

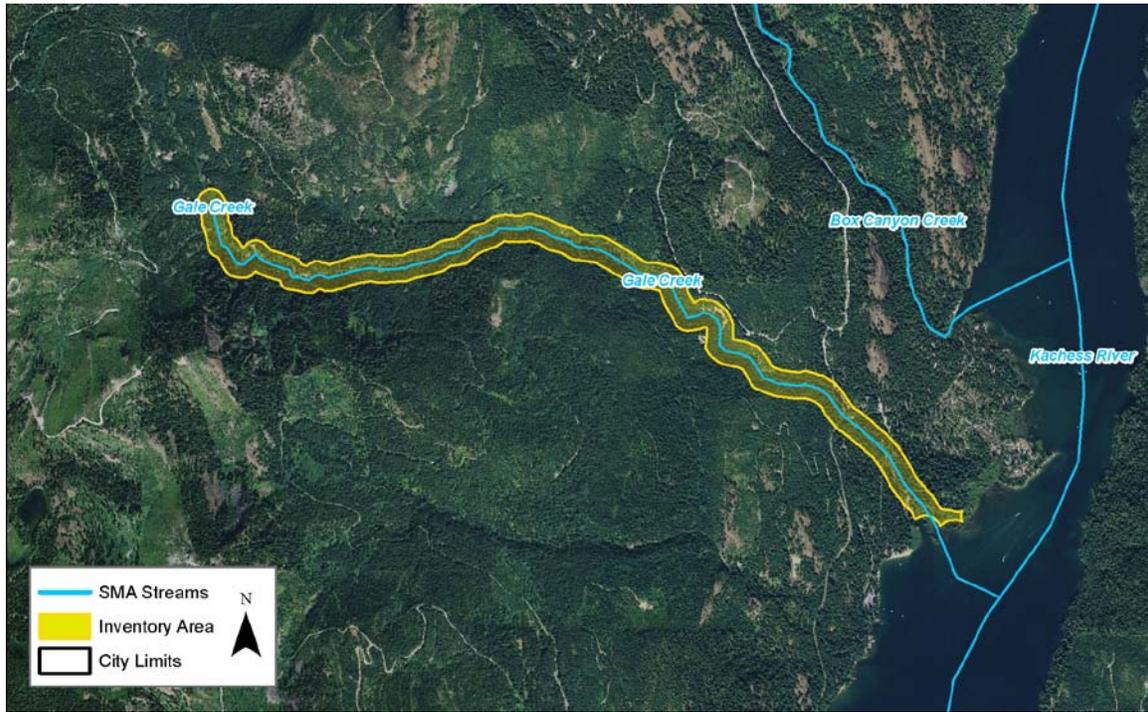
## GALE CREEK

**SHORELINE LENGTH:**

2.7 Miles

**REACH INVENTORY AREA:**

131.5 Acres



### PHYSICAL AND ECOLOGICAL FEATURES

**CHANNEL CONFIGURATION**

The reach roughly flows west to east and begins in a relatively broad valley that transitions to a narrow ravine downstream. The stream flows through a forested corridor and passes under two roads associated with the Kachess Lake Campground near the stream mouth.

**LAND COVER (MAP FOLIO #3)**

Land cover within the reach is conifer-dominated forest (63%), harvested forest (21%), riparian vegetation (15%), and other (1%).

**HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)**

A very small amount (1%) of the reach is located within the FEMA 100-year floodplain and a numerous landslide hazard areas (73%) are mapped.

**HABITATS AND SPECIES (MAP FOLIO #1)**

WDFW mapping shows the presence of rainbow trout and westslope cutthroat. A very small amount (1%) of the reach is mapped as wetland. No priority habitats or species are identified in this reach by WDFW.

**WATER QUALITY**

The reach is listed on the State's Water Quality Assessment list of 303 (d) Category 5 waters for temperature, and a TMDL is required, but has not been implemented.

## BUILT ENVIRONMENT AND LAND USE

<p><b>SHORELINE MODIFICATIONS (MAP FOLIO #1)</b> There are two road crossings in the stream mouth.</p>	<p><b>PUBLIC ACCESS (MAP FOLIO #4)</b> A dog sled/snowmobile trail/Forest Service road crosses the lower stream reach and a hiking trail crosses the reach near the stream mouth.</p>
<p><b>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)</b> Land use within the reach is forestry (100%). Land ownership is 25% private and 75% public (Forest Service).</p>	<p><b>CONTAMINATED SITES</b> No identified contaminated sites are located within this reach.</p>
<p><b>ZONING (MAP #5)</b> Lands within the reach are zoned for commercial forest (100%).</p>	<p><b>CULTURAL AND ARCHAEOLOGICAL RESOURCES</b> There are no recorded sites within the reach.</p>

## SHORELINE FUNCTION ANALYSIS

<p><b>FISH HABITAT QUALITY</b> <b>Medium:</b> The stream is largely unaltered and provides habitat for priority fish species, but no spawning or rearing habitat is identified.</p>	<p><b>TERRESTRIAL HABITAT QUALITY</b> <b>High:</b> The reach is generally well-forested and is connected to a large area of contiguous forest habitat.</p>
<p><b>VEGETATION FUNCTIONS</b> <b>Medium:</b> Much of the reach area consists of dense, forest cover, but significant portions have been disturbed by timber harvest activities.</p>	<p><b>HYDROLOGIC FUNCTIONS</b> <b>Medium:</b> The stream is largely unaltered, but is located within a narrow floodplain.</p>

## KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Protect the high-quality forest habitat within the reach.
- Manage recreational activity to reduce impacts on vegetation and subsequent erosion.
- Decommission and revegetate any unused roads along the shoreline.
- New development should be set back an adequate distance to protect stream functions.

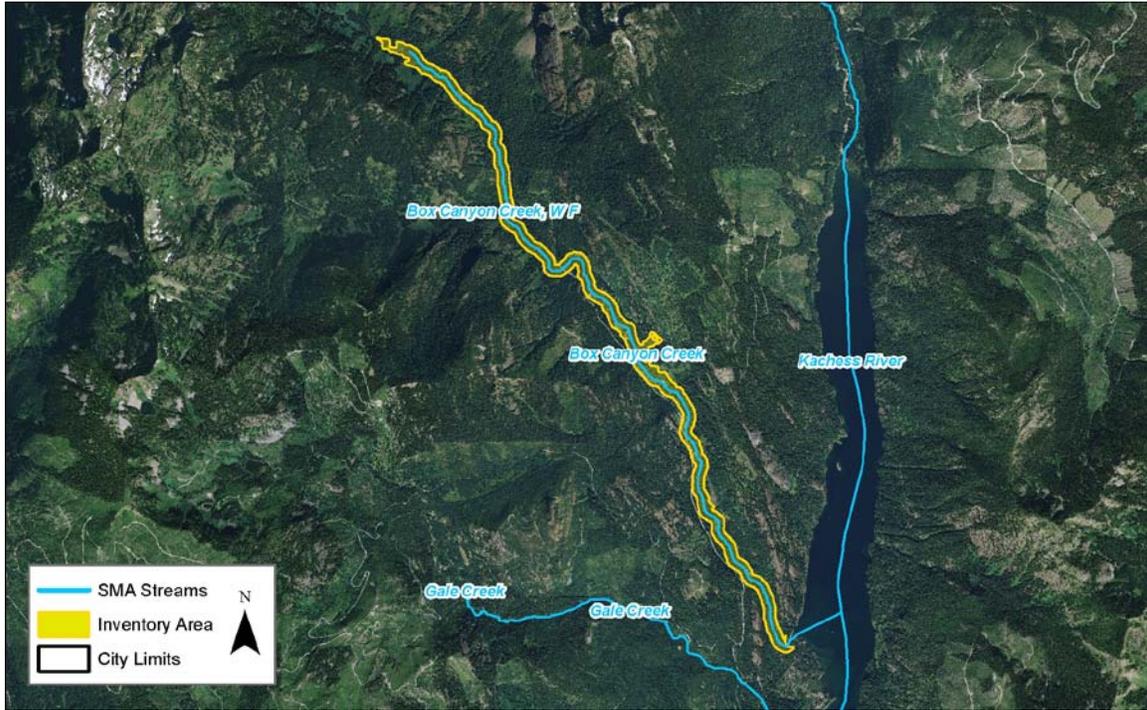
## BOX CANYON CREEK

**SHORELINE LENGTH:**

5.2 Miles

**REACH INVENTORY AREA:**

270.8 Acres



### PHYSICAL AND ECOLOGICAL FEATURES

**CHANNEL CONFIGURATION**

The reach flows to the southeast. The upstream portion of the reach is in a broad valley with scrub-shrub and forested vegetation types; the downstream portion of the reach enters a relatively narrow, forested corridor. The stream flows under two forest service roads; another forest service road parallels much of the reach's western shoreline.

**LAND COVER (MAP FOLIO #3)**

Land cover within the reach is conifer-dominated forest (72%), riparian vegetation (23%), harvested forest (3%), and shrubland (2%).

**HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)**

A very limited extent (2%) of the reach is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach.

**HABITATS AND SPECIES (MAP FOLIO #1)**

WDFW mapping shows that the reach provides spawning habitat for bull trout. The presence of westslope cutthroat, rainbow trout, eastern brook trout, and Kokanee salmon is also mapped.

**WATER QUALITY**

The reach is not listed on the State's Water Quality Assessment list of 303 (d) waters.

Slightly less than a quarter (21%) of the reach is mapped as wetland. Priority mountain goat summer and winter ranges are mapped within the reach.

## BUILT ENVIRONMENT AND LAND USE

### SHORELINE MODIFICATIONS (MAP FOLIO #1)

A Forest Service Road parallels much of the western shoreline, and there are two road crossings within the reach.

