous forest, wetland, and other habitats within this cover type.

The analysts also reviewed reports from the WDFW and other sources to determine the habitat associations and distribution of wildlife in the study area and vicinity. The WDFW Priority Habitats and Species (PHS) database provided information on specific locations of priority species and priority habitat (WDFW 2008). WDFW defines priority species as those species that are priorities for conservation and management. Priority species include state-listed endangered, threatened, sensitive, and candidate species; animal aggregations considered vulnerable; and those species of recreational, commercial, or tribal importance that are vulnerable. Priority habitats are those habitat

types or elements with unique or significant value to a diverse group of species.

The ecosystems analysts reviewed information from the USFWS and NOAA Fisheries on approximately known or expected occurrences of species listed or proposed for listing under Endangered Species Act (ESA), as well as federal species of concern in King County and the marine waters of coastal Washington, the Strait of Juan de Fuca, and Puget Sound. They also conversed with federal, state, and local biologists to obtain information on additional species. To supplement the existing data, the analysts evaluated field conditions and reviewed aerial photographs of the study area to categorize the cover types and to identify habitat occurrence within these cover types.

What is the Endangered Species Act?

The ESA is 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.

Transport of the floating bridge pontoons from Grays Harbor to Lake Washington is also analyzed as part of this EIS. Information is included on marine wildlife that may be found along the west coast of Washington, as well as through the Strait of Juan de Fuca, through Puget Sound, and ending at the Ballard Locks at Lake Union. Please refer to the Pontoon Construction Project Ecosystems Discipline Report for information on wildlife in Grays Harbor (WSDOT 2009e).

Typical habitat in the Urban Matrix cover type in the study area.

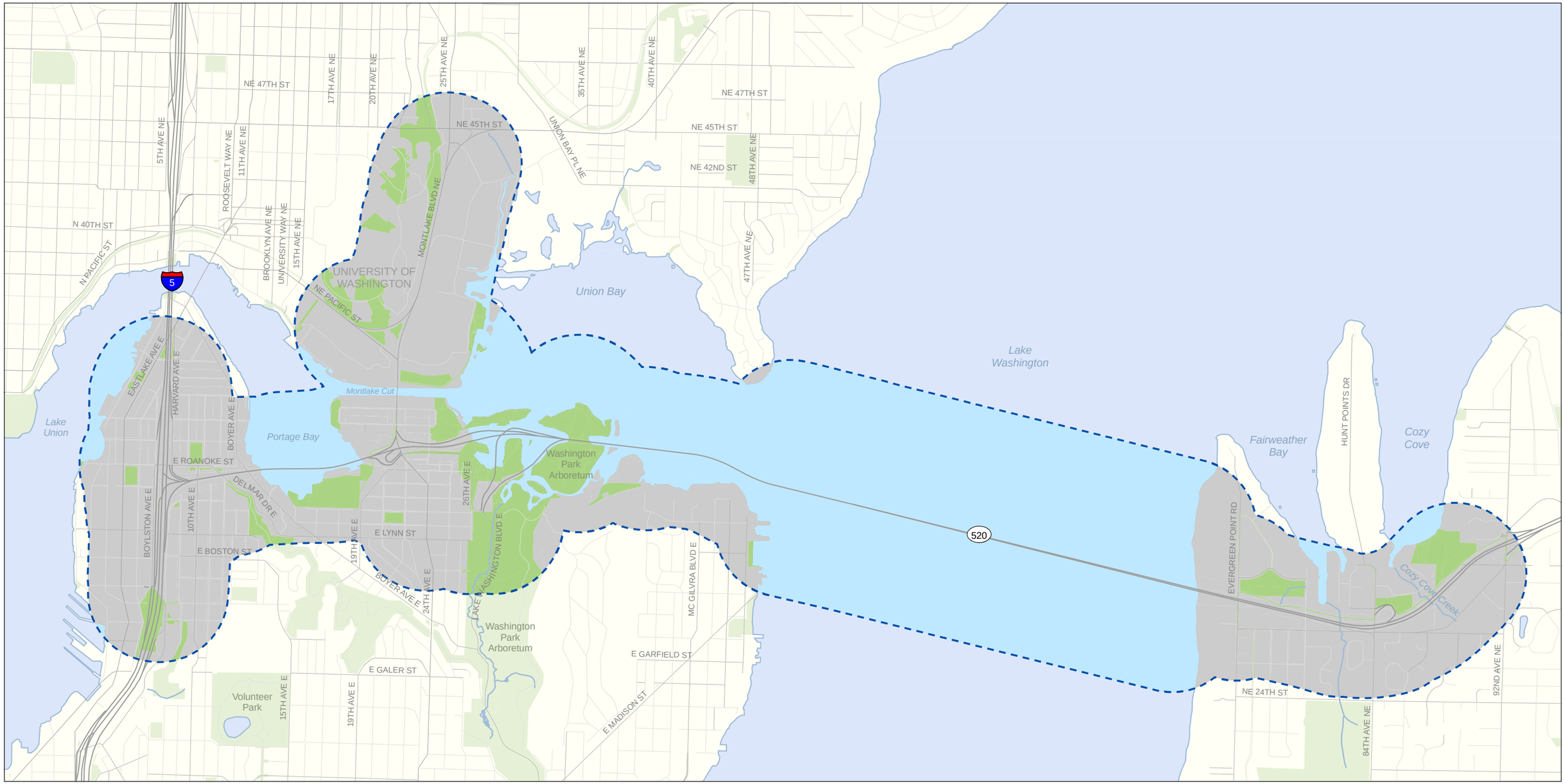
SR 520 Corridor

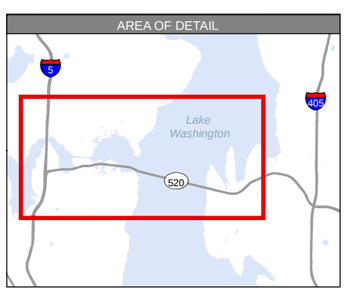
What are the existing wildlife and habitat characteristics of the study area?

In order to evaluate wildlife and wildlife habitat, the SR 520 study area was categorized into three landscape cover types based on similarities in landscape features (for example, presence of vegetation, buildings, roads) and expected wildlife occurrence and use.

The three cover types in the study area are (1) Urban Matrix, (2) Open Water, and (3) Parks and Other Protected Areas. Exhibit 4-1 shows the location of the existing cover types in the study area. Within these landscape cover types, various habitats are present, as described further in Exhibit 4-2.

Typical habitat in the Open Water cover type within the study area.





Habitat Type

- Urban Matrix
- Park or Other Protected Area
- Open Water
- Stream
- Existing Roadway
- Study Area
- Park

N

0 500 1,000 2,000 Feet

Source: Parametrix (2009) GIS Data (Habitat), King County (2005) GIS Data (Streets and Streams) King County (2007) GIS Data (Water Bodies), and CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 4-1. **Existing Cover Types in Project Corridor**

I-5 to Medina: Bridge Replacement and HOV Project

\\SIMBA\PROJ\PARAMETRIX\180171\GIS\MAPFILES\SDEIS\ECOSYSTEMS\SDEIS_DR_ECOS_HABITATEXISTING.MXD 10/05/2009

Exhibit 4-2. Study Area Landscape Cover Types, Habitats, and Representative Associated Wildlife

Cover Type	Description	Habitat Occurrence and Representative Associated Wildlife	Other Notes
Urban Matrix	Commercial and residential areas with buildings, asphalt, ornamental gardens, lawns, and scattered trees.	Limited wildlife habitat available. Roadside deciduous and coniferous trees provide some habitat for common birds (for example, European starlings, American robins, American crows, and black-capped chickadees). Ornamental and native trees and shrubs in residential lots provide habitat for additional species (for example, Steller's jays, northern flickers, ruby-crowned kinglets, and raccoons). Nesting by birds such as Canada geese and swallows likely occurs on the fixed approaches of the bridge. Small scrub-shrub, emergent, and forested wetlands provide habitat for Pacific treefrogs, garter snakes, raccoons, song sparrows, bushtits, and other songbirds. Wildlife species diversity is generally expected to be greater in the larger and more structurally diverse wetlands.	Most abundant cover type, distributed throughout the study area. Approximately 52% (1,479 acres) of the study area is Urban Matrix, with 4% currently as pavement.
Open Water	West Coast of Washington, Strait of Juan de Fuca, Puget Sound, Portage Bay, Union Bay, and Lake Washington. Lake Union is approximately 0.25 mile from the project alignment.	Provides habitat for a variety of marine-associated wildlife, including waterfowl, the most common of which are American coots, buffleheads, mallards, scaups, goldeneyes, widgeons, Canada geese, double-crested cormorants, pied-billed grebes, and western grebes. Other species present include bald eagles, great blue herons, belted kingfishers, river otters, beavers, Pacific treefrogs, and bullfrogs. Bat species forage over open water. In addition, marine wildlife such as marbled murrelets and other seabirds, leatherhead sea turtles, gray whales, killer whales, Pacific white-sided dolphin, Dall's porpoise, harbor porpoise, Steller sea lion, California sea lion, harbor seal, humpback whales, and minke whales are occasional visitors or frequent residents of the waters along the coastal route.	Approximately 44% (1,300 acres) of the study area is Open Water, with less than 1% covered by bridges.
Parks and Other Protected Areas	Includes Roanoke Park, Interlaken Park, East Montlake Park, and Washington Park Arboretum.	Near the proposed project alignment, these parks and other protected areas contain mostly upland deciduous forests (usually dominated by big-leaf maple); riparian forests (dominated by cottonwoods and other riparian-associated deciduous trees); and forested, scrub-shrub, and emergent wetlands. The Washington Park Arboretum contains native upland and wetland habitat. It also maintains an important collection of large, primarily ornamental, tree species near the Museum of History and Industry (MOHAI).	Approximately 6% (183 acres) of the study area consists of Parks and Other Protected Areas, with no appreciable amount of pavement present. Parks consisting solely of sports fields are not included because these areas do not provide valuable wildlife habitat. Lake Washington does not contain parks or other protected areas.

Exhibit 4-2. Study Area Landscape Cover Types, Habitats, and Representative Associated Wildlife

Cover Type	Description	Habitat Occurrence and Representative Associated Wildlife	Other Notes
		The upland forests within the parks and other protected areas provide habitat for a variety of birds, including warblers and other songbirds, hairy woodpeckers, red-tailed hawks, Cooper's hawks, and band-tailed pigeons. Wildlife associated with the wetlands and riparian areas include red-winged blackbirds, marsh wrens, great blue herons, belted kingfishers, beavers, mink, foraging bats (for example, little brown bats and big brown bats), Pacific treefrogs, and garter snakes. Large cottonwood trees, which are most abundant in the Washington Park Arboretum, provide potential nesting, roosting (resting), and perching sites for great blue herons, bald eagles, and other bird species. Wood ducks are also present at the Washington Park Arboretum.	

Do any federally listed species occur in the SR 520 corridor study area?

Exhibit 4-3 lists species listed under ESA as occurring or potentially occurring in the study area. No federally listed wildlife species are expected to occur in the Seattle, Lake Washington, and Eastside areas. A detailed evaluation of the potential effects of the proposed project on federally listed species will be conducted during ESA consultations with USFWS and NMFS.

Exhibit 4-3. Occurrence of Wildlife Species of Special Interest in the Study Area

Species	Status	Occurrence in the Study Area
SR 520 Corridor		
Federal Species of Concern		
Bald Eagle	Federal Species of Concern, State Sensitive	One bald eagle territory occurs in the study area. It has three bald eagle nest sites; one is in the Washington Park Arboretum and two are at the Broadmoor Golf Course. Wintering bald eagles occur around Portage Bay and Lake Union. Wintering bald eagles forage on waterfowl and fish in Lake Washington.
Peregrine Falcon	Federal Species of Concern, State Sensitive	Species forages in vicinity of Portage and Union Bays, where pigeons and waterfowl are prey.
Olive-sided Flycatcher	Federal Species of Concern	Potential breeding habitat may occur in the vicinity of the study area. Most sightings of this species in city parks and residential neighborhoods probably represent migrants rather than breeding individuals, however (Opperman et al. 2006).
Western Toad	Federal Species of Concern, State Candidate	Wetlands in the study area may provide suitable breeding habitat, but no sightings of this species have been recorded in the lowland areas of King County since 1984 (Hallock and McAllister 2005).
Western Pond Turtle	Federal Species of Concern, State Endangered	Documented sightings of individuals have been reported at the Washington Park Arboretum, but viable population is not present. Sightings represent released pets (WDFW 1993).
State-listed and State Priority Species		
Western Grebe	State Candidate	Wintering western grebes occasionally occur at Union Bay and Lake Washington. They are not present in summer.
Common Loon	State Sensitive	The only documented nesting in western Washington occurs on lakes and reservoirs with limited public access, indicating that nesting is not compatible with recreational boating or residential development (Opperman et al. 2006). Species is rarely observed in winter on Lake Washington. Species is not present during summer.
Great Blue Heron	State Priority	Species forages in wetlands in the Washington Park Arboretum, Portage Bay, and Union Bay. Most use is limited to shallow waters outside of Lake Washington.

Exhibit 4-3. Occurrence of Wildlife Species of Special Interest in the Study Area

Species	Status	Occurrence in the Study Area
Cavity-nesting Ducks	State Priority	In winter, species occasionally occur in wetland and open-water habitats at the Washington Park Arboretum. Species is rarely observed on Lake Washington during the winter months.
Band-tailed Pigeon	State Priority	Species may nest in forested areas of the Washington Park Arboretum
Pileated Woodpecker	State Candidate	Species may occasionally forage in the Washington Park Arboretum. Nesting pileated woodpeckers are not expected in the vicinity.
Pontoon Construction and Transport		
Federally Listed Species		
Killer Whale	Federally Endangered (Southern Resident population)	Resident killer whales congregate in relatively large groups (pods) in coastal areas where they forage primarily on fish. Transient killer whales, whose range extends over a broader area, primarily hunt marine mammals, but also frequent Puget Sound waters. Both can be found at any time of the year, but only resident pods breed in the Strait of Juan de Fuca. They are found there primarily in the spring, summer, and fall within shipping channels.
Humpback Whale	Federally Endangered	Humpbacks are generally seen off the coast of Washington from May to November, although they have also been seen earlier in the spring and later in the winter.
Steller Sea Lion	Federally Threatened	Species may occur in nearshore coastal waters, with smaller numbers in the inside waters of the Strait of Juan de Fuca and Puget Sound.
Brown Pelican	Federally Endangered	Species have been observed foraging along the outer Washington coast near estuaries.
Marbled Murrelet	Federally Threatened	Suitable foraging habitat occurs throughout the coast and Puget Sound. Suitable nesting habitat and confirmed nesting occurs along outer coast of Washington within 5 miles of the study area. Observed foraging in Strait of Juan de Fuca and Puget Sound.
Leatherback Sea Turtle	Federally Endangered	Species is associated with pelagic (open water) habitats and is occasionally sighted in bays and estuaries.
Federal Species of Concern		
Gray Whale	Protected under Marine Mammal Protection Act	Species migrates along the outer coast of Washington and within the Strait of Juan de Fuca and Puget Sound in the spring and summer; it is frequently spotted during those times within shipping channels.
Minke Whale	Protected under Marine Mammal Protection Act	Species is occasionally found along the outer coast and within the Strait of Juan de Fuca and Puget Sound year-round as single individuals within shipping channels.
Dall's Porpoise	Protected under Marine Mammal Protection Act	Species is known to occur throughout Puget Sound and along the coast year-round.
Harbor Porpoise	Protected under Marine Mammal Protection Act	Species is known to occur throughout Puget Sound and along the coast year-round.

