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## 5.12 Fish and Aquatic Resources

Finfish, shellfish, and aquatic organisms make use of several streams within the project area during some stage of their life cycle (such as spawning, rearing, and migrating). Most project area streams were modified over time and contain limited habitat for fish. A Biological Assessment has been prepared for the project, in compliance with the Endangered Species Act.

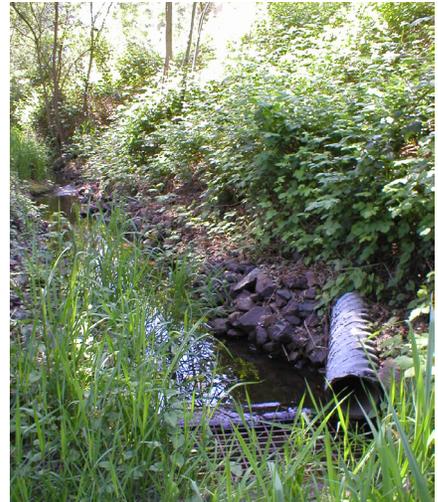
### **How did we identify and evaluate fish and aquatic resources for the Renton to Bellevue Project?**

Project biologists surveyed the habitat associated with each of the 22 streams identified in the Renton to Bellevue project area (Exhibit 5.12-1). The biologists also evaluated each of the streams for fish habitat value and expected fish presence. During the surveys, they also delineated the ordinary high water mark (OHWM) of each stream. Additionally, the biologists assessed the fish passage capabilities for each culvert that conveys a stream under I-405.

### **What streams are in the project area and what kinds of fish live in the streams?**

The biologists evaluated habitat for each stream both inside the I-405 right of way as well as an area extending 300 feet upstream and downstream from the right of way boundary. Only six of the streams in the project area are known by traditional names: the Cedar River, Johns Creek, Clover Creek, May Creek, Lakehurst Creek, and Coal Creek. The remaining sixteen streams were named by project biologists according to water resource inventory area (WRIA), the receiving water body, and the approximate milepost where the stream crosses I-405. For example, stream 08.LW-7.6 is located in WRIA 08, flows into Lake Washington, and crosses I-405 at milepost 7.6.

Avoiding or minimizing project effects to aquatic resources is a vital component of the project. Special consideration has been given to these resources because of the biological, environmental, economic, and cultural importance of fish and aquatic species in the Pacific Northwest.



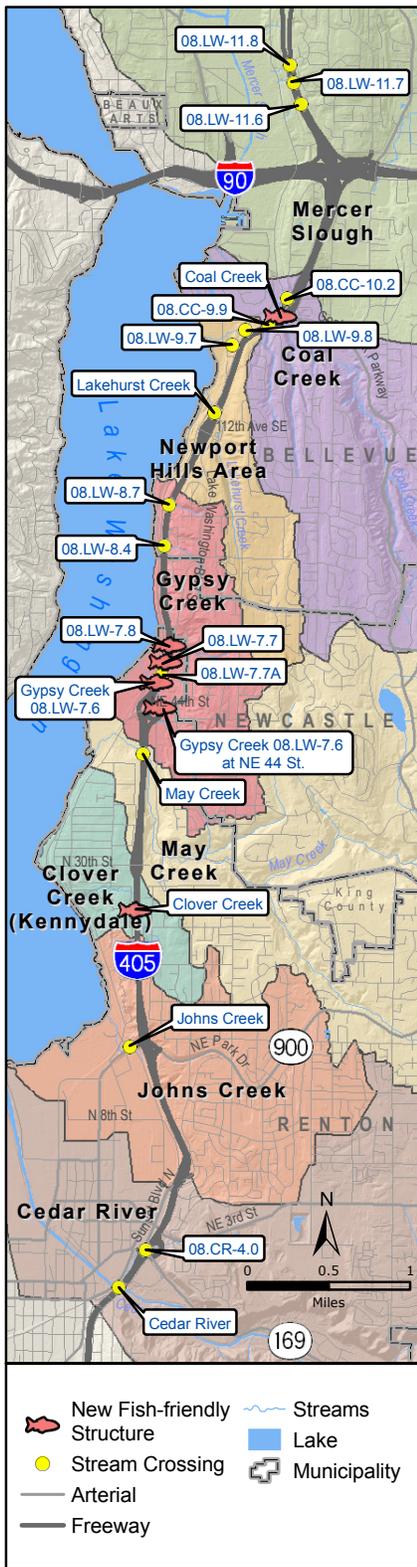
**Stream culvert in the study area**

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*Please refer to the Renton to Bellevue Fish and Aquatic Resources Discipline Report in Appendix X (on CD) for a complete discussion of the fish and aquatic resources analysis.*