### PUBLIC ACCESS (MAP FOLIO #4)

A hiking trail is adjacent to the upstream portion of the regulated stream area and another hiking trail crosses the mouth of the stream. However, trail access across the stream is limited to low flow months. The Rachel Lake Trailhead is also located adjacent to the regulated stream area, near the confluence with West Fork Box Canyon, Reach 1.

### EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use within the reach is forestry (100%). Land ownership is 100% public (Forest Service).

### CONTAMINATED SITES

No identified contaminated sites are located within this reach.

### ZONING (MAP #5)

Lands within the reach are zoned for commercial forest (100%).

### CULTURAL AND ARCHAEOLOGICAL RESOURCES

The Lake Kachess Picnic Site was built by the CCC and existed from 1920 to 1942. The site was determined not eligible for listing on the National Register.

## SHORELINE FUNCTION ANALYSIS

### FISH HABITAT QUALITY

**High:** The stream is largely unaltered and provides habitat for several priority fish species, including spawning habitat for bull trout.

### TERRESTRIAL HABITAT QUALITY

**High:** The reach is generally well-forested and is connected to a large area of contiguous forest habitat.

### VEGETATION FUNCTIONS

**High:** The reach area generally consists of dense, mature forest cover.

### HYDROLOGIC FUNCTIONS

**Medium:** The stream is largely unaltered, but is located within a narrow floodplain.

## KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Protect the high-quality forest habitat within the reach.
- Manage recreational activity to reduce impacts on vegetation and subsequent erosion.
- Decommission and revegetate any unused roads along the shoreline.

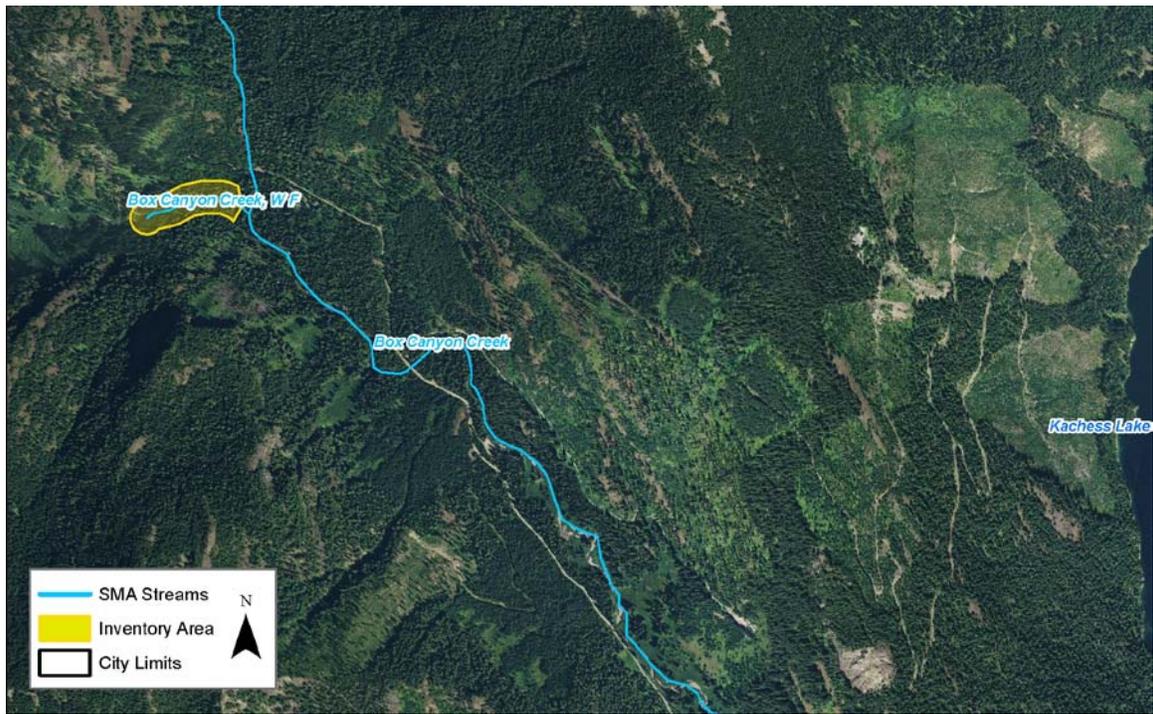
## WEST FORK BOX CANYON CREEK

**SHORELINE LENGTH:**

0.2 Miles

**REACH INVENTORY AREA:**

12.5 Acres



### PHYSICAL AND ECOLOGICAL FEATURES

**CHANNEL CONFIGURATION**

The reach flows west to east; the upstream portion is located in relatively flat scrub-shrub and forested habitat; downstream is forested and narrow.

**LAND COVER (MAP FOLIO #3)**

Land cover within the reach is conifer-dominated forest (70%), riparian vegetation (27%), shrubland (2%), and harvested forest (1%).

**HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)**

The reach is not located within the FEMA 100-year floodplain and a small number of landslide hazard areas (1%) are mapped near the upstream end of the reach.

**HABITATS AND SPECIES (MAP FOLIO #1)**

WDFW mapping shows the presence of westslope cutthroat within the reach.

No wetland is mapped within the reach. Priority mountain goat summer range is mapped within the reach.

**WATER QUALITY**

The reach is not listed on the State's Water Quality Assessment list of 303 (d) waters.

## BUILT ENVIRONMENT AND LAND USE

<p><b>SHORELINE MODIFICATIONS (MAP FOLIO #1)</b> There are no shoreline modifications identified within the reach.</p>	<p><b>PUBLIC ACCESS (MAP FOLIO #4)</b> There is no known public access to West Fork Box Canyon Creek.</p>
<p><b>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)</b> Land use within the reach is forestry (100%). Land ownership is 100% public (Forest Service).</p>	<p><b>CONTAMINATED SITES</b> No identified contaminated sites are located within this reach.</p>
<p><b>ZONING (MAP #5)</b> Lands within the reach are zoned for commercial forest (100%).</p>	<p><b>CULTURAL AND ARCHAEOLOGICAL RESOURCES</b> There are no recorded sites within the reach.</p>

## SHORELINE FUNCTION ANALYSIS

<p><b>FISH HABITAT QUALITY</b> <b>Medium:</b> The stream is largely unaltered and provides habitat for a priority fish species, but no spawning or rearing habitat is identified.</p>	<p><b>TERRESTRIAL HABITAT QUALITY</b> <b>High:</b> The reach is generally well-forested and is connected to a large area of contiguous forest habitat.</p>
<p><b>VEGETATION FUNCTIONS</b> <b>High:</b> The reach area generally consists of dense, mature forest cover.</p>	<p><b>HYDROLOGIC FUNCTIONS</b> <b>Medium:</b> The stream is largely unaltered, but is located within a narrow floodplain.</p>

## KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Protect the high-quality forest habitat within the reach.
- There is no identified public access to the reach.
- Decommission and revegetate any unused roads along the shoreline.

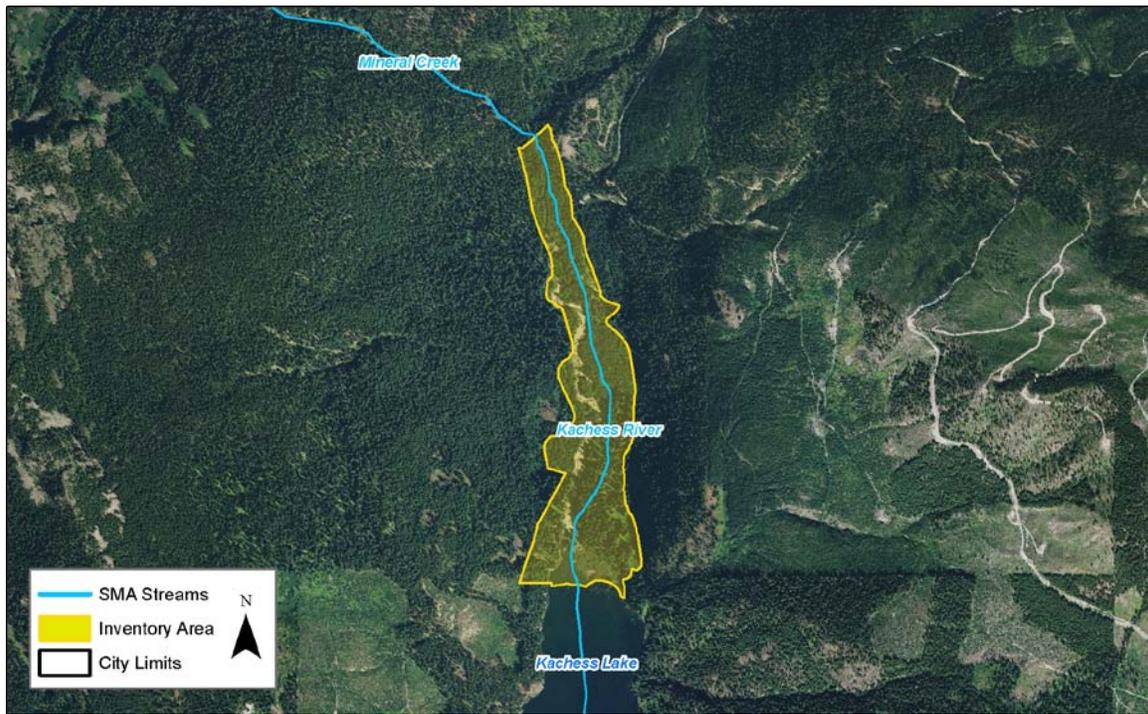
## KACHESS RIVER-REACH 2

**SHORELINE LENGTH:**

1.2 Miles

**REACH INVENTORY AREA:**

107.9 Acres



### PHYSICAL AND ECOLOGICAL FEATURES

**CHANNEL CONFIGURATION**

The undeveloped reach flows north to south. The stream corridor is forested and contains woody debris and wide banks.