Exhibit 4-3. Occurrence of Wildlife Species of Special Interest in the Study Area

Species	Status	Occurrence in the Study Area
Risso's Dolphin	Protected under Marine Mammal Protection Act	Species has been documented on the outer Washington coast.
Pacific white-sided dolphin	Protected under Marine Mammal Protection Act	Species is known to occur throughout Puget Sound and along the coast year-round.
Northern right whale dolphin	Protected under Marine Mammal Protection Act	Species is known to occur throughout Puget Sound and along the coast year-round.
False Killer Whale	Protected under Marine Mammal Protection Act	Small numbers of false killer whales have been observed off the Washington coast in the spring.
Harbor Seal	Protected under Marine Mammal Protection Act	This species uses the waters of Grays Harbor and adjacent estuaries. Important haul-out and pupping sandbars occur throughout the mid- and outer estuary. Species is regularly seen just offshore and throughout the Strait of Juan de Fuca and Puget Sound.
California Sea Lion	Protected under Marine Mammal Protection Act	Migrating individuals may be found throughout Puget Sound, the Strait of Juan de Fuca, and along the outer coast of Washington. There are occasional occurrences of individuals and bachelors during the fall, winter, and early spring. Species is found at Ballard Locks.
Northern Elephant Seal	Protected under Marine Mammal Protection Act	There are occasional occurrences off the Washington coast, primarily during summer and early fall. In inland waters only occasional bachelor males are found.
Northern Fur Seal	Protected under Marine Mammal Protection Act	Species is occasionally observed off the Washington coast year-round, but most individuals are encountered from January through May. Species is rarely sighted in the Strait of Juan de Fuca or Puget Sound.
Sea Otter	Protected under Marine Mammal Protection Act	The current range of sea otters in Washington extends from just south of Destruction Island on the outer coast to Pillar Point in the Strait of Juan de Fuca.

Sources: USFWS 2007; NOAA Fisheries 2009a, 2009b.

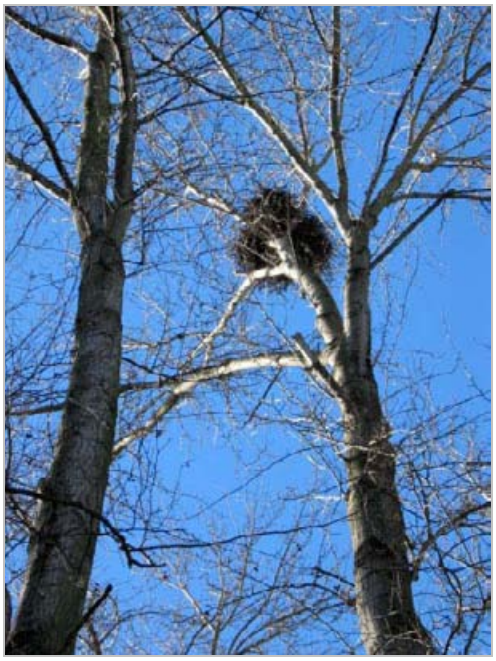
Do any federal species of concern occur in the study area?

USFWS (2007) identified federal species of concern that are known to occur or may occur in King County (Exhibit 4-3). Based on the presence of potentially suitable nesting and/or foraging habitat, two of these species (bald eagle and peregrine falcon) may occur in the study area and are discussed below.

Bald Eagle

The bald eagle is federally protected under the Bald and Golden Eagle Protection Act. This species and suitable habitat are found within the study area. Bald eagles generally are found along shores of saltwater and freshwater lakes and rivers that support substantial prey (generally anadromous fish or waterfowl) (Livingston et al. 1990, Stalmaster 1987).

Breeding bald eagles use large trees for nesting. The trees are generally within a mile of water with an unobstructed view of the water (ODFW 1996, Anthony and Isaacs 1989). Nest trees are usually found in old-growth or residual old-growth stands, but some nesting also occurs in riverine and lakeside forests dominated by cottonwood (ODFW 1996). Both breeding and wintering bald eagles forage over open water and use riparian trees (often cottonwood) for perching. The occurrence of bald eagles in the study area is described below in Exhibit 4-4.



Bald eagle nest in the Washington Park Arboretum near the proposed project alignment.

Exhibit 4-4. Bald Eagle Breeding Territories near the Study Area

Breeding Territory	Distance from Alignment	Nest Site and History
Broadmoor	Northern portion of territory includes the project alignment.	Territory contains three nest sites in the Washington Park Arboretum area south of SR 520. Nest 1 was active in 1998 and 2001 (productivity unknown) and 1999 (unsuccessful—that is, produced no fledglings); the site is approximately 1,250 feet from the project alignment. Nest 2 was active in 2000 (two young), 2001 (successful, but number of young unknown) and 2009; the site is approximately 900 feet from the project alignment. Nest 3 was active in 2002 (productivity unknown), 2003 (productivity unknown), and 2004 (unsuccessful); the site is approximately 1,500 feet from the project alignment.

Sources: WDFW (2008); J. Stofel, staff biologist, Washington Department of Fish and Wildlife, Mill Creek, Washington. March 8, 2004. Personal communication.

Note: Broadmoor territory includes nests at Washington Park Arboretum.

Peregrine Falcon

Peregrine falcons typically locate their nests on cliffs at least 150 feet high (Hays and Milner 1999). The species has also been documented nesting on skyscrapers in urban areas (Smith et al. 1997). In winter and fall, peregrine falcons spend much of their time foraging in areas with large shorebird or waterfowl concentrations, especially in coastal areas

(Dekkar 1995). No peregrine falcon individuals or nests have been documented within 1 mile of the study area (WDFW 2008). However, wetland and open-water habitats in the study area may provide suitable foraging habitat for this species (see Exhibit 4-3).

Do any state-listed or other state priority wildlife species occur in the study area?

Two state-listed sensitive species, the bald eagle and the peregrine falcon, are known to occur near the study area (WDFW 2008). Other state-listed, state candidate, or state priority species that may occur in the study area include western grebe, common loon, great blue heron, cavity-nesting ducks (for example, hooded merganser, wood duck), band-tailed pigeon, and pileated woodpecker (Exhibit 4-3). Bald eagles and peregrine falcons are addressed in the discussion under federal species of concern, above. Information on species that are known or likely to occur in the study area is provided in the following sections.

Typical habitat in the Parks and Other Protected Areas cover type within the study area.

Western Grebe and Common Loon

In the winter, western grebes and common loons are associated with the coastal waters and lakes of western Washington. Common loons are less common than western grebes in western Washington. Both species forage on fish.

Great Blue Heron

Great blue herons are associated with both freshwater and saltwater wetlands, seashores, rivers, swamps, marshes, and ditches (WDFW 2003). This species feeds on aquatic animals in shallow fresh and marine waters and occasionally preys upon mice and voles (Calambokidis et al. 1985; Butler 1995). Nests of these colonial breeders are usually constructed in the tallest trees available at a given site (WDFW 2003).

Cavity-nesting Ducks

WDFW's PHS list includes nesting individuals of the following species: wood duck, Barrow's goldeneye, common goldeneye, bufflehead, and hooded merganser. Only nesting individuals are considered priority species. As secondary cavity nesters, cavity-nesting ducks use natural tree cavities or those created by large woodpeckers. In addition, several

of these species will use artificial nest boxes where available. Preferred nest trees are generally found near shallow wetlands and are greater than 24 inches dbh (WDFW 2003).

Band-Tailed Pigeon

Band-tailed pigeons may occur in the study area during the breeding season (April to September). During this time, the birds nest in both coniferous and deciduous forests.

Pileated Woodpecker

The pileated woodpecker is generally associated with older forests that have large trees, snags, and coarse woody debris (Aubry and Raley 1993, Nelson 1988). These birds may also use younger forests for foraging, where snags are present (WDFW 2003). In addition, pileated woodpeckers are known to occasionally forage on suet feeders, utility poles, and fruit trees in suburban areas (WDFW 2003).

Do any other wildlife species of special interest occur in the study area?

Other species of special interest include those that receive protection by county and/or city ordinances but are neither federally or state-listed, nor considered state priority species. These locally protected species include raptors (predatory birds), particularly raptor nest sites. Raptor nests and eggs are also protected under the federal Migratory Bird Treaty Act and the state Revised Code of Washington (RCW 77.15.130). A red-tailed hawk nest reported in 2006 is no longer located near Broadmoor. There are no species of special interest in the study area.

Do state-listed priority wildlife habitats occur in the study area?

WDFW priority habitats within the study area include urban natural open space, riparian areas, and wetland areas (Julie Stofel, Staff Biologist, WDFW, Mill Creek, Washington. March 8, 2004. Personal communication). Urban natural open spaces are described under the Parks and Other Protected Areas cover type in Exhibit 4-2. The occurrence of riparian areas and wetlands within the study area is also described in Exhibit 4-2, as well as the Wetlands and Fish Resources sections of this report.

Pontoon Construction and Transport

In 2006, Ecology reported that approximately 4,500 tank ships and large cargo or passenger vessels entered the waters of Washington state via

the Strait of Juan de Fuca (Ecology 2007). In addition, approximately 3,100 tank barge transits were reported for Puget Sound, but no distinction was made between transits that remained entirely within Puget Sound and transits along the Straits of Georgia or Juan de Fuca. Please refer to the Pontoon Construction Project Construction Techniques Discipline Report (WSDOT 2009d) for information regarding pontoon construction.

Do any federally listed species occur?

USFWS (2007) and NOAA Fisheries (2009a, 2009b) have identified six species listed under ESA as occurring or potentially occurring in King County and along the coastal route of the shipped pontoons (Exhibit 1-7). The coastal route for shipping the pontoons contains suitable habitat for and/or sightings of six of these species: the leatherback sea turtle, southern resident killer whale, humpback whale, Steller sea lion, brown pelican, and marbled murrelet, as well as designated critical habitat for the southern resident killer whale population (Exhibit 4-3).

Other ESA-listed species are not expected to occur in the study area. The short-tailed albatross, blue whale, Sei whale, fin whale, sperm whale, and northern right whale are considered pelagic species inhabiting deep coastal waters farther than 15 miles from shore. These species are not found along the coastal waters or occur very rarely, and they do not come into the Strait of Juan de Fuca or Puget Sound (Carretta et al. 2006). It is possible, but unlikely, that they may occur in areas where pontoon transport would take place. The northern sea otter is found along coastal waters of Washington, but remains very close to shore and is also unlikely to encounter shipped pontoons. Loggerhead, green, and olive ridley sea turtles inhabit primarily warmer waters and have been found off the coast of Washington only rarely. A detailed evaluation of the potential effects of the proposed project on federally listed species will be conducted during ESA consultations with USFWS and NMFS.

Steller Sea Lion

The eastern stock of Steller sea lion is listed as threatened under ESA (55 FR 12645, April 5, 1990). The Steller sea lion, approximately 500 to 2,000 individuals, occurs year-round in Washington waters, with peak numbers in late summer, fall, and winter (NMFS 1992). No rookeries are found in Washington state, but, infrequently, one or two pups are born at haul-out sites on the Washington coast. However, it is unlikely

that these pups survive (Gearin and Scordino 1995). The closest rookeries are in northern British Columbia and central Oregon, where birthing occurs from late May to early July. Within Washington, Steller sea lions occur primarily in the nearshore zone and continental shelf zone, with smaller numbers in the inside waters of the Strait of Juan de Fuca and Puget Sound.

Killer Whale

There are three ecotypes of killer whales in the North Pacific Ocean: resident, transient, and offshore (Bigg et al. 1990; Ford et al. 2000). Resident killer whales congregate in relatively large groups in coastal areas where they forage primarily on fish. This ecotype is listed as endangered under ESA. Transient killer whales, whose range extends over a broader area, primarily hunt marine mammals (Krahn et al. 2004; Baird et al. 1992). Little is known about offshore killer whales, which prey on fish and occur in large groups from Mexico to Alaska (Ford et al. 2000; Krahn et al. 2002, 2004). All three ecotypes of killer whales were seen each year during ship surveys from the summer of 1995 to 2002, including southern and northern residents (Calambokidis et al. 2004). Killer whales were widely distributed across different habitats; animals were sighted both close to and far from shore and in fairly shallow and deep water.

> What is an ecotype?
>
> An ecotype is a group within a particular species that has unique physical characteristics genetically adapted to particular environmental conditions.

As summarized by Carretta et al. (2006), most sightings of the eastern North Pacific southern resident stock of killer whales have occurred in the summer in inland waters of Washington and southern British Columbia. Pods belonging to this stock have, however, also been sighted in coastal waters off southern Vancouver Island and Washington (Bigg et al. 1990, Ford et al. 2000). Of the three pods that make up this stock, one (J1) is commonly sighted in inshore waters in winter, while the other two (K1 and L1) apparently spend more time offshore (Ford et al. 2000).

NOAA Fisheries listed the southern resident killer whale distinct population segment as endangered in 2005 (70 FR 69903, Nov. 18, 2005). Listing factors included reduced quantity and quality of prey, persistent pollutants that could cause immune or reproductive system dysfunction, oil spills, and noise and disturbance from vessel traffic.

Southern Resident Killer Whale Critical Habitat

On November 29, 2006, NOAA Fisheries designated approximately 2,500 square miles of Puget Sound, including the study area, as critical habitat for the southern resident population of killer whales

(71 FR 69054-69070). Designated nearshore critical habitat (waters deeper than 20 feet) in the study area occurs in Elliott Bay.

Humpback Whale

The eastern North Pacific population of humpback whales is the stock that most commonly occurs in the study area during summer and fall and is listed as endangered under ESA (35 FR 8491, June 2, 1970). Humpbacks are generally seen off the coast of Washington from May to November, although they have also been seen earlier in the spring and later in the winter (Shelden et al. 2000), with the highest numbers in June and July. Humpbacks are not typically sighted in winter, but Shelden et al. (2000) did observe some off the coast of Washington in late fall and winter in 1998 to 1999. They concluded that the late occurrence of humpbacks in Washington waters could be due to reoccupation of habitat subsequent to commercial whaling, or to abundance of prey available. Humpbacks primarily occurred near the edge of the continental slope and deep submarine canyons (Brueggeman et al. 1992).

Leatherback Sea Turtle

The leatherback sea turtle is listed as endangered under ESA in the Washington state area (35 FR 8491, June 2, 1970; 43 FR 32800, July 28, 1978). Leatherback sea turtles are associated with pelagic (open water) habitats and occur with some regularity in the deep waters off the coast of Washington (Bowlby et al. 1994). In addition, these turtles occasionally have been sighted in bays and estuaries, although bays and estuaries are not their preferred habitat (Brown et al. 1995). Leatherback sea turtles are not known to nest in Washington state.

Brown Pelican

The brown pelican is currently listed as endangered under ESA (35 FR 8491, June 2, 1970), although it is proposed for de-listing. In the study area, brown pelicans occur as nonbreeding individuals, where they are present from June to October (Seattle Audubon Society 2005). They forage in marine waters, particularly in shallow areas, including bays and estuaries, and near offshore islands, spits, breakwaters, and open sand beaches. The birds rarely forage more than 40 miles from shore (USFWS 2005). Brown pelicans roost (rest) on islands along the outer coast of Washington (Seattle Audubon Society 2005). They are also known to rest on islands around and offshore of Grays Harbor.

Marbled Murrelet

The marbled murrelet is listed as threatened under ESA (57 FR 45328, October 1, 1992). This species nests in mature and old-growth forests and forages in marine waters. Nearshore marine waters within 1.2 miles of nesting sites are considered essential to the recovery of the species (USFWS 1997). Critical marine foraging habitat requires "proximity of old-growth forests, distribution of rocky shoreline/substrate versus sand shoreline/substrate, and abundance of kelp" (Thomson 1996, as cited in USFWS 1997). In the study area, marbled murrelets occur throughout the year in nearshore marine waters and bays.