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**Exhibit 5.12-1: Streams surveyed**



The primary species considered in the project area are the federal Endangered Species Act-listed salmonids. The listed species include fall Chinook salmon and bull trout. Other important species within the project area include coho, sockeye, and kokanee salmon; steelhead, rainbow, Dolly Varden, and cutthroat trout (WSDOT, 2002). Information provided by the USFWS indicates that migratory native char, including bull trout and Dolly Varden, occur within the Lake Washington system, but with low frequency (Lantz, USFWS, September 29, 2004). Bull trout adults or sub-adults may be present in Lake Washington (also in Lake Union and Lake Sammamish) year round, depending on the availability of prey resources. Currently, within the Cedar-Sammamish water resource inventory area (WRIA 8), there are no reproducing bull trout populations below the winter snow line (WDFW, 1999). There is no evidence that any of the streams in the vicinity of the Renton to Bellevue project area currently support bull trout.

There are several non-salmonid species present within the project area. They are either resident, migratory, exotic, warm water, or shellfish species. Non-salmonid species that may be present include sculpin, dace, stickleback, lamprey, crayfish, freshwater mussels, chub, northern pikeminnow, suckers, yellow perch, carp, and bullheads.

**What type of habitat is required for these fish?**

Fish habitat was evaluated upstream and downstream of I-405 even though the presence of migrating salmon is extremely limited because of impassable barriers downstream.

Salmon have specific habitat requirements. Different species have different needs for both juveniles and adults. Many of the I-405 streams provide habitat for juveniles but not for adults. Historically, many of these streams were too small for larger adult salmon spawning activities, especially Chinook. Of the smaller salmon species, coho, sockeye, and kokanee salmon, and cutthroat trout have the potential to occur in thirteen streams within the project area: Cedar River, Johns Creek, Clover Creek, May Creek, 08.LW-7.6, 08.LW-7.6A (Gypsy Creek system), 08.LW-7.7, 08.LW-7.7A, 08.LW-7.8, 08.LW-7.8A, Lakehurst Creek, Coal Creek, 08.LW-9.7, and 08.LW-9.8. These streams all flow into Lake Washington relatively close to the project area, which creates

eco-connectivity between the lakeshore habitat and the streams. Smaller fish often take advantage of different habitats, depending on the season or a specific life stage.

Bull trout require very cold water and high quality stream habitat. For a typical stream, this includes many deep pools with plenty of large woody debris in the stream and year-round cold water.

Biologists evaluated habitat conditions to determine which resident fish could be present. Resident fish and most of the non-salmonids are different from the migratory salmon species because they live in streams or lakes all their life—that is, they do not migrate to the ocean. Resident fish, which are often a food source for some salmonids and each other, may include native species as well as introduced species. Like salmon, resident species have unique habitat requirements for food, temperature, shade, or the presence of small gravels.

#### ***What is the condition of the fish habitat?***

Use by salmon and resident species is limited in many of the streams because of natural and development-caused conditions, including, but not limited to, poor water quality, lack of spawning substrate, limited open channels, steep gradients, non-passable culverts, and periods of high runoff.

Many of the streams also exhibit poor habitat and a low potential for salmon or resident species. This is attributed to conditions such as limited food sources, no cover, no water during part of the year, or a lack of open channels (because of pipes and culverts and water routed through stormwater control basins). Many of the unnamed urban drainages retain less than one-half of their historic open-water channels because portions of them have been piped underground. For others, during the dry summer months the flow disappears underground because of development upstream.