**LAND COVER (MAP FOLIO #3)**

Land cover within the reach is riparian vegetation (69%), conifer-dominated forest (20%), harvested forest (6%), unvegetated (1%), and other (4%).

**HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)**

Nearly half (46%) of the reach is located within the FEMA 100-year floodplain; no landslide hazard areas are mapped within the reach.

**HABITATS AND SPECIES (MAP FOLIO #1)**

WDFW mapping shows that the reach provides spawning and rearing habitat for bull trout. The presence of rainbow trout, westslope cutthroat, eastern brook trout and Kokanee salmon is also identified

**WATER QUALITY**

The reach is not listed on the State's Water Quality Assessment list of 303 (d) waters.

A significant portion (67%) of the reach is mapped as wetland. Priority bald eagle foraging area is mapped within the reach.

BUILT ENVIRONMENT AND LAND USE	
<p><b>SHORELINE MODIFICATIONS (MAP FOLIO #1)</b> A Forest Service road crosses the stream approximately mid-reach.</p>	<p><b>PUBLIC ACCESS (MAP FOLIO #4)</b> A hiking trail crosses the downstream portion of the reach in two locations and once again further upstream.</p>
<p><b>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)</b> Land use within the reach is forestry (100%). Land ownership is 100% public (Forest Service).</p>	<p><b>CONTAMINATED SITES</b> No identified contaminated sites are located within this reach.</p>
<p><b>ZONING (MAP #5)</b> Lands within the reach are zoned for commercial forest (100%).</p>	<p><b>CULTURAL AND ARCHAEOLOGICAL RESOURCES</b> There are no recorded sites within the reach.</p>

SHORELINE FUNCTION ANALYSIS	
<p><b>FISH HABITAT QUALITY</b> <b>Medium:</b> The stream is largely unaltered and provides habitat for several priority fish species, but no spawning or rearing habitat is identified.</p>	<p><b>TERRESTRIAL HABITAT QUALITY</b> <b>High:</b> The reach is generally well-vegetated, contains significant wetland habitat, and is connected to a large area of contiguous forest habitat.</p>
<p><b>VEGETATION FUNCTIONS</b> <b>High:</b> The reach is dominated by riparian shrub and mature forest habitat.</p>	<p><b>HYDROLOGIC FUNCTIONS</b> <b>High:</b> The stream is largely unaltered and unconfined across a wide floodplain.</p>

KEY MANAGEMENT ISSUES AND OPPORTUNITIES
<ul style="list-style-type: none"> <li>• Protect the high-quality forest and wetland habitat within the reach.</li> <li>• Manage recreational activity to reduce impacts on vegetation and subsequent erosion.</li> </ul>

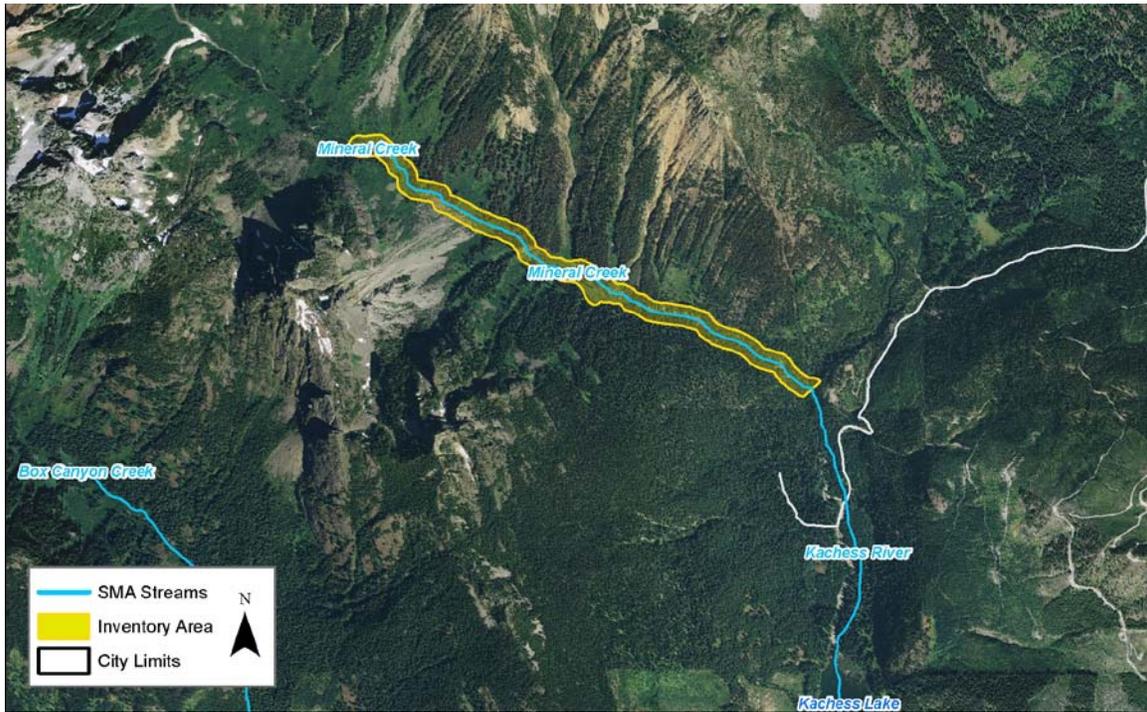
## MINERAL CREEK

**SHORELINE LENGTH:**

2.1 Miles

**REACH INVENTORY AREA:**

103.4 Acres



### PHYSICAL AND ECOLOGICAL FEATURES

**CHANNEL CONFIGURATION**

The reach drops roughly 1,000 feet in elevation, flowing to the southeast in a narrow ravine. The shoreline appears to experience frequent disturbance from avalanches.

**LAND COVER (MAP FOLIO #3)**

Land cover within the reach is conifer-dominated forest (59%), riparian vegetation (22%), and shrubland (19%).

**HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)**

A very small amount (1%) of the reach is located within the FEMA 100-year floodplain; no landslide hazard areas are mapped.

**HABITATS AND SPECIES (MAP FOLIO #1)**

WDFW mapping shows that the reach provides spawning and rearing habitat for bull trout. The presence of rainbow trout, westslope cutthroat, eastern brook trout, and Kokanee salmon is also identified.

**WATER QUALITY**

The reach is not listed on the State's Water Quality Assessment list of 303 (d) waters.

Wetland is mapped in approximately 12% of the reach. Priority mountain goat summer range is mapped within the reach.

## BUILT ENVIRONMENT AND LAND USE

<p><b>SHORELINE MODIFICATIONS (MAP FOLIO #1)</b></p> <p>There are no identified shoreline modifications within the reach.</p>	<p><b>PUBLIC ACCESS (MAP FOLIO #4)</b></p> <p>A hiking trail parallels the downstream half of the reach, crossing it several times, and borders the northern half of the regulated stream area.</p>
<p><b>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)</b></p> <p>Land use within the reach is forestry (100%). Land ownership is 100% public (Forest Service).</p>	<p><b>CONTAMINATED SITES</b></p> <p>No identified contaminated sites are located within this reach.</p>
<p><b>ZONING (MAP #5)</b></p> <p>Lands within the reach are zoned for commercial forest (100%).</p>	<p><b>CULTURAL AND ARCHAEOLOGICAL RESOURCES</b></p> <p>There are no recorded sites within the reach.</p>

## SHORELINE FUNCTION ANALYSIS

<p><b>FISH HABITAT QUALITY</b></p> <p><b>High:</b> The stream is largely unaltered and provides habitat for several priority fish species, including spawning and rearing habitat for bull trout.</p>	<p><b>TERRESTRIAL HABITAT QUALITY</b></p> <p><b>High:</b> The reach is generally well-forested and is connected to a large area of contiguous forest habitat.</p>
<p><b>VEGETATION FUNCTIONS</b></p> <p><b>High:</b> The reach area generally consists of dense, mature forest cover.</p>	<p><b>HYDROLOGIC FUNCTIONS</b></p> <p><b>Medium:</b> The stream is largely unaltered, but is located within a narrow floodplain.</p>

## KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Protect the high-quality forest habitat within the reach.
- Manage recreational activity to reduce impacts on vegetation and subsequent erosion.
- The shoreline appears to experience frequent disturbance from avalanches.

## 3.8 Silver Creek

Silver Creek flows from north to south and is a left-bank tributary to the Yakima River, entering the river at approximately RM 202.2.

### 3.8.1 Physical Characterization

The upstream portion of the stream is generally an unconfined, narrow, single channel. Downstream, residential developments and road crossings, including I-90, confine the channel. A streambed control feature is mapped near the mouth of the stream, at the Railroad Street Bridge crossing of the Yakima River, which acts as a partial fish passage barrier (WDFW 2010).

### 3.8.2 Habitats and Species

#### *3.8.2.1 Fish Use*

Silver Creek supports westslope cutthroat (StreamNet 2010). Fish passage barriers are mapped at roadway crossings on the lower part of the stream.

#### *3.8.2.2 Water Quality*

Silver Creek is not included on Ecology's 303(d) list of waterbodies with water quality impairments.

#### *3.8.2.3 Riparian Habitat Conditions (Land Cover)*

Silver Creek flows through rural residential areas. The upper portion of the stream has a narrow band of riparian trees which grows wider heading downstream. Roads constrict riparian vegetation along the lowest part of the stream.

#### *3.8.2.4 Wetlands*

No wetlands are mapped within the Silver Creek shoreline inventory area.