Do any federal species of concern occur?

USFWS (2007) identified species as federal species of concern that are known to occur or may occur in King County (Exhibit 4-3). It is likely that some birds protected by the federal Migratory Bird Treaty Act would occur in the study area.

Do any species protected under the Marine Mammal Protection Act occur?

All marine mammals are protected under the Marine Mammal Protection Act, regardless of their listing status under ESA. Three kinds of marine mammals, cetaceans (whales, dolphins, and porpoise), pinnipeds (seals and sea lions), and mustelids (sea otters) occur within the project vicinity.

Whales, Dolphins, and Porpoise

The eastern North Pacific gray whale population (also known as the California-Chukchi population) migrates annually along the west coast of North America. The whale migrates through the coastal waters of Washington and forages along the Strait of Juan de Fuca and Puget Sound waters during the spring and fall. Sightings of this species are common during those seasons (Swartz et al. 2006).

Minke whale, Risso's dolphin, Pacific white-sided dolphin, Dall's porpoise, harbor porpoise, and northern right-whale dolphin are found along the coast of Washington. Except for the Risso's dolphin, these species can be found within the Strait of Juan de Fuca and Puget Sound waters, as well. Risso's dolphins are consistently found on the continental slope and in shelf-edge waters throughout the year (Carretta et al. 2006).

Some seasonal shifts occur off the coast of Oregon and Washington where Pacific white-sided dolphins are more common in offshore waters during spring. Their distribution shifts to continental slope waters during summer and fall, in rough synchrony with the movements of prey (van Waerebeek 2002). They can occasionally be found in inland waters, as well.

In recent studies, Dall's porpoises were most common during fall, least common during winter, and intermediate in occurrence during spring and summer, although encounter rates were not substantially different among seasons, suggesting that a resident population occurs off the coast of Oregon and Washington (Carretta et al. 2006). Encounter rates were highest over the continental slope, lowest on the continental shelf, and intermediate in offshore waters. The encounters rarely occurred in shallow coastal waters.

Harbor porpoises are widespread throughout the inland and coastal waters of Washington with the exception of southern Puget Sound (NMFS 1992). Harbor porpoises are known to calve and breed in Washington, and they generally give birth in summer from May through July. Harbor porpoise are usually shy and avoid vessels; thus, they are difficult to approach and study. They occur within inshore areas, shallow bays, estuaries, and harbors.

The northern right whale dolphin has been reported in Washington waters during all seasons except winter (Calambokidis et al. 2004; Brueggeman et al. 1992). Numbers are highest in the fall and lowest during spring and summer. Use of the continental slope waters is considerably higher than the offshore water. Few dolphins occur in continental shelf waters.

Minke whales reside off the Washington coast year-round (Carretta et al. 2006). They typically occur as single animals, rather than in groups, and are occasionally found in inland waters.

False killer whales are found worldwide, mainly in tropical and warm temperate waters (Stacey et al. 1994). In the North Pacific, this species is well known from southern Japan, Hawaii, and the eastern tropical Pacific. Brueggeman et al. (1992) observed a small number of false killer whales off the Washington coast in the spring of 1992. It is possible that they may occur in the area as occasional visitors to offshore waters.

Seals and Sea Lions

Harbor seals, California sea lions, northern fur seals, and northern elephant seals are all found within the study area. Harbor seals occur year-round, principally in the nearshore zone, and are the most common marine mammal in Washington state (NMFS 1992). Harbor seals give birth on shore and nurse their pups for 4 to 5 weeks. After the pups are weaned, they disperse widely in search of food. Birthing and nursing of pups occur in May through July along the outer coast of Washington and the Strait of Juan de Fuca, and additionally in August in the strait. Breeding occurs in the water shortly after the pups are weaned. Important haul-out and birthing sandbars occur throughout the mid- and outer estuary, regularly just offshore.

Northern fur seals are a seasonal migrant off the Washington state coast, and they do not breed or haul out (although individuals may infrequently be seen on land interspersed with sea lions) in Washington state (Angliss and Outlaw 2005). Brueggeman et al. (1992) reported that northern fur seals primarily inhabited the deep offshore waters, but they also used the continental shelf and slope waters. They were observed off the Washington coast year-round, but most individuals (more than 90 percent) were encountered from January through May. Sightings of northern fur seals in the Strait of Juan de Fuca or Puget Sound are rare, but they do occur occasionally (Gearin and Scordino 1995).

Elephant seals occur off the Washington coast primarily during summer and early fall (Brueggeman et al. 1992) and were the second most common pinniped sighted during summer during ship surveys off the Washington state coast from 1995 to 2002 (Calambokidis et al. 2004). No elephant seal haul-out sites occur in Washington state, and bachelor males are only occasionally found in inland waters.

California sea lions appear seasonally in Washington waters (NMFS 1992). Beginning in August, male California sea lions appear along the outer Washington coast, principally in the nearshore and continental shelf zones. Some move into Puget Sound and British Columbia. California sea lions remain in Washington waters through the winter and early spring before returning to California in May and June (Gearin and Scordino 1995, Jeffries et al. 2000). The migration can be characterized as a feeding migration consisting primarily of adult and subadult males. The sea lions are considered common in certain areas where fish stocks are easy to catch and plentiful.

Sea Otters

The current range of sea otters in Washington extends from just south of Destruction Island on the outer coast to Pillar Point in the Strait of Juan de Fuca. A few individual sea otters have been seen in Puget Sound and the San Juan Islands, as well as along the Oregon coast (Lance et al. 2004). Sea otters live seaward of the high-tide line almost exclusively, only occasionally venturing onto offshore rocks and islands. In Washington, sea otters generally stay in relatively shallow waters and forage on a variety of marine invertebrates, including sea urchins, throughout the entire depth range from intertidal areas out to at least 120 feet (Lance et al. 2004). Sea otter pups are born in late winter and early spring. They are weaned in late summer and early fall. Reproduction occurs throughout their range in Washington waters (Lance et al. 2004). Sea otters are particularly susceptible to mortality caused by oil spills due to the importance of their fur in regulating metabolism (Ballachey et al. 1994).

Do any state-listed or other state priority wildlife species occur?

There are no state-listed or other state priority species along the pontoon transport route.

Do any wildlife species of special interest occur?

Other species of special interest include those species that receive protection by county and/or city ordinances but are neither federally or state-listed, nor considered state priority species. These locally protected species include raptors (predatory birds), particularly raptor nest sites, which may occur along the shoreline of the pontoon transport route. Raptor nests and eggs are also protected under the federal Migratory Bird Treaty Act and the state Revised Code of Washington (RCW 77.15.130).

Do state-listed priority wildlife habitats occur?

No state-listed priority wildlife habitats were evaluated for the pontoon transport route because it is exclusively marine waters.

Potential Effects of the Project

What methods were used to evaluate the potential effects on wildlife and habitat?

The ecosystems analysts evaluated the project's potential effects on wildlife and habitat using the following methods and resources:

- GIS analysis and site reconnaissance to determine acreage, type, and location of affected habitat
- Review of anticipated construction and highway traffic noise effects on raptor nest sites and other high-quality or sensitive habitat areas
- Review of anticipated construction and highway traffic effects on water quality and quantity
- Literature review of the effects of road construction and operation on wildlife and habitat

How would construction of the project affect wildlife and habitat?

No Build Alternative

There would be no construction effects on wildlife or habitat under the No Build Alternative because no construction activities would take place. The No Build Alternative is not discussed further in this section.

6-Lane Alternative

Construction effects would result from activities that would occur as a result of construction of the project. Construction activity under the 6-Lane Alternative could affect wildlife and habitat in the following ways:

> **Construction effects** would occur from work bridges, falsework, detour bridges, staging areas, and construction access roads during the construction period.

- Disturbance from noise and associated construction activity
- Clearing vegetation for staging areas, work bridges, access roads, and other construction-specific areas
- Shading of vegetation by construction work bridges
- Water quality effects
- Disturbance from noise and physical movement of towing pontoons

How would vegetation clearing and shading during construction affect wildlife and habitat?

Seattle

Construction activities and work areas that may affect wildlife and wildlife habitat would include construction work bridges, finger piers that extend from the work bridges to the support piles, falsework, a detour bridge, staging areas, and construction access roads. Specific staging and sequencing of construction activities would be determined as part of the construction contract packages.

Option A

For Option A, 12.4 acres of vegetation would be cleared for construction activities. Most of this area, 8 acres, would be in the Urban Matrix cover type, and 4.4 acres would be cleared in the Parks and Other Protected Areas cover type (see Exhibits 4-5, 4-6, and 4-7). Option A would have the smallest area cleared related to construction activities among the three options.

When the suboptions are added, an additional 0.5 acre of vegetation would be affected, all in the Parks and Other Protected Areas cover type (see Exhibits 4-6 and 4-8). These effects would result from activities related to adding eastbound and westbound off-ramps to Lake Washington Boulevard. Even with the addition of the suboptions, Option A still would have the least area of vegetation cleared and the least effect on wildlife habitat area.

In addition to clearing, vegetation would also be shaded by work bridges during construction. In Portage Bay, construction work bridges would be built on the north and south sides of the bridge and remain in place for a combined duration of a little more than 5 years. The construction work bridge would be built first on the north side of the bridge and then on the south. In Union Bay, the north and south construction work bridges would be in place for a combined duration of approximately 4.5 years for Option A.

Exhibit 4-5. Vegetation Removal from Construction by Cover and Habitat Type for each Option (acres)

	I-5 Area	Portage Bay Area	Montlake Area	West Approach Area	Floating Bridge Area	Eastside Transition Area[a]	Total Effect (Full Build)
Option A							
Parks and Other Protected Areas							
Deciduous and/or Coniferous Trees	-	<0.1	<0.1	1.1	-	-	1.1
Shrub/Grass	0.2	<0.1	<0.1	2.6	-	-	2.7
Wetland	-	<0.1	-	0.6	-	-	0.6
Subtotal	**0.2**	**<0.1**	**<0.1**	**4.2**	**-**	**-**	**4.4**
Open Water							
Wetland	-	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-	-
Urban Matrix							
Deciduous and/or Coniferous Trees	1.2	0.2	0.5	0.4	1.4	-	3.7
Shrub/Grass	1.5	0.6	0.4	1.8	-	-	4.2
Wetland	-	<0.1	-	<0.1	-	-	<0.1
Subtotal	**2.7**	**0.8**	**0.9**	**2.2**	**1.4**	**-**	**8.0**
Option A Total	**2.9**	**0.8**	**0.9**	**6.4**	**1.4**	**-**	**12.4**
Option K							
Parks and Other Protected Areas							
Deciduous and/or Coniferous Trees	-	<0.1	0.9	1.1	-	-	2.0
Shrub/Grass	0.2	0.1	1.0	1.7	-	-	2.9
Wetland	-	-	0.3	05	-	-	0.8
Subtotal	**0.2**	**0.1**	**2.2**	**3.2**	**-**	**-**	**5.7**
Open Water							
Wetland	-	-	0.1	-	-	-	0.1
Subtotal	-	-	**0.1**	-	-	-	**0.1**
Urban Matrix							
Deciduous and/or Coniferous Trees	1.3	0.1	0.9	0.5	1.4	-	4.1
Shrub/Grass	1.5	1.0	1.4	0.8	-	-	4.7
Wetland	-	-	0.2	<0.1	-	-	0.3
Subtotal	**2.7**	**1.1**	**2.5**	**1.3**	**1.4**	**-**	**9.1**

Exhibit 4-5. Vegetation Removal from Construction by Cover and Habitat Type for each Option (acres)

	I-5 Area	Portage Bay Area	Montlake Area	West Approach Area	Floating Bridge Area	Eastside Transition Area[a]	Total Effect (Full Build)
Option K Total	**2.9**	**1.3**	**4.7**	**4.5**	**1.4**	**-**	**14.9**
Option L							
Parks and Other Protected Areas							
Deciduous and/or Coniferous Trees	-	<0.1	0.2	0.9	-	-	1.2
Shrub/Grass	0.2	0.1	0.7	2.2	-	-	3.2
Wetland	-	-	0.1	0.4	-	-	0.5
Subtotal	**0.2**	**0.1**	**1.0**	**3.5**	**-**	**-**	**4.8**
Open Water							
Wetland	-	-	-	-	-	-	-
Subtotal	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Urban Matrix							
Deciduous and/or Coniferous Trees	1.2	0.1	0.8	0.4	1.4	-	4.0
Shrub/Grass	1.5	1.1	1.5	1.1	-	-	5.1
Wetland	-	<0.1	<0.1	<0.1	-	-	<0.1
Subtotal	**2.7**	**1.2**	**2.3**	**1.6**	**1.4**	**-**	**9.2**
Option L Total	**2.9**	**1.3**	**3.2**	**5.1**	**1.4**	**-**	**14.0**

[a] Construction activities in the Eastside transition area would be within the paved area.

For Option A, 6.4 acres of vegetation would be shaded, all of which would be wetlands. Among the options, Option A would have less shading than Option K and slightly more than Option L. The difference in effects from shading for Options A and L would be minimal (see Exhibits 4-6, 4-7, and 4-9). Please refer to the Wetlands section for more information regarding shading of wetlands. When the suboptions are added, an additional 0.5 acre of vegetation would be shaded, most of which would be in the Parks and Other Protected Areas cover type. These effects would result from activities related to adding eastbound and westbound off-ramps to Lake Washington Boulevard (see Exhibits 4-6 and 4-10).

Option K

Construction activities related to Option K would result in clearing of 14.9 acres of vegetation. Of these 14.9 acres, 5.7 acres would be in Parks

and Other Protected Areas, and 9.1 acres would be in the Urban Matrix cover type (see Exhibits 4-5, 4-7, and 4-11). Option K construction activities would result in clearing more acres of vegetation than those under Options A or L.

In Portage Bay, construction work bridges would be built on the north and south sides of the bridge and would remain in place for a combined duration of a little more than 5 years. In Union Bay, the north and south construction work bridges would be in place for a combined duration of approximately 5.5 years for Option K.