For bull trout, streams in the project area are too warm, they do not have enough woody debris for cover, and they do not contain the type of gravels needed for bull trout to lay eggs. Historically, because of natural limiting factors, bull trout use of the small streams in the project area probably ranged from extremely limited to no presence at all.

Cutthroat trout are more tolerant of urban stream conditions and appear in some of the streams that flow beneath I-405

#### **What is eco-connectivity?**

Eco-connectivity is environmental continuity accomplished by maintaining links between natural habitats or by defragmenting isolated habitats.

within the project area. Cutthroat trout can survive as a year-round stream resident, or they can migrate to and live in Lake Washington or Puget Sound. Most of the cutthroat in the project streams are considered to be year-round residents. Habitat in the project streams is adequate for cutthroat trout to spawn, hatch, and rear to adulthood.

***How will the project affect fish, aquatic habitat, and threatened and endangered fish species?***

WSDOT considers the Renton to Bellevue Project an opportunity to demonstrate how a highway can be constructed in an urban environment that either avoids or minimizes effects to natural resources, such as fish and streams. The Renton to Bellevue Project is in an urban area where people, buildings, and roads have existed for many decades, often in conflict with fish and streams.

WSDOT's goal is to minimize the harmful effects and maximize the long-term, beneficial effects by maintaining existing aquatic resources, and then improve those resources over time. Project engineers have used the results of the stream evaluations as a basis for making changes in the project design to avoid, minimize, or provide on-site and like-kind mitigation for potential effects. As a result of collaboration between the project biologists and design engineers, the Renton to Bellevue Project will have no major adverse effects on fish or aquatic resources and only minor, short- and long-term effects. In fact, the project will have beneficial effects on the Cedar River, Clover Creek, Stream 08.LW-7.7A, Stream 08.LW-7.8, May Creek, Coal Creek, and Gypsy Creek, including restoring fish passage, improving instream habitat, improving water quality and habitat by treating stormwater runoff, and removing existing instream obstructions such as pipes and screens.

WSDOT will build bridges on I-405 to replace a 350-foot-long, undersized culvert that conveys Coal Creek under I-405. Beneath the new bridge, Coal Creek will have sufficient space to meander freely, thereby restoring open channel habitat that will improve passage for steelhead, Chinook, and coho salmon, lamprey, cutthroat and other resident fish for full utilization of the watershed habitat.

WSDOT will also improve the stream habitat underneath the May Creek bridges. The removal of piers near the edge of

May Creek under the May Creek Bridge will allow the stream to meander more naturally compared to the confined channel that exists now. Fish will benefit when they seek the improved off-channel refuge during periods of high water.

WSDOT will replace four impassable cross-culverts with new, larger fish passage culverts in the Gypsy Creek, 08.LW-7.7, and 08.LW-7.8 stream systems. Large sections of inaccessible stream habitat will be opened up for use by several fish species, including coho salmon. The larger culverts will also provide greater stream eco-connectivity, a wider stream channel, healthier riparian habitats, and instream habitat restoration. When the direct habitat improvements occur in combination with the removal of stormwater discharge from the streams, the overall improvements to these streams result in over 5,600 feet of improved access and habitat values for fish to use.

Clover Creek is another stream where WSDOT will construct a new, larger fish passage culvert. Current effects of development throughout the Clover Creek stream corridor include the freeway, railroad, housing, a water supply diversion for a fish farm, major arterials, and stormwater projects. The stream has been degraded so much over the years that fish habitat values almost preclude fish life. WSDOT will create fish passage and instream habitat improvements that result in new access for salmonids to over 2,900 feet of stream upstream of I-405. The instream restoration phase includes 450 feet of new open-channel habitat that now flows through residential neighborhoods by means of a channel lined with creosote ties or is maintained in pipes and catch basins. Removing project stormwater discharge from Clover Creek will also enhance instream habitat values for all aquatic life upstream (indirectly) and downstream (directly) from the project area. The direct water quality benefit will enhance 2,800 feet of stream habitat downstream of the improvements.