#### *3.8.2.1 Wildlife Habitats and Species*

Most of Silver Creek is located in a mapped elk wintering area.

### 3.8.3 Land Use

The downstream end of Silver Creek, south of its I-90 crossing, is bordered by railroad tracks. Upstream of I-90, the creek is bordered by high- and low-density residential developments.

### 3.8.4 Public Access

The lands bordering Silver Creek are private. View access is available from public road crossings.

### 3.8.5 Reach Sheet

## SILVER CREEK

**SHORELINE LENGTH:**

0.8 Mile

**REACH INVENTORY AREA:**

37.8 Acres



### PHYSICAL AND ECOLOGICAL FEATURES

**CHANNEL CONFIGURATION**

The reach has low topographic relief, and the upstream portion is generally an unconfined, narrow, single channel. Downstream, residential developments and road crossings, including I-90, confine the channel.

**LAND COVER (MAP FOLIO #3)**

Land cover within the reach is dominated by forest (42%), harvested forest (26%), and developed lands (22%), with limited other (5%) and riparian vegetation (5%).

**HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)**

20% of the reach is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach.

**HABITATS AND SPECIES (MAP FOLIO #1)**

WDFW mapping shows the presence of westslope cutthroat in the creek.  
No wetland habitat is mapped in the reach. A significant amount of priority elk winter concentration area is mapped within the reach.

**WATER QUALITY**

The reach is not listed on the State's Water Quality Assessment list of 303 (d) waters.

## BUILT ENVIRONMENT AND LAND USE

<p><b>SHORELINE MODIFICATIONS (MAP FOLIO #1)</b> A portion of the reach is constrained at the I-90 crossing. Fish barrier culverts are located at I-90 and Parks Rd.</p>	<p><b>PUBLIC ACCESS (MAP FOLIO #4)</b> There is no public access to this reach.</p>
<p><b>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)</b> Land use along the reach is primarily rural (80%), with some urban (17%) and commercial (3%) lands near the center of the reach. Land ownership is 95% private and 5% public (State Parks).</p>	<p><b>CONTAMINATED SITES</b> No identified contaminated sites are located within this reach.</p>
<p><b>ZONING (MAP #5)</b> Lands within the reach are zoned primarily for rural residential (67%), with commercial (12%) and other (21%) [I-90] at the downstream end.</p>	<p><b>CULTURAL AND ARCHAEOLOGICAL RESOURCES</b> There are no recorded sites within the reach.</p>

## SHORELINE FUNCTION ANALYSIS

<p><b>FISH HABITAT QUALITY</b> <b>Low:</b> Fish habitat within the reach is limited by adjacent development and fish passage barriers.</p>	<p><b>TERRESTRIAL HABITAT QUALITY</b> <b>Low:</b> The reach is surrounded by roads (including I-90) and residential development.</p>
<p><b>VEGETATION FUNCTIONS</b> <b>Medium:</b> Some dense forest cover remains along the stream, but significant portions have been removed by adjacent development and I-90.</p>	<p><b>HYDROLOGIC FUNCTIONS</b> <b>Low:</b> The reach contains significant hydromodifications and floodplain alteration.</p>

## KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- New development should be set back an adequate distance to protect stream functions and protect structures from flooding and channel migration hazards.
- Protect the remaining high-value forested floodplain areas, where possible.
- Two fish-barrier culverts are located within the reach (I-90 and Sparks Road).
- There is no public access to the reach.
- Restore fish passage at Railroad Street Bridge crossing and roadways.
- Educate shoreline property owners about measures to protect and restore riparian areas.

## 3.9 Lavender Lake

Lavender Lake is located on the right bank of the Yakima River, north of I-90, between Silver Creek (upstream) and Big Creek (downstream), at RM 198.

### 3.9.1 Physical Characterization

Lavender Lake is approximately 0.3 mile long and 0.1 mile wide and contains several acres of surface water. The lake is primarily used by anglers fishing for stocked rainbow trout. The west and north sides of the lake contain residential development, the east side of the lake is forested, and the south side is adjacent to the interstate. There is no permanent surface water connection between the lake and the Yakima River; however, the FEMA 100-year floodplain is mapped in a portion of the inventory area (FEMA 1996).

### 3.9.2 Habitats and Species

#### 3.9.2.1 Fish Use

Lavender Lake is stocked with rainbow trout.

#### 3.9.2.2 Water Quality

Lavender Lake is listed on the State's Water Quality Assessment list of 303 (d) waters for invasive exotic species.

#### 3.9.2.3 Riparian Habitat Conditions (Land Cover)

Approximately half of the lake shoreline is forested, while the remainder consists of rural residential uses and roadways.

#### 3.9.2.4 Wetlands

No wetlands are mapped along the Lavender Lake shoreline.

#### 3.9.2.1 Wildlife Habitats and Species

Lavender Lake is located at the edge of a mapped elk wintering area.

### 3.9.3 Land Use

Lavender Lake is bordered by moderate-density residential development to the west and north, I-90 to the south, and undeveloped forest land (zoned R3) to the east.

### 3.9.4 Public Access

Public access to the southern shoreline of Lavender Lake is provided at Cresto Road.

### 3.9.5 Reach Sheet

## LAVENDER LAKE

**SHORELINE LENGTH:**  
1.0 Mile

**WATERBODY AREA:** 18.5 Acres  
**REACH INVENTORY AREA:** 39.0 Acres



### PHYSICAL AND ECOLOGICAL FEATURES

**PHYSICAL CONFIGURATION**

The shoreline of the lake, which is oriented west to east, contains limited development and is located between residential development and the Yakima River to the north and I-90 to the south. The lake does not drain to the Yakima River and likely was created by gravel mining.

**LAND COVER (MAP FOLIO #3)**

Land cover within the reach is primarily open water (43%), forest (33%), riparian vegetation (13%), and developed lands (10%).

**HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)**

About one-quarter of the reach (27%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach. Over half of the reach (52%) is located within the channel migration zone of the Yakima River.

**HABITATS AND SPECIES (MAP FOLIO #1)**

The lake is stocked with rainbow trout. Wetland habitat is mapped on the northern shoreline of the lake (16% of the reach) and a priority elk winter concentration area is also mapped within the reach.

**WATER QUALITY**

The reach is listed on the State's Water Quality Assessment list of 303 (d) waters for invasive exotic species.

## BUILT ENVIRONMENT AND LAND USE

<p><b>SHORELINE MODIFICATIONS (MAP FOLIO #1)</b> The lake, which was created by gravel mining activities, is directly adjacent to I-90 to the south.</p>	<p><b>PUBLIC ACCESS (MAP FOLIO #4)</b> Public access to the southern shoreline of Lavender Lake is provided at Cresto Road.</p>
<p><b>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)</b> Land use surrounding the lake is rural (100%). Land ownership is 100% private.</p>	<p><b>CONTAMINATED SITES</b> No identified contaminated sites are located within this reach.</p>
<p><b>ZONING (MAP #5)</b> Lands within the reach are zoned for rural residential (44%) to the north and other (56%) [I-90] to the south.</p>	<p><b>CULTURAL AND ARCHAEOLOGICAL RESOURCES</b> There are no recorded sites within the reach.</p>

## SHORELINE FUNCTION ANALYSIS

<p><b>FISH HABITAT QUALITY</b> <b>Low:</b> The lake is a manmade artifact of gravel mining, with no surface water connection to the Yakima River. There is no priority fish use.</p>	<p><b>TERRESTRIAL HABITAT QUALITY</b> <b>Medium:</b> The reach is directly adjacent to I-90, but contains some dense forest cover and connects to an area of relatively unaltered habitat to the east.</p>
<p><b>VEGETATION FUNCTIONS</b> <b>Medium:</b> Approximately half of the reach area contains dense forest cover, but significant areas have been altered by I-90 and adjacent residential development.</p>	<p><b>HYDROLOGIC FUNCTIONS</b> <b>Low:</b> The lake is a manmade artifact of gravel mining.</p>

## KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Develop a plan to control invasive aquatic vegetation.
- Educate shoreline property owners about measures to protect and restore riparian areas.

## 3.10 Big Creek

Big Creek is a right-bank tributary to the Yakima River, located between Lavender Lake upstream and Little Creek downstream. Big Creek generally flows from southwest to northeast and drains to the Yakima River at RM 195.8.

### 3.10.1 Physical Characterization

Several landslide hazard areas are mapped in the upper reach of the stream (WDNR 2010). Steep slopes are mapped along most of the stream's shoreline, upstream of about RM 1.5 (Kittitas County 2012). The FEMA 100-year floodplain is mapped within much of the downstream one-third of the inventory area (FEMA 1996). Big Creek has an unpredictable floodplain and flood capacity (Tetra Tech, 2012), and a channel migration zone is mapped along much of the creek.

Big Creek passes under and over multiple man-made features located in the lower portion of the stream, including Interstate 90 and several other roads, the John Wayne Heritage Trail, a railroad, an irrigation canal, and power line corridors.

The watershed was clearcut in the late 1800s and developed for agriculture, and water diversions on Big Creek were installed by the late 1880s.

### 3.10.2 Habitats and Species

#### 3.10.2.1 Fish Use

Big Creek supports spawning spring Chinook and summer steelhead. Numerous spring Chinook juveniles rear in the lower reaches (Haring 2001). Other fish species documented in Big Creek include eastern brook trout, rainbow trout, and westslope cutthroat (StreamNet 2010).

In recent years, several projects have occurred to increase fish access and instream flows within Big Creek. These projects include an irrigation efficiencies program, screening of irrigation diversions, and the correction of a fish passage barrier at the Big Creek Waters Users dam (Anna Lael, personal communication). Low instream flows remain an issue, but work is ongoing to continue to secure water rights for instream flow improvements.