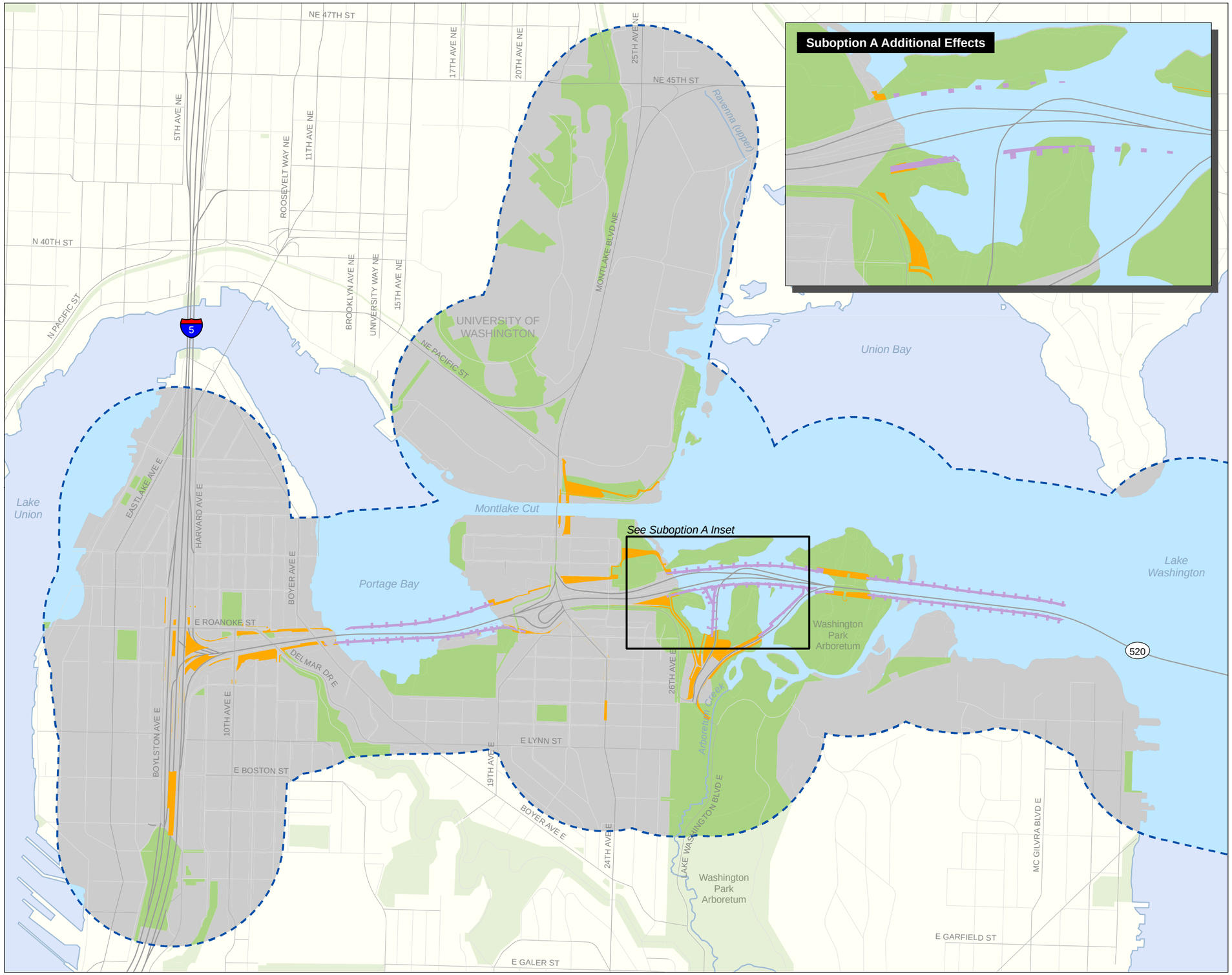
In addition, WSDOT would build a 60-foot-wide detour bridge in Union Bay from Montlake Boulevard to Foster Island, which would remain in place approximately 4 years.

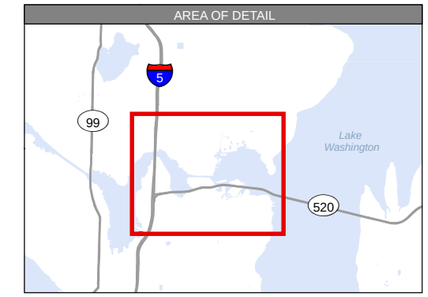
For Option K, 8.7 acres of vegetation would be shaded by construction work bridges and the construction detour bridge. Of these 8.7 acres, 8.2 acres would be wetlands (see Exhibits 4-9 and 4-11). Option K would result in the most shading from construction among the options; this difference is primarily the result of the proposed construction detour bridge. The addition of the suboptions for Option K would not increase clearing or shading of vegetation (see Exhibits 4-8 and 4-10).

Option L

For Option L, there would be 14.0 acres of vegetation cleared for construction activities. The largest area of clearing would be in the Urban Matrix cover type (9.2 acres), with 4.8 acres of vegetation cleared in Parks and Other Protected Areas (see Exhibits 4-5, 4-7, and 4-12). Option L would have more vegetation cleared for construction activities compared to Option A, but less than Option K.

When the suboptions are added to Option L, 0.2 acre of vegetation would be cleared in Parks and Other Protected Areas. These effects would be from activities related to the construction of wider lanes in order to increase capacity northbound on Montlake Boulevard Northeast (see Exhibits 4-6 and 4-8).





Construction Effect

- Direct Removal
- Shading

Habitat Type

- Urban Matrix
- Park or Other Protected Area
- Open Water
- Existing Roadway
- Stream
- Study Area
- Park

N

0 500 1,000 2,000 Feet

Source: Parametrix (2009) GIS Data (Habitat), King County (2005) GIS Data (Streets and Streams) King County (2007) GIS Data (Water Bodies), and CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 4-6. **Construction Effects of Option A and its Suboptions on Cover Type**

I-5 to Medina: Bridge Replacement and HOV Project

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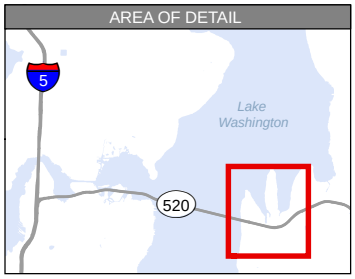


Construction Effect

- Direct Removal
- Shading

Habitat Type

- Urban Matrix
- Park or other Protected Area
- Open Water

- Existing Roadway
- Stream
- Study Area
- Park

Source: Parametrix (2009) GIS Data (Habitat), King County (2005) GIS Data (Streets and Streams) King County (2007) GIS Data (Water Bodies), and CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 4-7. **Construction Effects of Options A, K, or L on Cover Type in the Eastside Area**

I-5 to Medina: Bridge Replacement and HOV Project

Exhibit 4-8. Vegetation Removal from Construction by Cover and Habitat Type for Suboptions Only (acres)

	I-5 Area	Portage Bay Area	Montlake Area	West Approach Area	Floating Bridge and Eastside Transition Area	Total Effect (Full Build)
Option A Suboptions						
Parks and Other Protected Areas						
Deciduous and/or Coniferous Trees	-	-	-	0.2	-	0.2
Shrub/Grass	-	-	-	0.1	-	0.1
Wetland	-	-	-	0.1	-	0.1
Subtotal	**-**	**-**	**-**	**0.5**	**-**	**0.5**
Open Water						
Wetland	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-
Urban Matrix						
Deciduous and/or Coniferous Trees	<0.1	-	<0.1	<0.1	-	<0.1
Shrub/Grass	<0.1	<0.1	<0.1	<0.1	-	<0.1
Wetland	-	-	-	<0.1	-	<0.1
Subtotal	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**-**	**<0.1**
Option A Suboptions Total	**<0.1**	**<0.1**	**<0.1**	**0.5**	**-**	**0.5**
Option K Suboptions						
Parks and Other Protected Areas						
Deciduous and/or Coniferous Trees	-	-	-	<0.1	-	<0.1
Shrub/Grass	-	-	-	<0.1	-	<0.1
Wetland	-	-	-	<0.1	-	<0.1
Subtotal	-	-	-	<0.1	-	<0.1
Open Water						
Wetland	-	-	-	-	-	-
Subtotal	**-**	**-**	**-**	**-**	**-**	**-**
Urban Matrix						
Deciduous and/or Coniferous Trees	<0.1	-	-	<0.1	-	-

Exhibit 4-8. Vegetation Removal from Construction by Cover and Habitat Type for Suboptions Only (acres)

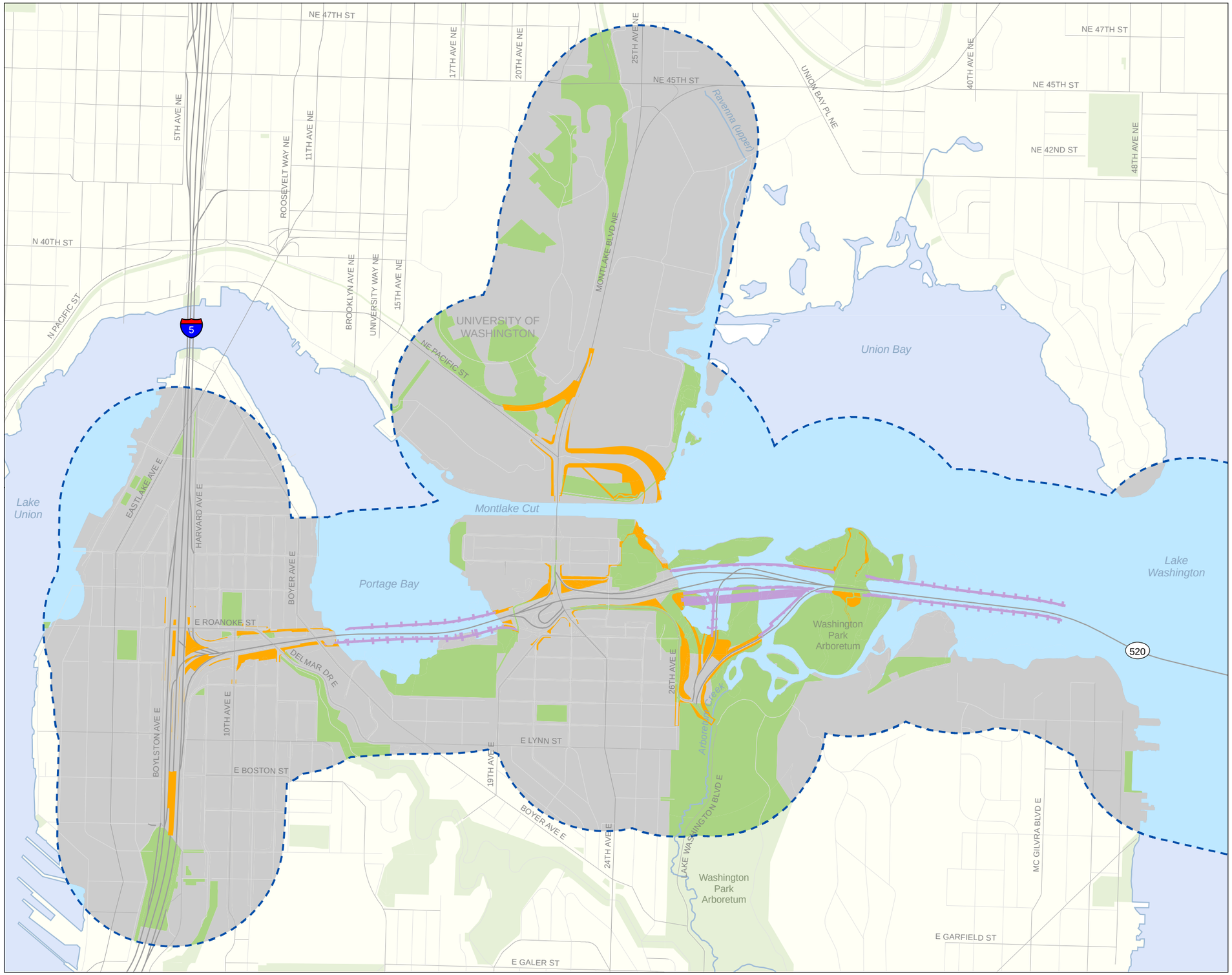
	I-5 Area	Portage Bay Area	Montlake Area	West Approach Area	Floating Bridge and Eastside Transition Area	Total Effect (Full Build)
Shrub/Grass	<0.1	<0.1	-	<0.1	-	<0.1
Wetland	-	-	<0.1	<0.1	-	<0.1
Subtotal	**<0.1**	**<0.1**	**-**	**<0.1**	**-**	**<0.1**
Option K Suboptions Total	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**-**	**<0.1**
Option L Suboptions						
Parks and Other Protected Areas						
Deciduous and/or Coniferous Trees	-	-	0.2	-	-	0.2
Shrub/Grass	-	-	<0.1	<0.1	-	<0.1
Wetland	-	<0.1	-	-	-	<0.1
Subtotal	**-**	**<0.1**	**0.2**	**<0.1**	**-**	**0.2**
Open Water						
Wetland	-	-	-	-	-	-
Subtotal	**-**	**-**	**-**	**-**	**-**	**-**
Urban Matrix						
Deciduous and/or Coniferous Trees	<0.1	-	-	<0.1	-	<0.1
Shrub/Grass	<0.1	<0.1	<0.1	<0.1	-	<0.1
Wetland	-	-	<0.1	-	-	<0.1
Subtotal	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**-**	**<0.1**
Option L Suboptions Total	**<0.1**	**<0.1**	**0.2**	**<0.1**	**-**	**0.2**

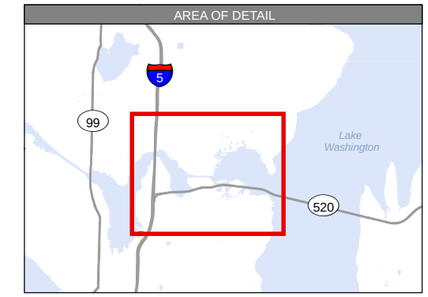
Exhibit 4-9. Shading from Construction by Cover and Habitat Type for each Option (acres)

Area, Cover Type, and Habitat Type	Option A	Option K	Option L
Parks and Other Protected Areas			
Deciduous and/or Coniferous Trees	-	0.3	0.1
Shrub/Grass	-	0.3	<0.1
Wetland	0.8	2.1	1.2
Subtotal	**0.8**	**2.4**	**1.2**
Open Water			
Wetland	5.2	5.6	4.7
Subtotal	**5.2**	**5.6**	**4.7**
Urban Matrix			
Deciduous and/or Coniferous Trees	-	<0.1	<0.1
Shrub/Grass	-	<0.1	<0.1
Wetland	0.4	0.5	0.5
Subtotal	**0.4**	**0.6**	**0.5**
Total	**6.4**	**8.7**	**6.6**

Exhibit 4-10. Shading from Construction by Cover and Habitat Type for each Suboption Only (acres)

Area, Cover Type, and Habitat Type	Option A Suboptions	Option K Suboptions	Option L Suboptions
Parks and Other Protected Areas			
Deciduous and/or Coniferous Trees	<0.1	-	-
Shrub/Grass	0.1	-	-
Wetland	0.3	-	-
Subtotal	**0.4**	-	-
Open Water			
Wetland	0.1	<0.1	-
Subtotal	**0.1**	<0.1	**-**
Urban Matrix			
Deciduous and/or Coniferous Trees	-	-	-
Shrub/Grass	-	-	-
Wetland	-	-	-
Subtotal	**-**	-	-
Total	**0.5**	**<0.1**	-





Construction Effect

- Direct Removal
- Shading

Habitat Type

- Urban Matrix
- Park or Other Protected Area
- Open Water
- Existing Roadway
- Stream
- Study Area
- Park