Chinook salmon require very cold water to survive; therefore, WSDOT will manage vegetation adjacent to streams (vegetation is one of nature's ways of conserving water), within the right of way to benefit aquatic species by ensuring that:

- Vegetation will remain in place near the roadway streams and waterways;

**Where will fish-friendly culverts and structures be placed?**

WSDOT will make fish passage improvements at the following locations:

Clover Creek crossing – a new fish-friendly culvert and new stream channel;

Gypsy Creek crossing – two new fish-friendly culverts;

Stream 08.LW-7.7A crossing – new fish-friendly culvert;

Stream 08LW-7.8 crossing – new fish-friendly culvert;

Coal Creek crossing – replace a culvert with a bridge.

- Vegetation will be planted along streams to provide cover and to keep the water cool with additional shade; and
- Vegetation will be kept healthy and functioning over time.

Most of the other aquatic resources, including small insects, will also benefit from the colder water and extra vegetation.

In addition to shade, vegetation provides other long-term benefits. For example:

- Plants reduce erosion, thereby introducing less sand and dirt to the streams;
- Dead vegetation helps create big pools in the streams that attract fish;
- Plants retain and release water as part of a natural cycle that keeps water in streams during the hot summer;
- Tiny insects live on the wood and leaves of plants and provide food; and
- The stream banks and shoreline remain natural.

***Will the project remove barriers to fish passage?***

The project includes several beneficial actions that will restore and improve fish passage.

WSDOT will construct fish-friendly culverts or bridges to replace existing fish passage barriers on several streams (Gypsy Creek [2 culverts], 08.LW-7.7, 08.LW-7.8, and respective tributaries, Clover Creek, and Coal Creek). After WSDOT constructs the structures, juvenile and adult salmonids will be able to swim upstream and downstream beneath the freeway. Initially, and especially in the smaller streams, cutthroat trout and other resident species will benefit the most. The fish passage projects will have greater benefits in the future for migratory fish, as other barriers throughout the watershed are removed. Currently, these species either use lower portions of the watersheds, including the Lake Washington nearshore habitat, or have access to the lower stream sections.

Improvements to the stormwater treatment structures have indirect benefits to fish passage. The new stormwater

structures will help maintain normal stream flows, thereby making it easier for young fish to swim upstream during a storm event. This means fish will have better access to habitats.

Additionally, revegetation will help retain more water in the streams for longer periods of time. During the critical dry summer months, fish will benefit from improved access to habitats and have a higher likelihood of survival.

### ***How will construction activities affect fish and aquatic resources?***

Construction activities that can affect fish and stream habitat in the short term include:

- Filling and grading;
- Removing stream-side vegetation; and
- Temporarily diverting streams and dewatering.

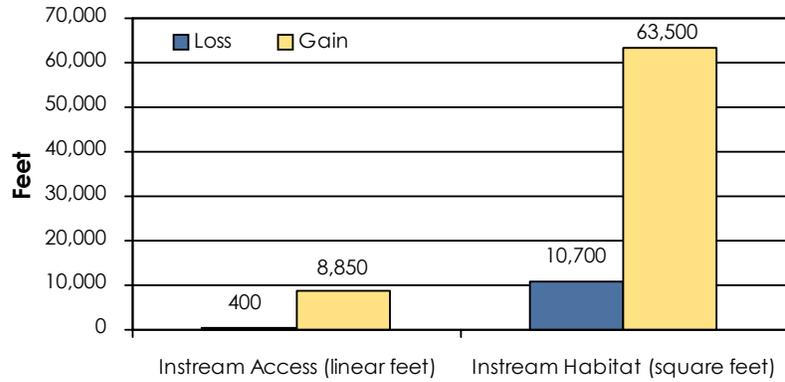
Road widening, culvert replacement and extension, as well as construction of headwalls, retaining walls, and stormwater conveyance systems and associated outfalls to streams, will involve some work in streams, resulting in some loss of instream habitat (such as pool and riffle areas). These disturbances may affect spawning, rearing, and migration habitat; however, these effects will be short term because of beneficial revegetation or restoration of other stream functions. WSDOT will not allow any in-water construction work to take place except during seasonal work windows established to protect fish, unless prior approval has been obtained from fisheries resource agencies.