The Integrated Water Resource Management Plan for the Yakima River basin proposes modifications to laterals of the Kittitas Reclamation District (KRD) Main and South Branch canals to reduce seepage losses and allow greater flexibility in

KRD supply management. The water saved or transferred would be used to enhance instream flows in tributaries to the Yakima River, including Big Creek (Reclamation and Ecology 2011a).

### 3.10.2.2 *Water Quality*

The lower portion of Big Creek, just below the boundary of Wenatchee National Forest, is listed by Ecology for high water temperatures and a TMDL has been implemented (Ecology, 2005) This portion of the stream crosses a cleared utility corridor where the lack of shade may contribute to higher stream temperatures.

Excess sediment may also affect water quality in lower Big Creek, resulting from a lack of riparian vegetation and large wood (Haring 2001).

### 3.10.2.3 *Riparian Habitat Conditions (Land Cover)*

Coniferous forest occupies over half of the Big Creek riparian corridor, particularly in the upper reaches. Around one-quarter of the reach is used for timber harvest. Rural residential and agricultural uses dominate the lower part of the stream, where riparian vegetation is narrower and trees are scattered. Large wood was actively removed from the channel in the past, and there is currently little wood from the powerline crossing to the stream mouth (Haring 2001).

### 3.10.2.4 *Wetlands*

Scattered wetlands mapped along Big Creek compose less than 5 percent of the shoreline inventory area.

### 3.10.2.1 *Wildlife Habitats and Species*

Priority wildlife species mapped in the Big Creek watershed include northern spotted owl (federally listed threatened species), elk, and mountain goat.

## 3.10.3 *Land Use*

The downstream end of Big Creek, between its confluence with the Yakima River and I-90, is undeveloped forest land zoned for rural residential development. Between I-90 and the KRD Big Creek Siphon, land use is primarily low-density residential, with one moderate-density residential subdivision bordering the creek in the northwest. From the siphon to approximately 1 mile upstream, undeveloped forested land borders the creek which is zoned as forest and range. An electric

transmission line corridor also crosses the creek in this segment. The remainder of the creek flows through a “checkerboard” of National Forest and private forest land.

### 3.10.4 Public Access

A dogsled trail crosses Big Creek at the Big Creek Siphon, and a snowmobile trail/Forest Service road crosses the stream within the electric transmission line corridor. Starting on National Forest land, the Big Creek trail borders much of the upper stream.

### 3.10.5 Reach Sheet



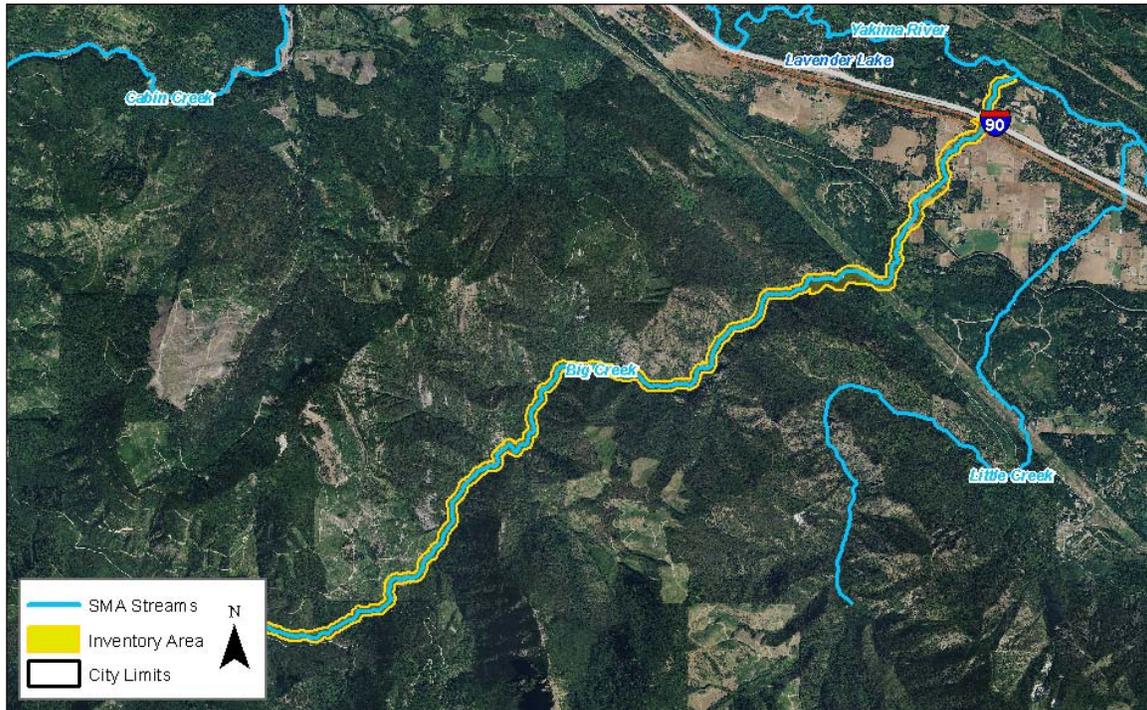
## BIG CREEK

**SHORELINE LENGTH:**

10.4 Miles

**REACH INVENTORY AREA:**

531.4 Acres



### PHYSICAL AND ECOLOGICAL FEATURES

**CHANNEL CONFIGURATION**

The upstream portion of the reach primarily flows as a single channel through a narrow valley flanked by steep slopes. Downstream, the streamflows through flat terrain in a channel that exhibits limited migration.

**HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)**

A portion of the reach (21%) is located within the FEMA 100-year floodplain and a several landslide hazard areas (3%) are mapped at the upstream end of the reach. Over half of the reach (64%) has potential for channel migration.

**WATER QUALITY**

The reach is listed on the State's Water Quality Assessment list of 303 (d) Category 5 waters for temperature; a TMDL has been implemented

**LAND COVER (MAP FOLIO #3)**

This reach is mostly covered by conifer-dominated forest (59%), harvested forest (18%), and riparian vegetation (17%), with small amounts of agricultural lands (3%), other (2%), and developed lands (1%).

**HABITATS AND SPECIES (MAP FOLIO #1)**

WDFW mapping shows that the reach provides spawning habitat for spring Chinook and summer steelhead. The presence of rainbow trout, eastern brook trout, and westslope cutthroat is also mapped.

Limited wetland habitat is mapped along the river in several patches (2% of the reach) and priority elk winter concentration area is also mapped within the reach.

The Big Creek shoreline inventory area is mapped as habitat for rare plant species by the Washington Natural Heritage Program.

## BUILT ENVIRONMENT AND LAND USE

### SHORELINE MODIFICATIONS (MAP FOLIO #1)

Shoreline modifications includes I-90 and railroad crossings at the downstream end of the reach.

### PUBLIC ACCESS (MAP FOLIO #4)

The John Wayne Heritage Trail crosses the downstream portion of the stream. A dogsled trail crosses Big Creek at the Big Creek Siphon, and a snowmobile trail/Forest Service road crosses the stream within the electric transmission line corridor. Big Creek trail borders the middle portion of the stream and the North Ridge Trail parallels a segment of the stream downstream from here.

### EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use along the reach is primarily forestry (68%) with rural lands (32%) along the downstream end. Land ownership is 58% private and 42% public (Forest Service).

### CONTAMINATED SITES

No identified contaminated sites are located within this reach.

### ZONING (MAP #5)

Lands within the reach are zoned primarily for commercial forestry (68%), with forest & range (15%), agriculture (10%), rural residential (4%), and other (3%) [I-90] areas at the downstream end.

### CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no recorded sites within the reach.

## SHORELINE FUNCTION ANALYSIS

### FISH HABITAT QUALITY

**Medium:** The creek provides habitat for a variety of priority fish species (including spawning habitat for spring Chinook), but low summer flows and fish passage barriers are a limiting factor for fish use.

### TERRESTRIAL HABITAT QUALITY

**Medium:** The reach contains significant areas of dense forest cover and connections to large areas of relatively undisturbed habitat (primarily upstream), but habitat is altered in some areas by I-90, residential development, and timber harvest.

### VEGETATION FUNCTIONS

**Medium:** Much of the reach area consists of dense, mature forest cover, but some riparian areas have been disturbed by forest harvest (upstream) and agriculture, residential development, and I-90 (downstream).

### HYDROLOGIC FUNCTIONS

**Medium:** The upstream portions of the reach are relatively intact, but floodplain development and irrigation diversions have significantly altered the hydrology of the lower creek.

## KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Resource lands within the reach have the potential to be converted to more intensive uses (e.g., from forestry to residential subdivisions), particularly at the downstream end of the reach. New development should be set back an adequate distance to protect stream functions and protect structures from flooding.
- Work is ongoing to secure water rights for improving instream flows.
- Manage recreational activity to reduce impacts on vegetation and subsequent erosion.
- The reach contains a rare plant species, mapped by the Washington Natural Heritage Program.
- Participate in efforts to balance irrigation needs with fish passage flows.
- The downstream portion of the reach has an unpredictable floodplain and flood capacity.

## 3.11 Little Creek

Little Creek is a right-bank tributary to the Yakima River that enters at RM 194.6.

### 3.11.1 Physical Characterization

Multiple transportation corridors (I-90 and other roads, railroad, and the John Wayne Heritage Trail) and utility corridors (drainage canal and power line) cross the lower reach of Little Creek. The stream also traverses agricultural land and is flanked by sparse to moderate-density residential development.