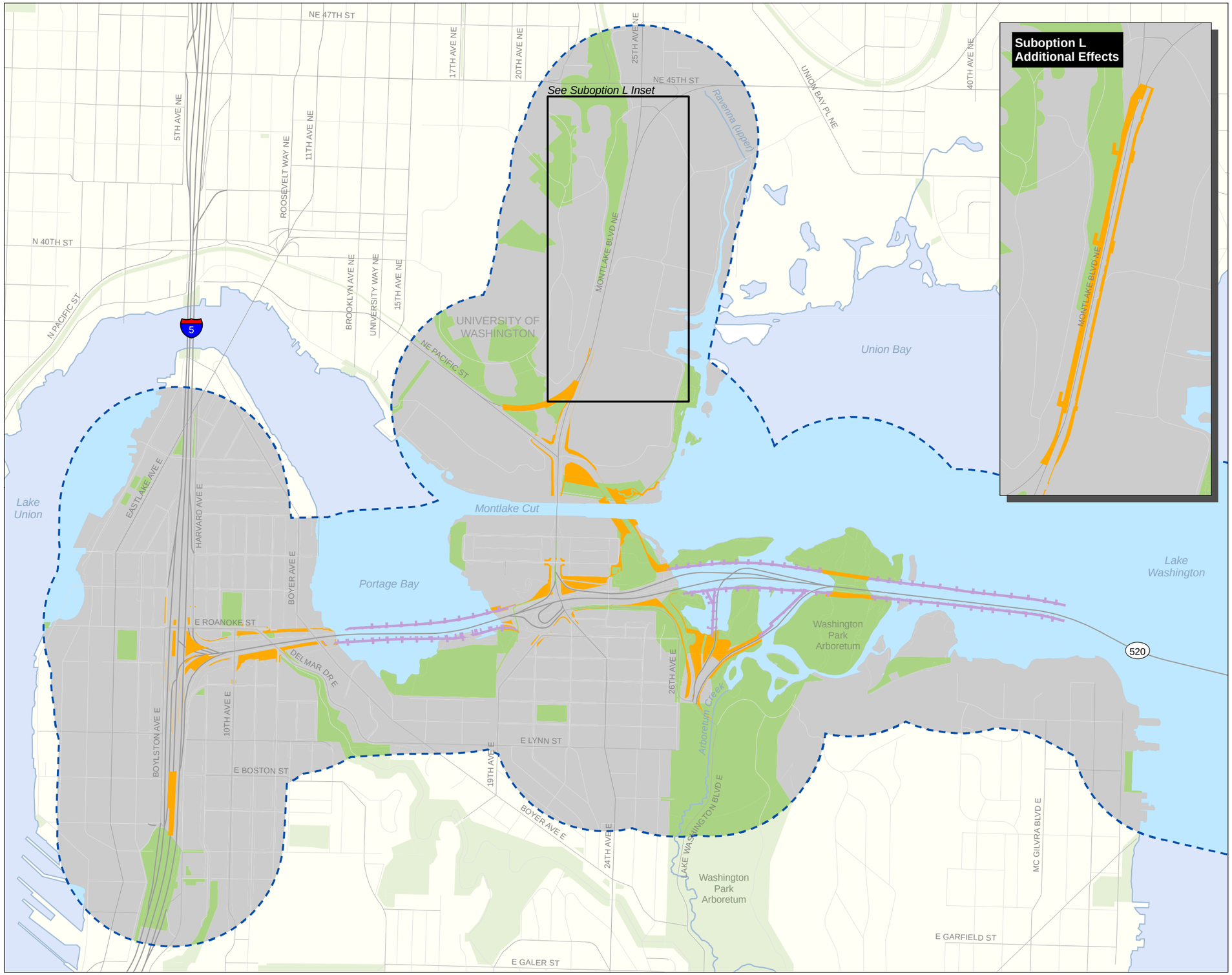
N

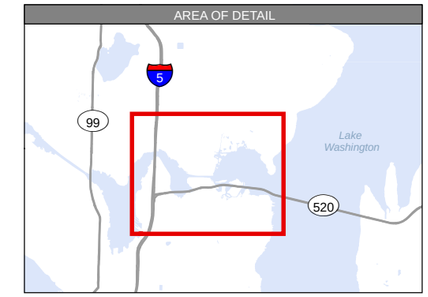
0 500 1,000 2,000 Feet

Source: Parametrix (2009) GIS Data (Habitat), King County (2005) GIS Data (Streets and Streams) King County (2007) GIS Data (Water Bodies), and CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 4-11. **Construction Effects of Option K on Cover Type**

I-5 to Medina: Bridge Replacement and HOV Project





Construction Effect

- Direct Removal
- Shading

Habitat Type

- Urban Matrix
- Park or Other Protected Area
- Open Water
- Existing Roadway
- Stream
- Study Area
- Park

N

0 500 1,000 2,000 Feet

Source: Parametrix (2009) GIS Data (Habitat), King County (2005) GIS Data (Streets and Streams) King County (2007) GIS Data (Water Bodies), and CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 4-12. **Construction Effects of Option L and its Suboptions on Cover Type**

I-5 to Medina: Bridge Replacement and HOV Project

In addition to clearing, vegetation would be shaded during construction by work bridges. Similar to Options A and K, in Portage Bay, construction work bridges would be built on the north and south sides of the bridge and would remain in place for a combined duration of a little more than 5 years. In Union Bay, the north and south construction work bridges would be in place for a combined duration of approximately 4.5 years for Option L.

With Option L, 6.6 acres of vegetation would be shaded from construction work bridges. Of these 6.6 acres, 6.4 acres would be wetlands. The amount of shading is very similar to Option A but less than Option K (see Exhibits 4-7, 4-10, and 4-12).

Lake Washington and Eastside Transition Area

For all options in the Lake Washington area, 1.4 acres of trees in the Urban Matrix cover type would be removed along the east shoreline of Lake Washington for the construction of the bridge maintenance facility (see Exhibits 4-5 and 4-7). No wetland habitat would be affected in this area. In addition, there would be no difference in effects among the options when their respective suboptions are considered.

There would be no effects to wildlife habitat in the Eastside transition area because construction would be limited to the paved areas. It was assumed that the Medina to SR 202 Project would be constructed prior to the I-5 to Medina Project.

Pontoon Construction and Transport

No vegetated wildlife habitat would be affected by the project as a result of the construction or transport of pontoons.

Phased Implementation Scenario

Effects on wildlife and their habitat would be phased over a longer time as construction is completed in phases. However, overall effects would be the same. There is the potential that some areas may be affected more than once if work has to occur in the same area but in different phases.

How would project construction-related water quality effects affect wildlife and habitat?

Seattle

All options and suboptions could affect wildlife and habitat through construction-related water quality effects, including the following:

- Effects on foraging waterfowl and other aquatic birds from deep-water sediments being disturbed (causing clouding of water that could obscure the prey of waterfowl and other aquatic birds) through pile driving and other in-water work
- Destruction of amphibian eggs through sedimentation (deposition and settling of sediment particles)
- Poisoning or otherwise injuring waterfowl, beavers, and other aquatic wildlife through spills of oil, gasoline, concrete, or other toxic substances

Measures to avoid or minimize these effects would include using erosion control barriers and implementing other BMPs. With the implementation of BMPs, construction effects on water quality would be similar between options; therefore, effects on wildlife would be similar between options. Please refer to the Fish and Aquatic Habitat section of this report for more discussion regarding in-water work and to the Water Resource Discipline Report (WSDOT 2009a) for more detail regarding water quality.

Lake Washington and Eastside Transition Area

Sedimentation and accidental spills of toxic substances could have adverse effects on wildlife that forage near the floating bridge. Wildlife species may avoid such areas if a spill occurs. However, it is likely that noise disturbance may deter wildlife from the area before potential water quality issues emerge.

Pontoon Construction and Transport

Towing trips associated with pontoon transport would result in a negligible increase in the amount of vessel traffic in the shipping lanes between Grays Harbor and Lake Washington. Towing would, therefore, not be expected to substantially increase the risk of adverse effects on water quality. Substrate disturbance from transport vessel propellers would likely be insignificant.

Phased Implementation Scenario

Construction of the project in phases would spread out the duration of disturbance over time. Overall effects would, however, be the same. Some areas potentially may be affected more than once if work has to occur in the same area but in different phases.

How would noise and other project construction activities affect wildlife and habitat?

The terms "construction noise" and "general construction" refer to the use of all heavy equipment, except pile driving, in the construction of bridges, additional lanes, lids, interchanges, ramps, tunnels, and traffic turnarounds. Operation of construction barges is considered a part of the general construction activities. Pile driving is discussed separately because of the relatively high noise levels that it would produce. Both in-water and in-air noise could potentially disturb wildlife.

Lighting associated with nighttime highway construction could also disturb wildlife. Such disturbance is expected to be greatest in areas where existing light levels are relatively low and in areas with minimal vegetation or other structures that can block the light.

Noise disturbance from construction activities could occur over almost 7 years for Options A and L and slightly more than 7 years for Option K. If the project is developed in phases, however, these periods would be drawn out over a longer time. Noise and associated construction activity can disturb wildlife by causing stress and altering behavior patterns and, therefore, interfering with activities such as reproduction and feeding. The degree of disturbance would depend on noise level, timing, and duration of construction activities, as well as the sensitivity of the individual animals. In general, most wildlife species found in areas adjacent to the project site are adapted to urban conditions and highway noise. However, loud construction activities could displace some animals or discourage them from using adjacent habitats. In extreme cases, birds could abandon their nests in response to noise disturbance.

Seattle

The average noise levels near wildlife habitat along SR 520 (within 100 feet) would rise from 60 to the low 70s in decibels on an A-weighted scale [dBA] (depending on the location), potentially reaching a maximum of 94 dBA during general construction.

What is a dBA?

A dBA, or A-weighted decibel provides an accurate "single number" measure of what the human ear can actually hear. When the A-weighted scale is used, a decibel level is designated as dBA.

Noise levels would decrease with distance from the construction area; in most cases, noise levels at distances of 750 to 1,000 feet from areas of active construction would be similar to existing noise levels.

Pile driving in the Portage Bay and the Washington Park Arboretum areas is anticipated to raise noise levels to a maximum of 105 dBA 50 feet from the pile driver. Noise levels would decrease with distance from pile driving. At 500 feet, anticipated noise levels from the pile driver would range from approximately 80 to 95 dBA; at 1,000 feet, noise levels would range from approximately 72 to 92 dBA. See the Noise Discipline Report (WSDOT 2009c) for more details on construction noise. Noise from construction could cause wildlife to avoid this area during construction.

General construction noise levels would be similar between the options. Any difference in noise level would be unsubstantial and localized. Option K may have more noise associated with general construction than Options A or L because of the construction of the construction detour bridge over Union Bay to divert mainline traffic. None of the suboption activities would substantially increase noise levels above the general construction noise expected from the options.

Lake Washington and Eastside Transition Area

Noise in the Lake Washington and Eastside transition area would consist of general construction noise as described above for the Seattle area. In addition, pile driving could add additional noise levels to an area waterfowl and bald eagles use for foraging during the day. This could displace bald eagles and waterfowl during foraging periods. Nesting is not likely to occur near the floating span for any species; therefore, construction would not affect nesting wildlife.

The bridge maintenance facility would be constructed from the east shoreline out into the open water of Lake Washington. A small area of shoreline habitat would be cleared during construction. Noise from construction could cause wildlife to avoid this area during construction.

Pontoon Construction and Transport

The number of pontoon towing trips, although the exact number is unknown at this time, would not represent a substantial increase over the number of ships (potentially several thousand per year) that travel through the waters between Grays Harbor and Lake Washington. Increased ship traffic associated with the project would not be expected

to result in a noticeable increase in the amount of noise disturbance in the marine or freshwater environments. Marine organisms would likely affix themselves to the pontoons. However, once the pontoons are transported into the freshwaters of Lake Washington, these organisms would die and decompose in the lake. This decomposition would have a negligible effect on water quality in Lake Washington.

Phased Implementation Scenario

Construction of the project in phases would spread out the duration of disturbance over time. However, overall effects would be the same. Some areas may be affected more than once if work has to occur in the same area, but in different phases.

How would project construction affect federally listed species and federal species of concern?

Seattle

Vegetation clearing associated with construction work bridges could involve removing several large trees near the Washington Park Arboretum. These trees provide potential eagle nesting and perching sites. Additionally, the two sculptures that bald eagles frequently use for perching would be removed. However, most of the suitable nesting and perching trees are located outside the study area and would not be affected. Although unlikely, if birds protected by the Migratory Bird Treaty Act would be affected by construction activities, WSDOT would obtain a permit. Option K may have a larger effect on federally listed species or species of concern from construction activities because construction would take a year longer than Options A and L.

Bald Eagles

Noise from general construction activities and pile driving could affect both nesting and foraging bald eagles, particularly the eagles that occupy the Broadmoor nesting territory. The effects of construction noise on nesting and foraging bald eagles in urban environments have not been well studied.

Nest monitoring over 8 years at Discovery Park in Seattle indicated that construction noise that was approximately 1,300 feet away did not adversely affect bald eagles at their nest site (Parametrix 1996). However, pile driving was not a part of construction activities at Discovery Park.

The foraging area for the Broadmoor eagle pair includes the area along Lake Washington where construction activities and pile driving would occur. The pair's three nest sites are approximately 900 feet to 1,500 feet from construction and pile-driving areas. The 2009 nest site is, however, approximately 900 feet from the SR 520 corridor. The eagles are expected to avoid foraging in the immediate vicinity of construction and pile driving. However, remaining foraging habitat within the bald eagles' territory is expected to provide sufficient prey for the birds.

Because eagles are more sensitive to noise at their nest site than in their foraging areas, the Broadmoor eagles at their nest site could be affected. All three nest sites are visible from the highway, and there is no topographic cover to help reduce the noise. Some vegetation is present to help reduce noise effects. The louder noises created by pile driving could adversely affect the nesting activity of the Broadmoor eagle pair. USFWS considers pile driving within 1 mile of an eagle nest site as having the potential to adversely affect eagles. WDFW (2005) recommends, but does not require, that loud activities, such as pile driving, take place during the least sensitive time period for eagles, July 15 to January 31. The eagles' most sensitive period (nest establishment) is between February 1 and April 15.

Comparing existing noise levels at the Broadmoor eagles' nest sites to anticipated noise levels from pile driving helps determine how pile driving would affect the eagles. Based on model output, and assuming that hollow metal piles would be used for the construction work bridge, noise levels from pile driving could be approximately 78 dBA at the closest Broadmoor eagle nest. These noise level ranges are based on a maximum pile-driving noise of 105 dBA at 50 feet, with a 6.0 dBA reduction per doubling of distance. Existing noise levels near the Broadmoor eagle nest are in the upper 50s to mid-60s dBA.

At the next closest Broadmoor eagle nest site (approximately 1,250 feet from the nearest pile-driving location), noise levels from pile driving would be approximately 77 dBA. At the farthest Broadmoor eagle nest site (approximately 1,500 feet from the nearest pile driving), noise levels would be approximately 75.5 dBA.

The model results in the previous paragraphs provide general ranges of anticipated noise levels. Actual noise levels from pile driving would vary considerably from pile to pile, depending on the pile size, ground type, ground cover reduction, and surrounding vegetation that could buffer the noise associated with pile driving (WSDOT 2008d).

Because of the anticipated disturbance of the Broadmoor eagles, the 6-Lane Alternative could affect the nesting success of the eagle pair. Effects could occur over 4.5 to 5.5 years depending on the option. However, the pair has demonstrated a tolerance to noise and urban conditions. It is also possible that construction would negligibly influence the pair, with no effects on their nesting success.

Effects on wintering eagles are expected to be negligible from construction activities. Wintering eagles are not restricted by a need to remain near their nest sites, and the birds are expected to be able to move to other foraging areas outside of the construction and pile driving areas.

Peregrine Falcons

Construction noise and pile driving may affect foraging peregrine falcons at Portage and Union Bays. The birds would likely avoid portions of the bays near construction and pile-driving activities. However, other foraging habitat that the birds are known to use would remain, and overall effects on the birds are expected to be negligible.

Lake Washington and Eastside Transition Area

Construction activities for the relocation of the transit station and the maintenance facility would be similar to those associated with the Seattle area description. The closest bald eagle nest is over 1 mile from the Eastside transition area and there are no anticipated effects on bald eagles. No peregrine falcon nest sites are known within 1 mile of the proposed facilities.

Pontoon Construction and Transport

As discussed above, several federally protect wildlife species may occur in marine waters along the pontoon transport route (Exhibit 4-3). Key habitat elements for many of these species are generally close to shore and well away from the shipping lanes where pontoon transport would occur.