In-water work can also result in short-term increases in turbidity and sedimentation, similar to the effects of removing stream-side vegetation. Culvert replacement, culvert extension, or headwalls may require temporary disturbance to the stream bank. There is the potential for bank erosion and downstream sediment transport during the initial plant re-growth period of any stream bank segment subjected to disturbances associated with culvert replacement.

During construction of the Renton to Bellevue Project, the stream crossing culverts for several streams will be replaced. They include Gypsy Creek, 08.LW-7.7, 08.LW-7.8, and respective tributaries, Clover Creek, and Coal Creek. On average, approximately 40 to 50 linear feet of stream on each

side of I-405 may be affected long term (that is, filled and graded). An approximate loss of 10,700 square feet of aquatic habitat will result from project construction. However, after fish-friendly culverts are constructed, approximately 8,850 linear feet and 63,500 square feet of stream habitat will become available for fish use upstream of the freeway (Exhibit 5.12-2).

**Exhibit 5.12-2: Fish habitat gains and losses**



To reduce the amount of necessary in-water work, the new Coal Creek bridge will be constructed over a new dry channel to minimize effects. Flow will then be rerouted to the new channel. For a short distance, the stream water will become turbid until it mixes with the ambient water. The disturbance will be temporary; since the work will be planned during the summer low-flow period when salmonids are typically not present; the effects will be minimal. The new bridge at Coal Creek will improve fish use for the entire Coal Creek and Newport Creek subbasins where there are over 4 miles of open-channel habitat upstream of the project area.

Streamside (riparian) vegetation plays a number of important roles in supporting instream habitat functions. It provides large woody debris, food, stream bank stabilization, water storage, and water quality (Poole and Berman, 2001). Therefore, removal of streamside vegetation is likely to affect these habitat functions. The extent of vegetation removal determines the type and degree of the effect, especially regarding large woody debris recruitment.

Streamside vegetation removal can alter soil stability. Loose soils can cause erosion, which, in turn, can increase sediment deposition in streams or fill the pool habitat (Berman, 1998).

In addition, reduction in canopy cover can promote higher temperatures and increase sediment transport from cleared areas (Bolton and Shellberg, 2001).

Vegetation clearing can adversely affect salmonid habitat. Depending on the duration, timing, frequency, and level of turbidity, the associated sedimentation can cause behavioral, sublethal, and lethal effects in juvenile and adult salmonids (Newcombe and Jensen, 1996). However, vegetation loss will be offset by over 22,900 square feet of instream habitat gained for fish use after construction of the new fish-friendly culverts. This number does not include the gain in habitat use for fish in the upper Coal Creek Basin.

Effects to streamside, vegetated areas will result in permanent removal of an estimated 94,100 square feet (approximately 2 acres) of streamside habitat.

During in-water construction work at Gypsy Creek, 08.LW-7.7, 08.LW-7.8, their respective tributaries, Clover Creek, May Creek, and Coal Creek, the work area isolation activities, dewatering, or temporary stream diversion could harm fish. Harmful activities can include fish seining, electrofishing, fish exposure to turbidity (although rare), and small losses of streamside functions because of vegetation removal. These fish stressors may induce responses ranging from behavioral to lethal. WSDOT will use National Marine Fisheries Service handling procedures to minimize harmful effects to fish species.

In addition, macro invertebrates and amphibians occupying the dewatered segments of the stream channel will be displaced, thereby temporarily disrupting food sources for fish. However, numerous studies have indicated that benthic invertebrates drift down from upstream, rapidly recolonizing the affected area (Barton, 1977; Reed, 1977; Chisolm and Downs, 1978; Waters, 1995). Likewise, aquatic insect production is seldom affected in the long term by minimal habitat displacement and short-term pulses of suspended sediment (Spence et al., 1996). Therefore, any effects on benthic macro invertebrates and aquatic insects are expected to be short-term.