The watershed was extensively logged and converted to agriculture in the late 1880s. Water diversions were established on the stream by 1881 (Haring 2001). The Little Creek channel may have been rerouted in the vicinity of the Yakima River floodplain to facilitate residential development (Haring 2001). The stream would have originally flowed through an area of wetlands and springs associated with the hyporheic zone of the Yakima River, but much of this area has been altered by development.

The FEMA 100-year floodplain is mapped within much of the downstream half of the inventory area (FEMA 1996). The floodplain in this area has an unpredictable floodplain and flood capacity (Tetra Tech, 2012).

### 3.11.2 Habitats and Species

#### 3.11.2.1 Fish Use

Little Creek supports spring Chinook and steelhead rearing and potentially steelhead spawning in the lower reaches (Haring 2001). Other fish species mapped in the stream include rainbow trout and westslope cutthroat (StreamNet 2010).

The Integrated Water Resource Management Plan for the Yakima River basin proposes modifications to laterals of the Kittitas Reclamation District (KRD) Main and South Branch canals to reduce seepage losses and allow greater flexibility in KRD supply management. The water saved or transferred would be used to enhance instream flows in tributaries to the Yakima River, including Little Creek (Reclamation and Ecology 2011a).

### 3.11.2.2 *Water Quality*

The lower part of Little Creek is on Ecology's 303(d) list for high water temperatures. The lack of riparian vegetation and shade along this part of the stream may contribute to temperature issues.

Water quality in Little Creek may be affected by excess sediments, particularly during floods that transport streambed substrates (Haring 2001).

### 3.11.2.3 *Riparian Habitat Conditions (Land Cover)*

The upper three-quarters of Little Creek is located in managed forest land. The lower portion flows through rural residential/agricultural areas with scattered trees in the riparian zone.

Vegetation management along the power line crossing of Little Creek (near the center of the reach) limits tree cover (shade) and potential future large wood for the stream. Large wood is lacking in other parts of Little Creek as well because of past fires, channelization, and deliberate removal (Haring 2001).

### 3.11.2.4 *Wetlands*

A small portion of the Little Creek shoreline inventory area is mapped as wetland, located near the power line corridor crossing.

### 3.11.2.1 *Wildlife Habitats and Species*

No priority habitats or species are mapped near Little Creek.

## 3.11.3 *Land Use*

The downstream end of Little Creek, between its confluence with the Yakima River and I-90, is bordered by high-density residential development. Between I-90 and the KRDL Little Creek Siphon, land use bordering the creek is primarily low-density residential and agriculture. From the siphon to the National Forest boundary (approximately 1.3 miles), undeveloped forested land borders the creek, with the exception of an electric transmission corridor that crosses the stream. Zoning within this segment is forest and range and agriculture (3-acre lots). The remainder of the creek flows through National Forest land.

### 3.11.4 Public Access

A dogsled trail crosses Little Creek at the Little Creek Siphon, and a snowmobile trail/Forest Service road crosses the creek near the electric transmission line corridor. The John Wayne Heritage Trail crosses the creek at the downstream end.

### 3.11.5 Reach Sheet



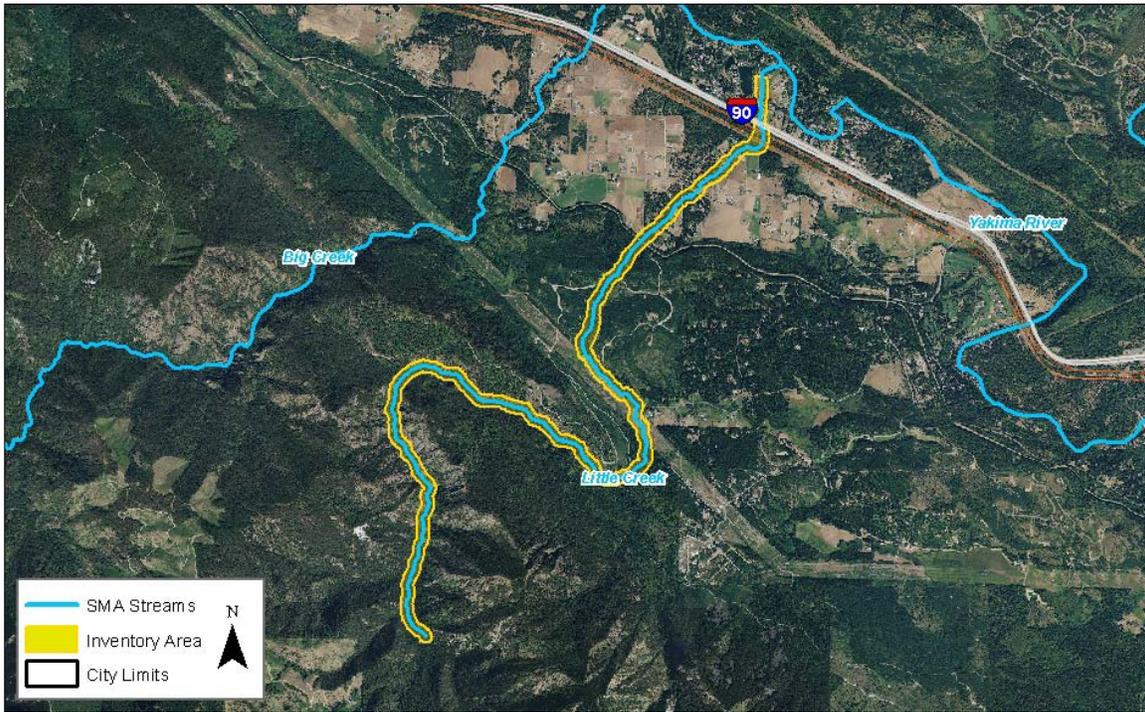
## LITTLE CREEK

**SHORELINE LENGTH:**

7.1 Miles

**REACH INVENTORY AREA:**

351.9 Acres



### PHYSICAL AND ECOLOGICAL FEATURES

**CHANNEL CONFIGURATION**

The upstream portion of the reach primarily flows as a single channel through a narrow valley with steep slopes. The downstream portion of the streamflows through flat terrain, but the channel is more confined and has been rerouted in the vicinity of the Yakima River floodplain.

**LAND COVER (MAP FOLIO #3)**

Land cover within the reach is dominated by conifer-dominated forest (61%), riparian vegetation (17%), and harvested forest (13%), with some agricultural lands (5%), developed lands (2%), and other (2%).

**HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)**

Approximately 36% of the reach is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach.

**HABITATS AND SPECIES (MAP FOLIO #1)**

WDFW mapping shows that the reach provides spawning and rearing habitat for spring Chinook. The presence of, rainbow trout, summer steelhead, and westslope cutthroat is also mapped.

**WATER QUALITY**

The reach is listed on the State’s Water Quality Assessment list of 303 (d) Category 5 for temperature.

Wetland habitat is mapped in the middle portion of the reach (4% of the reach). No priority habitats or species are identified in this reach by WDFW.

## BUILT ENVIRONMENT AND LAND USE

### SHORELINE MODIFICATIONS (MAP FOLIO #1)

Identified shoreline modifications within the reach include I-90, railroad crossings, and a water diversion structure at RM 1.2. Other, unmapped diversion structures may be present, as well.

### PUBLIC ACCESS (MAP FOLIO #4)

The John Wayne Heritage Trail crosses the downstream portion of the stream. A dogsled trail crosses Little Creek at the Little Creek Siphon, and a snowmobile trail/Forest Service road crosses the stream near the electric transmission line corridor.

### EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use along the reach is forestry (54%) upstream and rural (46%) downstream. Land ownership is 46% private and 54% public (Forest Service).

### CONTAMINATED SITES

No identified contaminated sites are located within this reach.

### ZONING (MAP #5)

Lands within the reach are zoned for commercial forestry (54%) along the upstream half and rural residential (17%), agriculture (14%), forest & range (10%), and other (5%) [I-90] along the downstream half.

### CULTURAL AND ARCHAEOLOGICAL RESOURCES

There is 1 recorded historic site within the reach.

## SHORELINE FUNCTION ANALYSIS

### FISH HABITAT QUALITY

**Medium:** The creek provides habitat for a variety of priority fish species (including spawning habitat for spring Chinook), but low summer flows (and periodic channel dewatering) are a limiting factor for fish use.

### TERRESTRIAL HABITAT QUALITY

**Medium:** The reach contains significant areas of dense forest cover and connections to large areas of relatively undisturbed habitat (primarily upstream), but habitat is altered in some areas by I-90, residential development, and timber harvest.

### VEGETATION FUNCTIONS

**Medium:** Much of the reach area consists of dense, mature forest cover, but some riparian areas have been disturbed by forest harvest (upstream) and agriculture, residential development, and I-90 (downstream).

### HYDROLOGIC FUNCTIONS

**Medium:** The upstream portions of the reach are relatively intact, but floodplain development and irrigation diversions have significantly altered the hydrology of the lower creek.

## KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Resource lands within the reach have the potential to be converted to more intensive uses (e.g., from forestry to residential subdivisions), particularly at the downstream end of the reach. New development should be set back an adequate distance to protect stream functions and protect structures from flooding.
- Participate in efforts to balance irrigation needs with fish passage flows.
- Manage recreational activity to reduce impacts on vegetation and subsequent erosion.
- Educate shoreline property owners about measures to protect and restore riparian areas.
- The downstream portion of the reach has significant flood hazard potential.

## 3.12 Lower Cle Elum River

The lower Cle Elum River flows approximately 8 miles from the Cle Elum Lake Dam to the Yakima River. The Cle Elum River is a left-bank tributary to the Yakima River, emptying at RM 185.6. The lower Cle Elum River is considered a shoreline of statewide significance.