Some individuals may use areas farther offshore primarily for foraging. The transport of pontoons would not represent a substantial increase over the number of ships (potentially several thousand per year) that travel through the Strait of Juan de Fuca and the outer coast. Increased ship traffic associated with pontoon transport would not be expected to result in a noticeable increase in the amount of noise and disturbance to these species. The risk of collisions with any of these species would be

negligible. All the birds and marine mammals identified above can fly or swim quickly away from any oncoming vessels except leatherback sea turtles, which are slow swimmers. Given the rare occurrence of this species in Washington waters, the likelihood of a leatherback sea turtle encounter is low.

Pontoon transport would not likely result in effects on critical habitat for southern resident killer whales. Traffic associated with pontoon transport would not be expected to substantially increase the risk of adverse effects on killer whales.

Phased Implementation Scenario

Construction of the project in phases would spread out the duration of disturbance over time. However, overall effects would be the same. Some areas may be affected more than once if work has to occur in the same area, but in different phases.

How would project construction affect state-listed or other state priority species?

Seattle

Noise from construction activities and pile driving would likely temporarily displace state-listed and priority species (that is, western grebe, common loon, great blue heron, cavity-nesting ducks, band-tailed pigeon, and pileated woodpecker). None of these species are known to nest in the Seattle portion of the study area; consequently, construction disturbance would not be likely to affect nesting success. If nesting birds are present near construction and pile-driving activities, disturbance could cause possible nest abandonment. Options A, K, and L, as well as all suboptions associated with these options, would similarly not affect any of these species.

Nighttime light levels during construction could displace wildlife, particularly cormorants that use the piers near Washington Park Arboretum.

Lake Washington and Eastside Transition Area

Noise from construction activities and pile driving would likely displace state-listed and priority species from foraging sites in open water or along the edges of the floating bridge. These species do not nest in open water; therefore, no effects on nesting would be expected

for any of these species. No large trees would be removed; therefore, potential rookery habitat for great blue herons would not be affected.

Nighttime light levels during construction could displace wildlife such as waterfowl on Lake Washington, as well as cormorants that use the piers near the Washington Park Arboretum.

> What is a rookery?
>
> A rookery is a colony of breeding animals, such as seabirds, marine mammals, and sea turtles.
>
> What is haul-out site?
>
> Haul-outs are beaches, rocky areas, floats, and other areas where seals can rest, give birth, and nurse.

Phased Implementation Scenario

Construction of the project in phases would spread out the disturbance over time. However, overall effects would be the same. Some areas may be affected more than once if work has to occur in the same area, but in different phases.

How would operation of the project affect wildlife and habitat?

No Build Alternative

Under the No Build Alternative, no changes would occur to wildlife species, habitat, or vegetation within the study area. No change in use of wildlife habitat is expected if SR 520 continues operation under current conditions.

Under the No Build Alternative, the quality of stormwater runoff discharged to the surface waters in the study area would likely decline over time because of increased traffic. See the Water Resource Discipline Report (WSDOT 2009a) for more information on water quality. Declining water quality could expose wildlife that forage on plants, invertebrates, and fish in wetlands and aquatic areas (for example, waterfowl, great blue herons) to higher contaminant levels. The health and reproductive success of some wildlife species could be affected, depending on the overall pollutant levels. In addition, the natural environment is at risk from accidental spills as there currently is no means to capture spills.

6-Lane Alternative

The proposed project has the potential to affect habitat and/or wildlife in the following ways:

- Effects on vegetation used by wildlife, through loss of habitat, shading, and changes in hydrology
- Water quality effects from changes in stormwater

- Noise disturbance from increased noise levels in the highway vicinity
- Changes in obstructions to animal movement

The likelihood and anticipated magnitude of these potential effects are described below. Effects from wildlife habitat fragmentation would be negligible because the area is already highly fragmented by the existing roadway and surrounding development.

How would vegetation removal and shading from project operation affect wildlife and habitat?

Seattle

All Options and Suboptions

In the Open Water and in the Parks and Other Protected Areas cover types (specifically the Washington Park Arboretum), existing wildlife habitat quality is relatively high, and upland and wetland vegetation removal would represent a loss of wildlife cover and forage.

Operational effects are effects that would occur while the new bridge, roadways, ancillary facilities, and any mitigation features are in use.

Two specimen tree collections near MOHAI would also be affected. The tree collection located west of 24th Avenue NE and south of Hamlin Street includes Scotch pine, Italian cypress, Port Orford cedar, and incense cedar. These trees could be removed for the bicycle/pedestrian path and the Montlake Boulevard off-ramps. The tree collection nearest MOHAI may be also affected, including possible removal of several species of pine and birch. The main portion of a stormwater facility would be constructed at this site. The extent of the effect on the specimen tree site is not known at this time.

Habitat quality is generally low for the Urban Matrix cover type. Removing vegetation would reduce cover for urban-adapted species such as black-capped chickadees, American robins, and eastern gray squirrels. Waterfowl such as Canada geese and mallards would likely continue to use the area.

This beaver lodge near Foster Island is within the footprint of the 6-Lane Alternative.

The proposed project would have an effect on beavers because a large beaver lodge in Union Bay adjacent to Foster Island likely would be displaced by the new bridge. This displacement, as well as the time and energy required to construct

a new lodge, could affect the beavers' reproductive success until the new lodge is constructed.

Vegetation would be permanently removed from areas where new roadway would be on the ground and some vegetation would be removed for columns to support the roadway. Vegetation would be shaded where the roadway (bridges and approaches) would be elevated, such as in Portage Bay and through the Washington Park Arboretum. Actual shading effects in individual areas would depend on roadway height in the area and existing vegetation cover.

Also of potential concern is shading of wetlands in the Parks and Other Protected Areas and in the Open Water cover types. The wetland habitat type provides a great deal of diversity for wildlife. The height of the elevated roadway through the Washington Park Arboretum area in Options A and L would accommodate shrubs and some trees; however, the increased bridge width would limit light and rain, and would likely preclude vegetation growth in some portions of the wetlands. In any case, reduced wildlife use under the roadway would more likely be due to noise than to changes in vegetation.

Shading of vegetation would occur primarily within the Seattle area because there is little vegetation in the Lake Washington area. The elevated roadway would shade open water, but shading in open-water areas would not likely affect wildlife. Shading of open-water habitat is discussed in the Fish and Aquatic Resources section.

Option A

Approximately 11.4 acres would be permanently removed from mostly the Urban Matrix cover type, evenly spread among all areas. Less than 0.1 acre of wetland would be affected (see Exhibits 4-13, 4-14, and 4-15). When suboptions are included in Option A, an additional 0.2 acre of habitat would be removed in the west approach area in the Parks and Other Protected Areas (see Exhibits 4-14 and 4-16). These additional effects would result from the eastbound and westbound off-ramps to Lake Washington Boulevard.

Exhibit 4-13. Vegetation Removal from Operation by Cover and Habitat Type for each Option (acres)

	I-5 Area	Portage Bay Area	Montlake Area	West Approach Area	Floating Bridge Area	Eastside Transition Area	Total Effect (Full Build)
Option A							
Parks and Other Protected Areas							
Deciduous and/or Coniferous Trees	<0.1	<0.1	-	0.8	-	-	0.8
Shrub/Grass	0.1	0.2	0.1	0.9	-	-	1.3
Wetland	-	<0.1	-	<0.1	-	-	<0.1
Subtotal	**0.1**	**0.2**	**0.1**	**1.7**	**-**	**-**	**2.1**
Open Water							
Wetland	-	<0.1	-	<0.1	-	-	<0.1
Subtotal	**-**	**<0.1**	**-**	**<0.1**	**-**	**-**	**<0.1**
Urban Matrix							
Deciduous and/or Coniferous Trees	0.9	0.4	0.5	0.6	2.7	-	5.0
Shrub/Grass	0.5	1.3	2.0	0.2	-	-	4.2
Wetland	-	0.1	<0.1	<0.1	-	-	0.1
Subtotal	**1.4**	**1.8**	**2.5**	**0.8**	**2.7**	**-**	**9.2**
Option A Total	**1.6**	**2.0**	**2.6**	**2.5**	**2.7**		**11.4**
Option K							
Parks and Other Protected Areas							
Deciduous and/or Coniferous Trees	<0.1	<0.1	0.7	3.5	-	-	4.3
Shrub/Grass	0.1	0.1	2.0	1.5	-	-	3.8
Wetland	-	<0.1	0.1	0.4	-	-	0.6
Subtotal	**0.1**	**0.2**	**2.9**	**5.4**	**-**	**-**	**8.7**
Open Water							
Wetland	-	<0.1		1.1	-	-	1.1
Subtotal	**-**	**<0.1**		**1.1**	**-**	**-**	**1.1**
Urban Matrix							
Deciduous and/or Coniferous Trees	0.9	0.5	0.8	0.4	2.7	-	5.3
Shrub/Grass	0.5	1.9	1.8	<0.1	-	-	4.3
Wetland	-	0.1	<0.1	<0.1	-	-	0.1
Subtotal	**1.4**	**2.5**	**2.6**	**0.4**	**2.7**	**-**	**9.7**

Exhibit 4-13. Vegetation Removal from Operation by Cover and Habitat Type for each Option (acres)

	I-5 Area	Portage Bay Area	Montlake Area	West Approach Area	Floating Bridge Area	Eastside Transition Area	Total Effect (Full Build)
Option K Total	**1.6**	**2.7**	**5.5**	**7.0**	**2.7**	**-**	**19.5**
Option L							
Parks and Other Protected Areas							
Deciduous and/or Coniferous Trees	<0.1	<0.1	0.6	0.4	-	-	1.0
Shrub/Grass	0.1	0.1	0.7	0.7	-	-	1.6
Wetland	-	<0.1	0.1	0.1	-	-	0.2
Subtotal	**0.1**	**0.2**	**1.4**	**1.1**	**-**	**-**	**2.8**
Open Water							
Wetland	-	<0.1	<0.1	<0.1	-	-	<0.1
Subtotal	**-**	**<0.1**	**<0.1**	**<0.1**	**-**	**-**	**<0.1**
Urban Matrix							
Deciduous and/or Coniferous Trees	0.9	0.6	0.4	0.2	2.7	-	4.7
Shrub/Grass	0.5	1.9	0.8	<0.1	-	-	3.2
Wetland	-	0.1	<0.1	<0.1	-	-	0.1
Subtotal	1.4	2.5	1.2	0.2	2.7	-	8.0
Option L Total	**1.6**	**2.7**	**2.5**	**1.3**	**2.7**	**-**	**10.8**

Approximately 3.2 acres of vegetation would be shaded by new bridge structures, with all of this area in wetlands (see Exhibits 4-14, 4-15, and 4-17). When suboptions are added, less than 0.1 acre more vegetation would be shaded (see Exhibit 4-18).

Option K

Approximately 19.5 acres of vegetation would be removed under Option K, primarily within the Urban Matrix cover type, with most in the Montlake area (see Exhibits 4-13, 4-15, and 4-19). When suboptions are included in Option K, there would be virtually no change to wildlife habitat (less than 0.1 acre) (see Exhibit 4-16).

In addition, approximately 4.2 acres of vegetation would be shaded; of this area, 2.8 acres would be wetlands (see Exhibits 4-15, 4-17, and 4-19). When suboptions are added, there would be no increase in the vegetation shaded (see Exhibit 4-18).

Option L

Approximately 10.8 acres of vegetation would be removed, primarily within the Urban Matrix cover type, approximately spread between the geographic areas (see Exhibits 4-13, 4-15, and 4-20). When suboptions are included in Option L, 0.1 acre more vegetation would be affected (see Exhibit 4-16).

Approximately 7.1 acres of vegetation would be shaded; of this area, 4.3 acres would be wetlands (see Exhibits 4-15, 4-17, and 4-20). When suboptions are included, no more vegetation would be shaded (see Exhibit 4-18).

In summary, Option K would result in the greatest loss of wildlife habitat, mostly within the Urban Matrix cover type, both with and without the suboptions. Option L would shade the most wildlife habitat, both with and without suboptions.

Lake Washington and Eastside Transition Area

In Lake Washington and the Eastside transition area, less than 3 acres of vegetation would be removed with any of the options. These numbers are included in the total areas above. The 3 acres would be removed in association with construction of the bridge maintenance facility (see Exhibits 4-13 and 4-15).

Effects from shading are not separated out by area and are discussed by option above. There would be no effects in the Eastside transition area because work would be limited to the paved areas.

Pontoon Construction and Transport

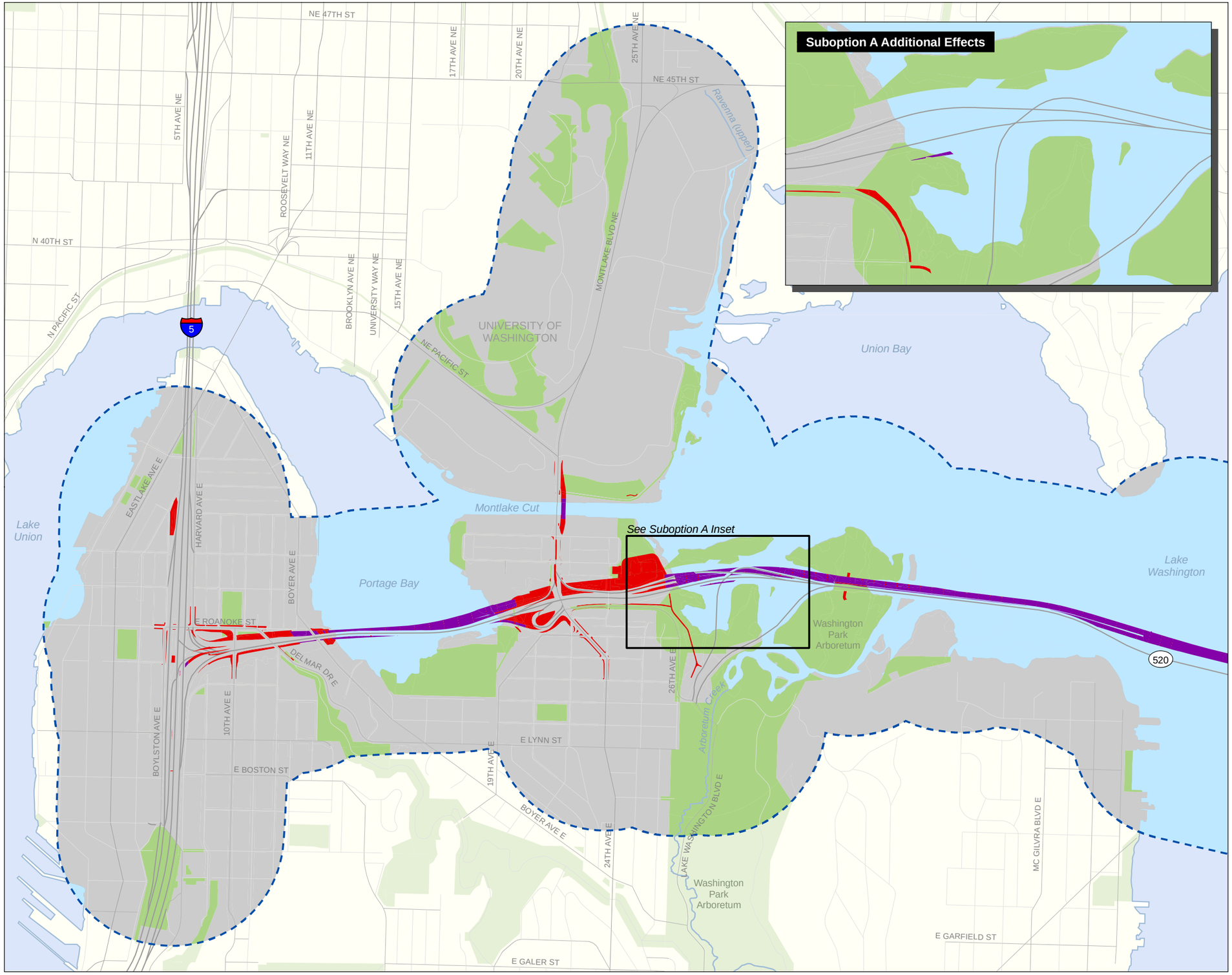
There would be no disturbance to wildlife along the pontoon transport corridor from pontoon construction, and transport is only related to construction. Pontoon construction and transport are not discussed further in this section related to operational effects.