WSDOT will affect various types of stream habitat and functions during construction of the new fish-friendly cross-culverts and bridges. The quantity and quality of instream habitat (habitat below the OHWM) is critical for fish. The riparian areas protect that instream value by buffering fish life from development. When WSDOT widens I-405 and replaces open-channel habitat with a fish-friendly culvert, there will be a loss of natural instream and riparian habitat by putting the stream flow into a culvert. The amount of habitat lost for fish and other aquatic resources will be small compared to the total amount of habitat gained for fish use after access is restored. The greatest benefit for fish will be restoration of year-round access to their spawning, feeding, and rearing habitat. Habitat is the key to their survival, therefore, the quantity and quality of the habitat will determine if the fish will survive on their own or need further protection. The loss of the riparian areas during construction will be offset by a large gain in two different, but more important stream habitat functions: fish passage (five new culverts, one new bridge) and access to instream habitat (a net increase of 8,450 linear feet of stream equaling 52,800 square feet of habitat below the OHWM).

***How will operation activities affect fish and aquatic resources?***

Operational effects are direct effects caused by the existence, use, and maintenance of the project elements, including new or altered stream crossing culverts, over-water structures, stormwater facilities, and impervious surfaces. The primary difference between existing operational effects and operational effects of the project will be positive. All of the new impervious surfaces and stormwater facilities will be designed to reduce adverse effects to streams and, in several areas, improve conditions compared to those that exist today.

Although project elements are designed and sited to avoid or minimize adverse effects on aquatic life, some residual effects are likely during operation of the project.

The Renton to Bellevue Project will extend culverts and construct headwalls to accommodate a wider roadway span in the vicinity of Clover Creek, Gypsy Creek, 08.LW-7.7, 08.LW-7.8, and respective tributaries.

Most of the existing highway runoff drains to streams, watercourses, and storm drains with minimal treatment for

quantity or quality. The Renton to Bellevue Project will have beneficial effects on fish life in streams and in the Cedar River, Coal Creek, and Lake Washington by improving existing water quality conditions through the treatment and removal of sediments, and other roadway pollutants. Proper maintenance and improvements to these stormwater facilities over time will continue to provide benefits to the aquatic environment.

A design criterion for the Renton to Bellevue Project is to limit or reduce peak flows resulting from stormwater facilities discharging to the streams in the area. As a result, the increase in impervious surfaces and the proper operation of stormwater detention facilities will not adversely affect peak and base streamflow in the Renton to Bellevue project area streams.

Detailed stream-by-stream discussions of the effects of the specific project elements on fish species and aquatic habitat are presented in the Renton to Bellevue Project Fish and Aquatic Resources Discipline Report (Appendix X on CD).

***What measures are proposed to avoid or minimize effects to fish and aquatic species during construction?***

WSDOT will use the following measures to avoid or minimize effects to fish and aquatic resources during construction:

- WSDOT will implement construction BMPs (such as silt fencing or sedimentation ponds) to avoid disturbing sensitive natural areas.
- WSDOT will not allow any in-water work to occur except during seasonal work windows established to protect fish unless otherwise approved by the appropriate agencies.

***What measures are proposed to avoid or minimize effects to fish and aquatic species during operation?***

WSDOT will use the following measures to avoid or minimize effects to fish and aquatic resources during operation of the project:

- WSDOT will remove stormwater from some streams and discharge it through facilities that are located, designed, and approved to minimize long-term aquatic

effects by mixing with large volumes of water in Lake Washington.

- WSDOT will construct fish-friendly culverts near the NE 44th Street Interchange and at Clover Creek that will restore fish passage beneath the freeway. Approximately 8,850 linear feet of stream between the freeway and the upper watersheds will become available for migratory fish use.
- WSDOT will construct new bridges at Coal Creek to improve passage and enhance fish utilization for the entire upper Coal Creek and Newport Creek Basins. There is over 4 miles of habitat in upper Coal Creek and another 4,500 feet in the Newport Creek Basin.
- WSDOT will construct headwalls<sup>1</sup> at the five new fish-friendly cross-culvert inlets and outlets to minimize the amount of grading and filling and to restore and increase long-term riparian functions at each site.
- WSDOT's ongoing maintenance of stormwater treatment and detention facilities will not include the application of any chemical weed control agents (herbicides).

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<sup>1</sup> A concrete structure at the end of a culvert to protect the embankment slopes, anchor the culvert, and prevent undercutting.