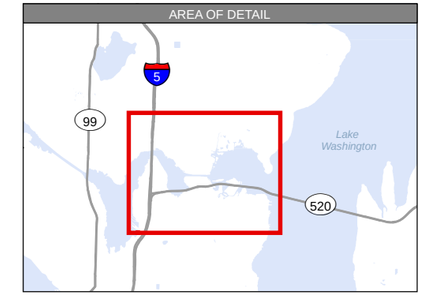
Phased Implementation Scenario

Construction of the project in phases would spread out the duration of disturbance over time. However, the overall effects would be the same.

How would changes in water quality during project operation affect wildlife and habitat?

All the options would include stormwater treatment facilities to treat and remove pollutants from the roadway and associated structures.





Operational Effect

- Direct Removal
- Shading

Habitat Type

- Urban Matrix
- Park or Other Protected Area
- Open Water
- Existing Roadway
- Stream
- Study Area
- Park

N

0 500 1,000 2,000 Feet

Source: Parametrix (2009) GIS Data (Habitat), King County (2005) GIS Data (Streets and Streams) King County (2007) GIS Data (Water Bodies), and CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 4-14. **Operational Effects of Option A and its Suboptions on Cover Type**

I-5 to Medina: Bridge Replacement and HOV Project

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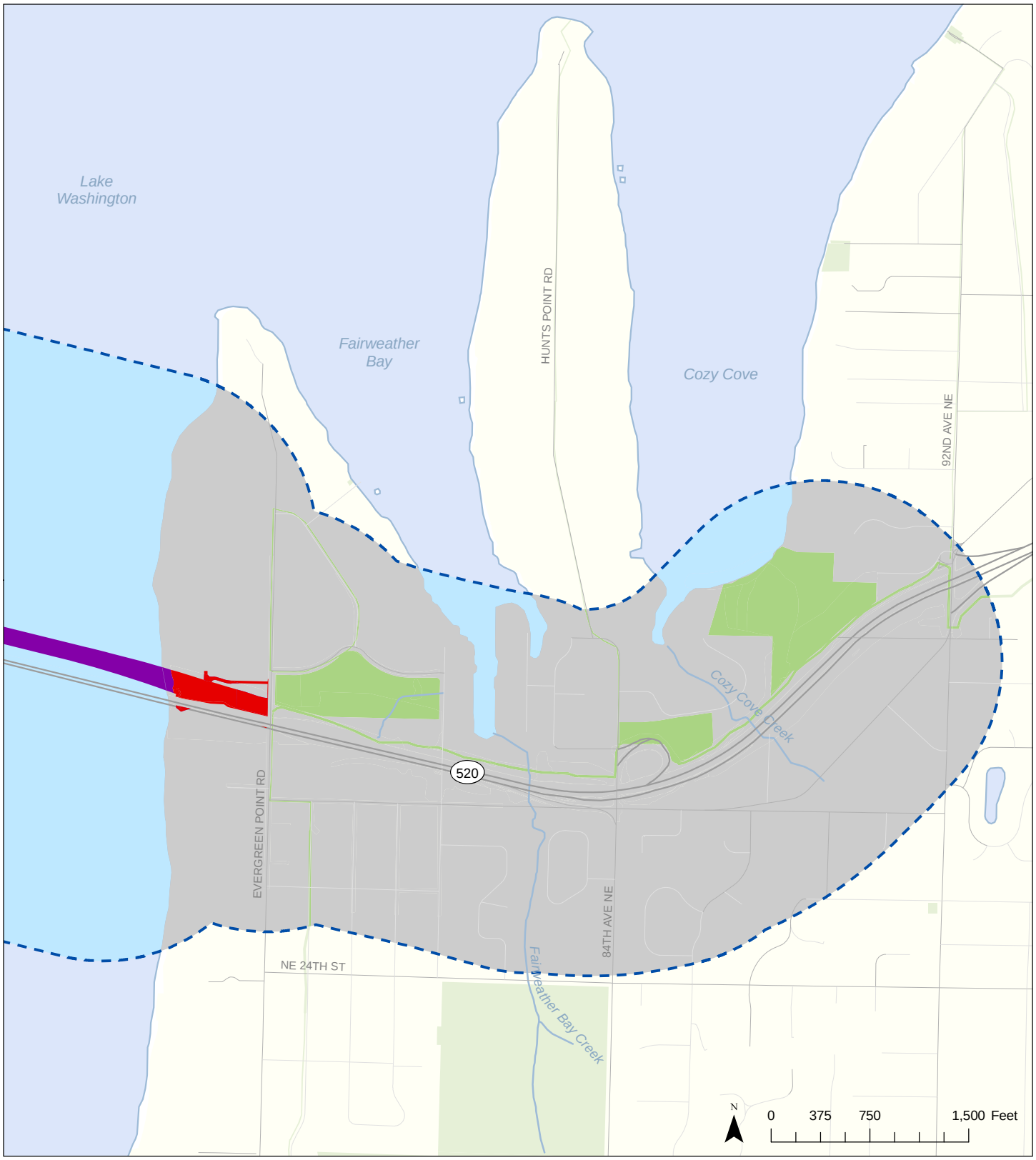
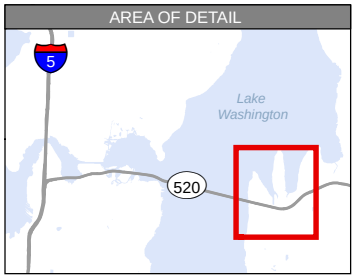




Operational Effect

- Direct Removal
- Shading

Habitat Type

- Urban Matrix
- Park or Other Protected Area
- Open Water
- Existing Roadway
- Stream
- Study Area
- Park

Source: Parametrix (2009) GIS Data (Habitat), King County (2005) GIS Data (Streets and Streams) King County (2007) GIS Data (Water Bodies), and CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 4-15. **Operational Effects of Options A, K, or L on Cover Type in the Eastside Area**

I-5 to Medina: Bridge Replacement and HOV Project

Exhibit 4-16. Vegetation Removal from Operation by Cover and Habitat Type for Suboptions Only (acres)

	I-5 Area	Portage Bay Area	Montlake Area	West Approach Area	Floating Bridge and Eastside Transition Area	Total Effect (Full Build)
Option A Suboptions						
Parks and Other Protected Areas						
Deciduous and/or Coniferous Trees	-	-	-	0.1	-	0.1
Shrub/Grass	-	<0.1	-	0.1	-	0.1
Wetland	-	-	-	<0.1	-	<0.1
Subtotal	**-**	**-**	**-**	**0.2**	**-**	**0.2**
Open Water						
Wetland	-	-	-	<0.1	-	<0.1
Subtotal	**-**	**-**	**-**	**<0.1**	**-**	**<0.1**
Urban Matrix						
Deciduous and/or Coniferous Trees	-	-	-	-	-	-
Shrub/Grass	-	<0.1	-		-	<0.1
Wetland	-	-	-	-	-	-
Subtotal	**-**	**<0.1**	**-**	**-**	**-**	**<0.1**
Option A Suboptions Total	**-**	**<0.1**	**-**	**0.2**	**-**	**0.2**
Option K Suboptions						
Parks and Other Protected Areas						
Deciduous and/or Coniferous Trees	-	<0.1	-	-	-	<0.1
Shrub/Grass	-	-	-	-	-	-
Wetland	-	-	-	-	-	-
Subtotal	**-**	**<0.1**	**-**	**-**	**-**	**<0.1**
Open Water						
Wetland	-	-	-	-	-	-
Subtotal	**-**	**-**	**-**	**-**	**-**	**-**
Urban Matrix						
Deciduous and/or Coniferous Trees	-	-	-	-	-	-
Shrub/Grass	-	-	-	-	-	-
Wetland	-	-	-	-	-	-

Exhibit 4-16. Vegetation Removal from Operation by Cover and Habitat Type for Suboptions Only (acres)

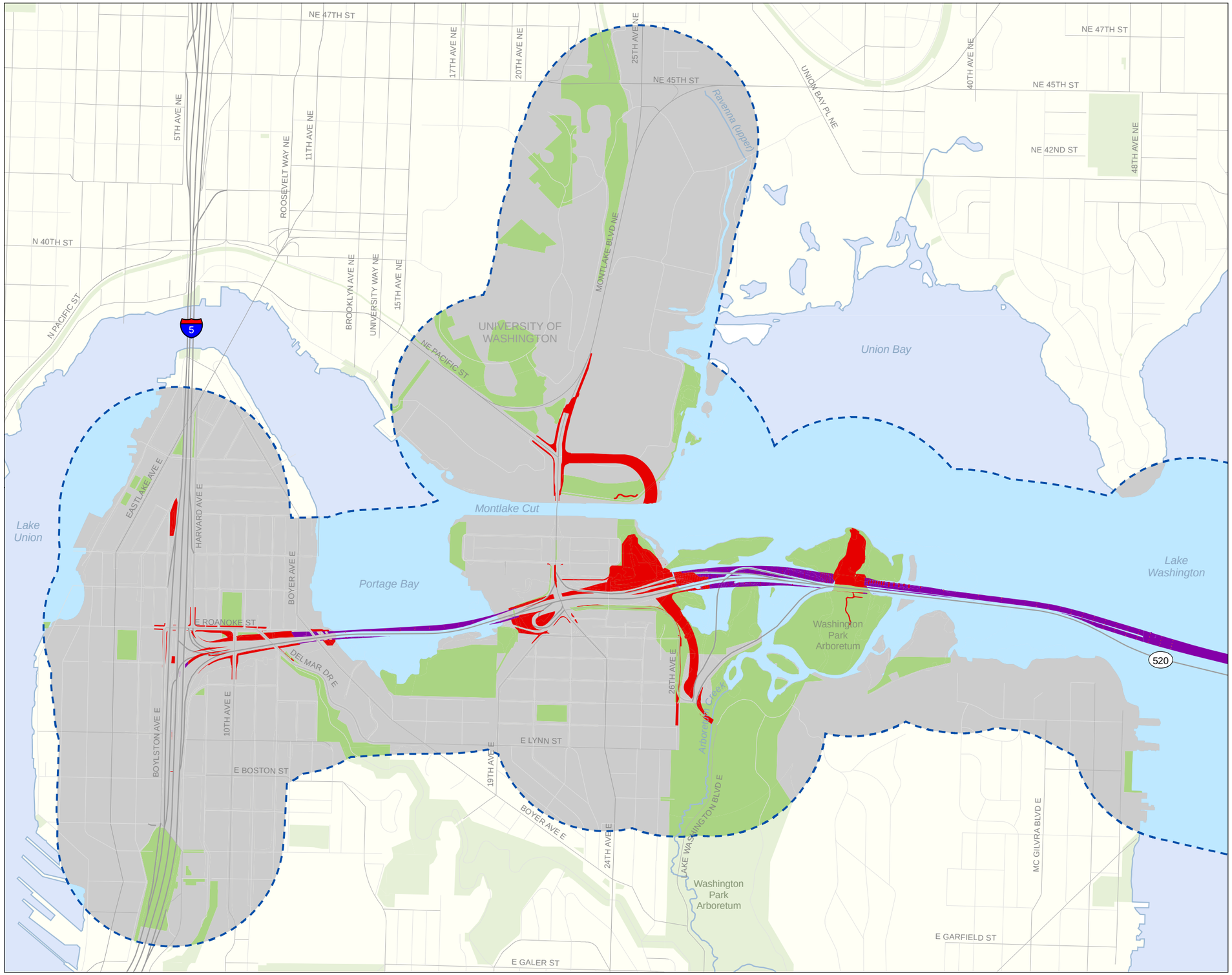
	I-5 Area	Portage Bay Area	Montlake Area	West Approach Area	Floating Bridge and Eastside Transition Area	Total Effect (Full Build)
Subtotal	**-**	**-**	**-**	**-**	**-**	**-**
Option K Suboptions Total	**-**	**<0.1**	**-**	**-**	**-**	**<0.1**
Option L Suboptions						
Parks and Other Protected Areas						
Deciduous and/or Coniferous Trees	-	-	<0.1	-	-	<0.1
Shrub/Grass	-	-	0.1	-	-	0.1
Wetland	-	-	-	-	-	-
Sub-Total	**-**	**-**	**0.1**	**-**	**-**	**0.1**
Open Water						
Wetland	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-
Urban Matrix						
Deciduous and/or Coniferous Trees	-	-	<0.1	-	-	<0.1
Shrub/Grass	-	-	<0.1	-	-	<0.1
Wetland	-	-	-	-	-	-
Subtotal	**-**	**-**	**<0.1**	**-**	**-**	**<0.1**
Option L Suboptions Total	**-**	**-**	**0.1**	**-**	**-**	**0.1**

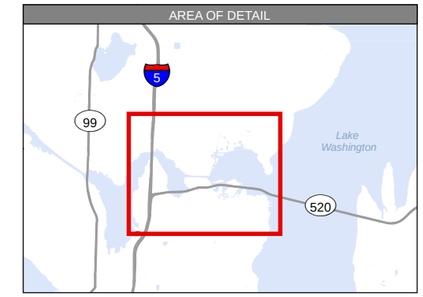
Exhibit 4-17. Shading from Operation by Cover and Habitat Type for each Option (acres)

Area, Cover Type, and Habitat Type	Option A	Option K	Option L
Parks and Other Protected Areas			
Deciduous and/or Coniferous Trees	-	<0.1	0.7
Shrub/Grass	<0.1	-	0.9
Wetland	0.2	0.3	0.4
Total	**0.2**	**0.3**	**2.0**
Open Water			
Wetland	2.9	2.5	3.8
Urban Matrix			
Deciduous and/or Coniferous Trees	-	1.1	0.6
Shrub/Grass	-	0.3	0.6
Wetland	0.1	<0.1	<0.1
Total	**0.1**	**1.4**	**1.3**
Total	**3.2**	**4.2**	**7.1**

Exhibit 4-18. Shading from Operation by Cover and Habitat Type for Suboptions Only (acres)

Cover Type and Habitat Type	Option A Suboptions	Option K Suboptions	Option L Suboptions
Parks and Other Protected Areas			
Deciduous and/or Coniferous Trees	-	-	-
Shrub/Grass	-	-	-
Wetland	<0.1	-	-
Total	**<0.1**	**-**	**-**
Open Water			
Wetland	0.1	-	-
Urban Matrix			
Deciduous and/or Coniferous Trees		-	-
Shrub/Grass	-	-	-
Wetland	-	-	-
Total	**-**	**-**	**-**
Total	**0.1**	**-**	**-**





Operational Effect

- Direct Removal
- Shading

Habitat Type

- Urban Matrix
- Park or Other Protected Area
- Open Water
- Existing Roadway
- Stream
- Study Area
- Park

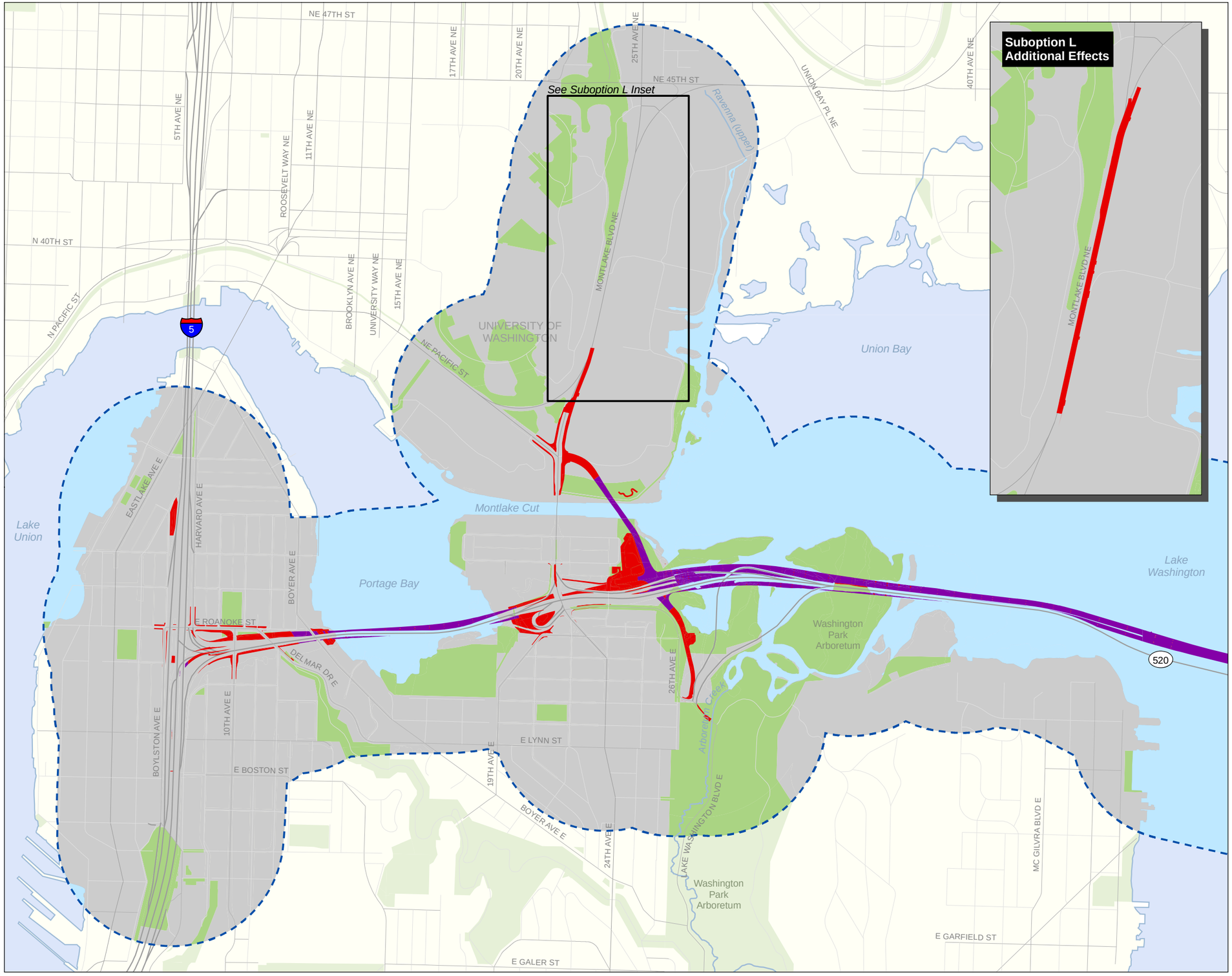
N

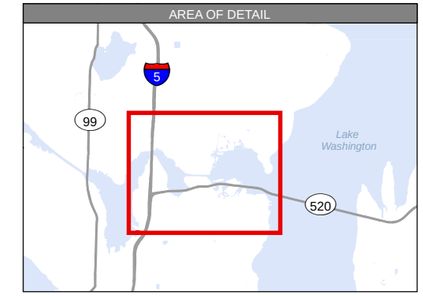
0 500 1,000 2,000 Feet

Source: Parametrix (2009) GIS Data (Habitat), King County (2005) GIS Data (Streets and Streams) King County (2007) GIS Data (Water Bodies), and CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 4-19. **Operational Effects of Option K on Cover Type**

I-5 to Medina: Bridge Replacement and HOV Project





Operational Effect

- Direct Removal
- Shading

Habitat Type

- Urban Matrix
- Park or Other Protected Area
- Open Water
- Existing Roadway
- Stream
- Study Area
- Park

N

0 500 1,000 2,000 Feet

Source: Parametrix (2009) GIS Data (Habitat), King County (2005) GIS Data (Streets and Streams) King County (2007) GIS Data (Water Bodies), and CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 4-20. **Operational Effects of Option L and its Suboptions on Cover Type**

I-5 to Medina: Bridge Replacement and HOV Project

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Sediment loads to receiving water bodies, including wetlands, would be reduced with all options and suboptions.

Stormwater discharges would be required to comply with federal and state water quality regulations. All options would be designed according to the 2008 *Highway Runoff Manual* (WSDOT 2008b). The Water Resource Discipline Report (WSDOT 2009a) provides details of the anticipated effects on water quality within specific basins.

Adverse effects on vegetation and habitat from increases in impervious surface area would not likely occur because the stormwater runoff would be treated prior to discharge into Lake Washington. Hydrologic changes in this area would be minimal because the Lake Washington water levels, regulated by USACE, largely control the hydrology of the adjacent habitats.

How would project operation cause disturbances to wildlife?

Seattle

Highway noise disturbs wildlife and can affect species distribution and behavior. WSDOT noise analysts predict that under all options, noise levels in the general area would be lower than existing conditions because sound walls would be installed along both sides of the highway through most of the Seattle study area. Consequently, noise disturbance to wildlife under all the options and suboptions would likely be slightly lower than under existing conditions.

Lake Washington

Anticipated noise levels from the proposed project, which would add noise from additional highway lanes on the floating portion of the Evergreen Point Bridge, would not likely raise noise levels substantially above existing conditions.

Eastside Transition Area

Disturbance of wildlife from noise would be similar to those effects described for the Seattle area, above.

How would project operation result in barriers or obstructions to wildlife movement?

Seattle

For Options A and L, throughout most of the Seattle area the roadway would be higher above the water than the existing bridge, and would be higher under Option A than Option L. For Option K, the bridges would be lower than existing conditions in the west approach area (see Exhibit 2-15). Elevating the roadway (especially through the Portage Bay and Foster Island areas) and installing sound walls in many areas could positively or negatively affect waterfowl and other aquatic birds, depending on their flight patterns and behavior. A higher structure would presumably interfere less with a bird in or near the water than the existing structure. However, when a bird is in flight away from the water, the higher structure and sound walls could cause greater interference, although the sound walls would primarily be installed close to residential areas, rather than near the Washington Park Arboretum, where waterfowl reside. These changes would not likely affect birds foraging in the area or elevate their risk of predation by eagles. The difference in slope profile between the options and suboptions would not likely change wildlife behavior patterns substantially because urbanized wildlife are generally adaptable and would adjust their flight patterns accordingly.

Changes in the bridge elevations would not affect passerine birds because the bridges are generally located over open water, away from passerine habitat. However, highway ramps and the portion of the highway that crosses Foster Island would be adjacent to passerine bird habitat. The bridges could hinder or improve the ability of passerine birds to forage in the vicinity, depending on the species of bird and its typical foraging height. Option K would include a landscaped lid over Foster Island through passerine bird habitat, which would introduce an avenue for public recreation that would not be available under the No Build Alternative or the other options. Disturbance to nesting and foraging passerine birds and waterfowl from public recreation would be greater with Option K due to the landscaped lid. Options A and L would not likely have a substantial effect on the overall foraging success or behavior of passerine birds in the vicinity.

Passerine bird families comprise more than half of all bird species. Most passerines are relatively small and are similar in shape. Passerine means "sparrowlike" and includes robins, sparrows, crows, warblers, and chickadees.

For terrestrial wildlife, passage between the north and south portions of Foster Island would improve under Options A and L. Under existing

conditions, SR 520's at-grade roadway and adjacent fencing are barriers to wildlife movement. The only passage available for terrestrial wildlife is through the pedestrian tunnel under the highway. Options A and L would elevate the highway, which would allow wildlife better movement under the highway. Option K would inhibit many wildlife species prevent wildlife from moving under the bridge. Wildlife could cross over SR 520 on the landscaped lid. However, this lid would be a manicured vegetation area, similar to an urban park, and would not provide habitat that would encourage wildlife use.

Lake Washington

The Evergreen Point Bridge would be maintained at its current elevation; as such, there would be no changes to wildlife use of the area. The bridge maintenance facility would not likely create any barriers to wildlife movement.

Eastside Transition Area

The new roadway would be maintained at the current elevation; therefore, there would be no changes to wildlife use of the area. The Evergreen Point Road transit stop would not likely create any barriers to wildlife movement.

How would project operation affect federally protected wildlife species?

Seattle

In the Seattle area, the operation of any of the options would have minimal effects on bald eagles and peregrine falcons. Noise disturbance to these species would be slightly lower than that produced by existing conditions because of the proposed sound walls. The sound walls would mitigate highway noise levels surrounding the bald eagle foraging areas near Portage Bay and the Washington Park Arboretum, as well as the peregrine falcon foraging areas in Union Bay.

The 6-Lane Alternative would remove a narrow swath of wetland and shoreline vegetation where these birds forage for prey. The effect on prey availability would be minimal, however, because this affected foraging area is small. Long-term effects on the abundance of prey (birds and fish) for bald eagle and peregrine falcon in other parts of the study area are not expected, as explained earlier in this section and in the Fish and Aquatic Habitat section of this report. The 6-Lane Alternative may affect bald eagle use of some potential perch trees,

because the eagles may avoid using trees underneath the new elevated roadway in the Washington Park Arboretum. However, most of the suitable nesting and perching trees for bald eagles and peregrine falcons are outside the project footprint and would not otherwise be affected by the project.

For Options A and L, the proposed bridges through the Washington Park Arboretum would be higher than existing conditions. The bridges for Option K would be lower than existing conditions. In addition, sound walls would be built adjacent to a portion of the roadway. It is unlikely that the bridges and sound walls would be more obstructive to foraging eagles and peregrine falcons than existing conditions.

Lake Washington and Eastside Transition Area

There would be no effects on federally protected species from the operation of the project. The closest bald eagle nest is over 1 mile from the Eastside transition area and there are no anticipated effects on bald eagles. No peregrine falcon nest sites are known within 1 mile of the proposed facilities.

How would project operation affect state-listed or other state priority species?

Seattle

Removing trees in forested areas and filling wetlands (see Exhibit 4-13), particularly in the Washington Park Arboretum, would reduce cover and/or foraging habitat for western grebes, great blue herons, hooded mergansers, wood ducks, band-tailed pigeon, and pileated woodpeckers. Noise from highway traffic under the three options would be lower than under the No Build Alternative; therefore, disturbance to these birds would be slightly reduced compared to existing conditions. Elevating the roadway (especially through Portage Bay and Union Bay) under Options A and L could have positive or negative effects, depending on birds' specific flight patterns and behavior. When the birds are in or near the water, the more elevated structure would presumably be less an obstruction than the existing structure.

Wintering wood ducks in open water habitat near the Washington Park Arboretum.

However, when the birds are in flight away from the water, the higher bridge structure could interfere with the birds more than the existing structure. It is unknown whether these changes would affect the birds' foraging or other behavior.

Option K would include a landscaped lid over Foster Island, which would introduce an avenue for public recreation that would not be present under the No Build Alternative or Options A and L. Under Option K, disturbance to foraging state-listed species and waterfowl from public recreation would, therefore, be greater than Options A and L. Options A and L would be unlikely to substantially affect the overall foraging success or behavior of state-listed or other priority species in the study area.

Lake Washington and Eastside transition area

No adverse effects on state-listed species would be expected from project operation. No changes in foraging patterns over the long term for state-listed species are expected.

How would the project alternatives differ in their effects on wildlife and habitat?

Exhibit 4-21 summarizes the differences in effects on wildlife and habitat between the No Build Alternative and 6-Lane Alternative associated options and suboptions. All options would generally affect wildlife and habitat in similar ways. However, small differences exist in the amount of vegetation clearing and shading, habitat loss, and wildlife passage.

Potential construction noise levels and the distance of construction areas from bald eagle nest sites and other sensitive habitats are similar among the options. The minor differences among the options would not result in substantial differences in the effects on wildlife.

Exhibit 4-21. Summary of Effects from Operation on Wildlife and Habitat

Type of Operation Effect				
Vegetation/Habitat Loss and Shading	**Effects to Wildlife from Change in Water Quality**	**Disturbance from Highway Operations**	**Changes in Barriers to Animal Movement**	**Effects on Federally and State-Listed Species (Bald Eagle)**
No Build Alternative				
Same as existing conditions.	Possible decline in aquatic wildlife health in basins over time with deterioration of water quality because of increasing traffic load.	Same as existing conditions.	No change. Barriers currently exist for wildlife movement.	Same as existing conditions.
6-Lane Alternative				
Option A				
Loss of wildlife habitat area: 11.4 acres, mostly trees and shrubs; 3.2 acres of shading.	Improvement over time as stormwater treatment facilities and BMPs would reduce sediment loads.	Less than existing conditions due to sound walls and mitigation of vegetation loss.	Barriers would be reduced as better culverts that allow passage are installed.	There would be effects from construction noise; no long-term effects expected on any species.
Option A with Suboptions				
Loss of wildlife habitat: increases by 0.2 and shading by 0.1 acre.	Same as Option A.	Same as Option A.	Same as Option A.	Same as Option A.
Option K				
Greatest loss of wildlife habitat area: 19.5 acres, mostly trees and shrubs; 4.2 acres of shading.	Slightly less sedimentation from Options A and L due to twin tunnels instead of bridges.	Same as Option A.	No substantial change from Option A.	Same as Option A.
Option K with Suboptions				
No additional change in wildlife habitat loss or shading.	Same as Option K.	Same as Option A.	Same as Option A.	Same as Option A.
Option L				
Least amount of wildlife habitat lost: 10.8 acres, mostly trees and shrubs; largest amount of shaded acres (7.1 acres).	Same as Option A.	Same as Option A.	Same as Option A.	Same as Option A.
Option L with Suboptions				
Wildlife habitat loss would increase by 0.1 acre but no additional shading.	Same as Option A.	Same as Option A.	Same as Option A.	Same as Option A.

Mitigation

What has been done to avoid or minimize negative effects on wildlife and habitat?

WSDOT will work with agencies to determine mitigation measures. WSDOT could use the following measures to avoid or minimize effects on wildlife and habitat:

- Limit construction clearing to minimal area needed.
- Follow BMPs and other safety measures to minimize erosion and sedimentation and to minimize the risk of spilling contaminants.
- Minimize pile driving near the Broadmoor eagle pair nest site during the early part of the bald eagle nesting season when the birds are most sensitive to disturbance. The bald eagle nesting period is January 1 to August 15, but they are most susceptible to noise from February 1 through May 1.
- Avoid or minimize effects on the beaver lodge near Foster Island during construction, if possible. Its proximity to the proposed bridge columns and construction piles may preclude its avoidance.
- Minimize removal of specimen trees in the Arboretum. If this is not possible, replant or replace trees nearby.
- Minimize effects of towing of pontoons using approved navigation channels.

What would be done to mitigate negative effects that could not be avoided or minimized?

Construction Mitigation

- Replant affected areas with native vegetation.
- Plant native shade-tolerant vegetation in areas under the elevated roadway and ramps, where feasible and practical.

What negative effects would remain after mitigation?

There would be a permanent loss of wildlife habitat under all options.

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