### 3.12.1 Physical Characterization

Downstream of the dam, the river is confined within a single channel for approximately 1 mile. Downstream of this point, the river is typically characterized by a large channel with multiple large side-channel complexes that become engaged with the main channel when flows exceed 500 cfs (Haring 2001).

Several landslides and steep slopes have been mapped along the lower river (WDNR 2010; Kittitas County 2012). The FEMA 100-year floodplain is mapped in most of the inventory area, with some of the upstream portions of the inventory area, below the dam, outside of the floodplain (FEMA 1996). The mapped channel migration zone extends throughout the majority of the inventory area, including areas within the City of Cle Elum.

Residential development and golf courses, associated with the Suncadia development, are located on the left and right banks of the river at about RM 2 to RM 6.5. Upstream of the development, one bridge crosses the river; downstream of this development, the river flows under a powerline corridor, four roadways including I-90, and a railroad bridge. In addition to residential development, the lower watershed has been extensively logged. The lower Cle Elum River confluence with the Yakima River is located at the John Wayne Heritage Trail crossing of the Yakima River.

#### 3.12.1.1 *City of Cle Elum*

A short stretch of the Cle Elum River (Cle Elum River Reach 1) flows through the western city limits of Cle Elum. The upstream extent begins at the Bullfrog Road and continues downstream until the I-90 bridge; a distance of approximately 0.8 mile. The river is listed as a shoreline of statewide significance in this reach. The stretch of river is largely undeveloped and contains a large left-bank bend with multiple channels. A small lake is located on the left bank of the river with several residential structures on its northern shoreline. The FEMA 100-year floodplain is mapped in most of the inventory area, with some of the upstream portions of the inventory

area (FEMA 1996) and the entire reach is located within the identified channel migration zone.

## 3.12.2 Habitats and Species

### 3.12.2.1 Fish Use

The lower Cle Elum River below Cle Elum Dam supports spring Chinook and summer steelhead spawning. The lower Cle Elum River is considered a high-density Chinook salmon spawning area; in most years, half of the spring Chinook salmon redds in the upper Yakima River watershed are found immediately upstream and downstream of the confluence of the Cle Elum and Yakima Rivers (Haring 2001). Currently, no steelhead occur upstream of Cle Elum Dam. Small numbers of steelhead may spawn in the Cle Elum River downstream from the dam. (Reclamation and Ecology 2011b).

Other species documented in the lower Cle Elum River include rainbow trout, westslope cutthroat, burbot, eastern brook trout, and mountain whitefish (StreamNet 2010).

Cle Elum Dam was constructed without fish passage facilities, blocking anadromous fish use from approximately 35 miles of highly productive historic habitat (Haring 2001). However, a temporary fish passage facility has recently been constructed at Cle Elum Dam, and sockeye salmon were subsequently re-introduced to the system. The Yakama Nation is currently studying the possibility of a permanent fish passage facility.

During the late 1800s and early 1900s, stream channels in the Cle Elum watershed were cleared in order to allow large rafts of logs to be floated downriver to lumber mills. This caused substantial damage to salmonid habitat (Haring 2001).

The natural hydrology of the Cle Elum River has been significantly altered by water storage for flood control and irrigation water delivery. High flows during the irrigation season provide fish access to side channels that provide summer rearing habitat. However, lowering of flows during flip-flop operations results in dewatering of the side channels, eliminating them as winter rearing habitat (Haring 2001).

Recently, the Kittitas Conservation Trust and other organizations installed large log jams in the lower Cle Elum River, which have deflected stream flows to re-activate the Domerie side channel (U.S. Department of the Interior, 2011). This work has created two stream miles of riparian habitat that provides rearing habitat for spring Chinook salmon (U.S. Department of the Interior, 2011).

## City of Cle Elum

See Section 2.12.2.1.

### 3.12.2.2 *Water Quality*

Dispersed recreational activity along the Cle Elum River and Cle Elum Lake may increase the delivery of fine sediments (Haring 2001).

The Cle Elum River has water temperatures that are higher than the standard acceptable levels for fish immediately above and downstream of the reservoir. Downstream from the dam, higher water temperatures may be a result of dam impoundment and surrounding forest practices (Reclamation and Ecology 2011b).

## City of Cle Elum

See Section 3.12.2.2.

### 3.12.2.3 *Riparian Habitat Conditions (Land Cover)*

The lower Cle Elum River flows through forested areas, some of which have been extensively logged. Several road crossings and utility corridors cross the river. See discussion above under Section 3.12.1.

## City of Cle Elum

Most of the Cle Elum riparian zone within city limits is forested. There is limited residential development in the shoreline inventory area.

### 3.12.2.4 *Wetlands*

Approximately one-third of the lower Cle Elum River shoreline inventory area is mapped as wetland, primarily forested-shrub wetland habitat.

## City of Cle Elum

A large forested wetland associated with the Cle Elum River is mapped within the city's shoreline inventory area.

### 3.12.2.1 *Wildlife Habitats and Species*

The lower Cle Elum River flows through a mapped elk winter concentration area.

## City of Cle Elum

Within the city, the Yakima River flows through a mapped elk winter concentration area.

### 3.12.3 Land Use

Between I-90 and its confluence with the Yakima River, the Cle Elum River is bordered by undeveloped forest land that is zoned as forest and range. Upstream of the I-90 crossing, within the City of Cle Elum, the land bordering the river is mostly undeveloped forest land (zoned for planned mixed use) with a few single-family residential lots.

Upstream of Cle Elum city limits to the National Forest boundary, the river is bordered by undeveloped forest land zoned for master planned resort (Suncadia). Much of this land is protected within conservation easements. From the Cle Elum Dam to approximately 1 mile downstream, the river flows through National Forest lands.

According to National Forest mapping data, there are two “special use” authorizations identified within the inventory area. A National Forest special use authorization allows for non-federal and temporary occupancy, use, rights, or privileges of National Forest lands.

#### 3.12.3.1 *City of Cle Elum*

The Cle Elum River flows through the west end of the City of Cle Elum. The river is generally bordered by undeveloped forest land, which is zoned for planned mixed use. A moderate-density residential development borders the river to the southeast.

### 3.12.4 Public Access

The lower Cle Elum River can be accessed from the Suncadia Conservancy, which borders the river from Bullfrog Road to the National Forest boundary. The Salmon Viewing Trail, which is ADA-accessible, is located off of Lake Cle Elum Dam Road, and Forest Service Road 4330 also provides river access.

#### 3.12.4.1 *City of Cle Elum*

There is no public access to this reach.

### 3.12.5 Reach Sheet

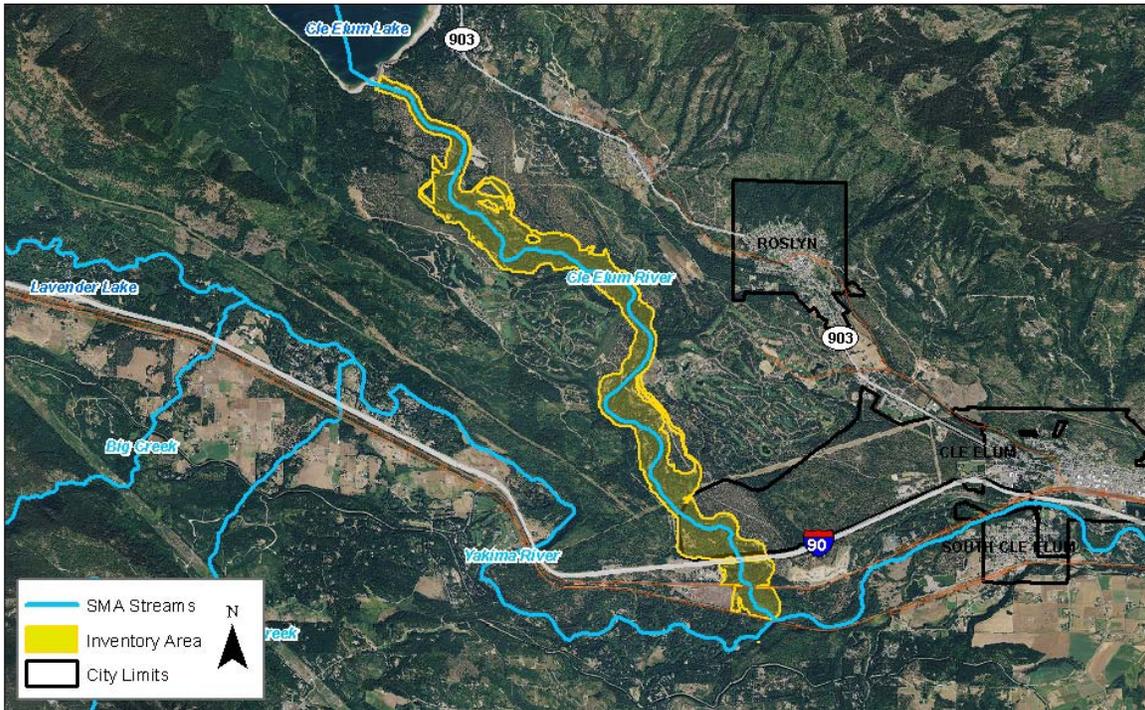
## CLE ELUM RIVER-REACH 1

**SHORELINE LENGTH:**

7.8 Miles

**REACH INVENTORY AREA:**

1,202 Acres



## PHYSICAL AND ECOLOGICAL FEATURES

**CHANNEL CONFIGURATION**

The reach descends approximately 250 feet, contains multiple channels, numerous side channels and gravel bars, particularly upstream of the Suncadia development. The downstream portion of the reach passes under several bridges, including I-90, which constrain channel movement.

**LAND COVER (MAP FOLIO #3)**

This reach is primarily forest (38%) and riparian vegetation (38%), with some unvegetated (6%), agricultural lands (6%), harvested forest (5%), other (3%), open water (2%), and developed lands (1%).

**HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)**

The majority of the reach (89%) is located within the FEMA 100-year floodplain and a few landslide hazard areas (2%) are mapped on both banks of the reach. Over three-quarters (81%) of the reach has potential for channel migration.

**HABITATS AND SPECIES (MAP FOLIO #1)**

WDFW mapping shows that the reach provides spawning habitat for spring Chinook and summer steelhead. The presence of sockeye salmon, burbot, eastern brook trout, mountain whitefish, rainbow trout, and westslope cutthroat is also mapped

**WATER QUALITY**

The reach is listed on the State's Water Quality Assessment list of 303 (d) Category 5 waters for temperature

Wetland habitat is mapped along the river throughout the reach (37% of the reach). A significant amount of priority elk winter concentration area is located in the reach; wood duck nesting habitat is also mapped in the reach.

## BUILT ENVIRONMENT AND LAND USE

### SHORELINE MODIFICATIONS (MAP FOLIO #1)

There are several crossing (bridges) over the reach, including I-90, a railroad, and 3 other roadways.

### PUBLIC ACCESS (MAP FOLIO #4)

The lower Cle Elum River can be accessed from the Suncadia Conservancy, which borders the river from Bullfrog Road to the National Forest boundary. The Salmon Viewing Trail, which is ADA-accessible, is located off of Lake Cle Elum Dam Road, and Forest Service Road 4330 also provides river access.

### EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use along the reach is primarily resort (70%) with rural lands at the upstream and downstream ends of the reach (30%). Land ownership is 93% private and 7% public (Forest Service).

### CONTAMINATED SITES

A State cleanup site (pesticide dump) is located at the downstream end of the reach.

### ZONING (MAP #5)

Lands within the reach are zoned primarily for master planned resort (70%), with forest & range (14%) along the upstream end and mixed use (11%), rural residential (1%), urban/suburban residential (1%) and other (3%) [I-90] at the downstream end.

### CULTURAL AND ARCHAEOLOGICAL RESOURCES

A total of 41 recorded precontact and historic sites are located within the reach. Recorded precontact sites include lithic scatters and burials while historic sites include bridges, refuse dumps, and waterlines.

## SHORELINE FUNCTION ANALYSIS

### FISH HABITAT QUALITY

**High:** The reach provides spawning and juvenile rearing habitat for priority fish species (including spring Chinook salmon), has generally low levels of hydromodifications, and exhibits a generally high level of channel complexity.

### TERRESTRIAL HABITAT QUALITY

**High:** The majority of the reach consists of dense forest and shrub habitat and connections to large areas of relatively undisturbed habitat are present throughout much of the reach.

### VEGETATION FUNCTIONS

**High:** Some areas of alteration exist, but the majority of the reach consists of dense riparian forest and shrub habitat.

### HYDROLOGIC FUNCTIONS

**High:** There are generally low levels of hydromodifications and floodplain alteration within the reach.

## KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Resource lands within the reach have the potential to be converted to more intensive uses (e.g., from forest and range to residential subdivisions). New development should be set back an adequate distance to protect stream functions and protect structures from flooding and channel migration.
- Protect the high-value wetland, forested floodplain, and wildlife areas.
- The lower Cle Elum River is a high-density Chinook salmon spawning area.
- Upstream of the City of Cle Elum, much of the shoreland area is protected within conservation easements.
- Many important cultural and archaeological sites are located within the reach.
- Support efforts to balance irrigation needs with fish passage flows.
- Manage recreational activity to reduce impacts on vegetation and subsequent erosion.
- Educate shoreline property owners about measures to protect and restore riparian areas.

## CLE ELUM RIVER-CITY OF CLE ELUM REACH

**SHORELINE LENGTH:**  
0.7 Miles

**REACH INVENTORY AREA:**  
148.7 Acres



### PHYSICAL AND ECOLOGICAL FEATURES

**CHANNEL CONFIGURATION**

The upstream extent of the reach is confined by a road crossing; the downstream extent by an I-90 crossing. This single channel reach transitions to multiple channels downstream and then back to a single channel at the I-90 crossing.

**LAND COVER (MAP FOLIO #3)**

The majority of the reach is covered by riparian vegetation (51%) and forest (22%). Other cover types include: agricultural lands (8%), harvested forest (6%), other (6%), unvegetated lands (5%), and developed lands (2%).

**HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)**

The majority of the reach (98%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach. The entire reach has potential for channel migration.

**HABITATS AND SPECIES (MAP FOLIO #1)**

WDFW mapping shows that the reach provides spawning habitat for spring Chinook and summer steelhead. The presence of sockeye salmon, burbot, eastern brook trout, mountain whitefish, rainbow trout, and westslope cutthroat is also mapped

**WATER QUALITY**

The reach is listed on the State's Water Quality Assessment list of 303 (d) Category 5 waters for temperature; a TMDL has been implemented

Wetland habitat is closely associated with the river, primarily the upstream portion of the left bank and entire right bank (36% reach total). Priority elk winter concentration area is also mapped within the reach.

## BUILT ENVIRONMENT AND LAND USE

<p><b>SHORELINE MODIFICATIONS (MAP FOLIO #1)</b> There are no shoreline modifications mapped within the reach.</p>	<p><b>PUBLIC ACCESS (MAP FOLIO #4)</b> There is no public access to this reach.</p>
<p><b>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)</b> Land use within the reach is rural (100%). Land ownership is 100% private.</p>	<p><b>CONTAMINATED SITES</b> No identified contaminated sites are located within this reach.</p>
<p><b>ZONING (MAP #5)</b> Lands within the reach are zoned for mixed use (91%), urban/suburban residential (5%), and other (4%).</p>	<p><b>CULTURAL AND ARCHAEOLOGICAL RESOURCES</b> There are 3 recorded precontact sites, and 1 recorded historic site located within the reach. The recorded precontact sites mostly feature lithic scatters with 1 site also containing burials.</p>

## SHORELINE FUNCTION ANALYSIS

<p><b>FISH HABITAT QUALITY</b> <b>High:</b> The reach provides spawning and juvenile rearing habitat for priority fish species (including spring Chinook salmon), has generally low levels of hydromodifications, and exhibits a generally high level of channel complexity.</p>	<p><b>TERRESTRIAL HABITAT QUALITY</b> <b>High:</b> The majority of the reach consists of dense forest and shrub habitat and connections to large areas of relatively undisturbed habitat are present throughout much of the reach.</p>
<p><b>VEGETATION FUNCTIONS</b> <b>High:</b> Some areas of alteration exist (associated with residential development), but the majority of the reach consists of dense riparian forest and shrub habitat.</p>	<p><b>HYDROLOGIC FUNCTIONS</b> <b>High:</b> There are generally low levels of hydromodifications and floodplain alteration within the reach.</p>

## KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- New development should be set back an adequate distance to protect stream functions and protect structures from flooding and channel migration hazards.
- Protect the high-value wetland and forested floodplain areas.
- There is no public access to the reach.
- The lower Cle Elum River is a high-density Chinook salmon spawning area.
- Manage recreational activity to reduce impacts on vegetation and subsequent erosion.
- Educate shoreline property owners about measures to protect and restore riparian areas.

## 3.13 Cle Elum Lake

Cle Elum Lake is the eastern-most of the three reservoirs which supply irrigation water as part of the Yakima Project. The lake is designated as a “lake of statewide significance.”

### 3.13.1 Physical Characterization

Cle Elum Lake is oriented north-south. It has an active storage capacity of approximately 436,000 acre-feet with a surface area of 4,800 acres when full. The maximum depth is approximately 258 feet. Lake levels fluctuate roughly 60 feet between the winter/spring and summer (Haring 2001). Major tributaries to the lake include the Cle Elum River and its tributaries and French Cabin Creek, all of which drain to the north end of the lake.

Several landslide hazard areas have been mapped within narrow canyons along the southwestern shoreline of the lake (WDNR 2010). Steep slopes are mapped near the northeastern shoreline and at many locations along the southwestern shoreline (Kittitas County 2012). The FEMA 100-year floodplain extends around the circumference of the lake, but is not mapped throughout the inventory area (FEMA 1996).

State Route 903 and Salmon La Sac Road roughly parallel much of the eastern lake shoreline. The roadways provide access to sparse to moderate-density residential development along the eastern and southeastern shorelines. Virtually no development is located along the north, west, or southwest shorelines of the lake. A limited number of Forest Service roads are mapped near the northwest portion of the lake.

Cle Elum Lake originally formed in the U-shaped glacial valley of the Cle Elum River with a capacity of approximately 100,000 acre-feet. In 1933, an earth and gravel-fill dam was constructed at the outlet of the lake to increase storage capacity for irrigation (Haring 2001). The Cle Elum Lake Dam is located at the south end of the lake. Below the 165-foot dam, the lake drains to the south via the Cle Elum River until its confluence with the Yakima River (BOR 2009).

## 3.13.2 Habitats and Species

### 3.13.2.1 Fish Use

The construction of a crib dam at Cle Elum Reservoir contributed to the local extinction of sockeye from the basin in the early 1900s. Later the U.S. Bureau of Reclamation (Reclamation) constructed Cle Elum Dam. The dam expanded a natural lake that historically supported populations of sockeye, coho, and spring Chinook salmon, steelhead, Pacific lamprey, bull trout, and other resident fish. Lack of passage at the dam blocked access to the lake and upstream habitat for anadromous salmonids and contributed to the extirpation of sockeye salmon runs in the Yakima River basin. The absence of passage has also isolated local populations of bull trout and may have prevented the recolonization of populations. (Reclamation 2011, Haring 2001).

Interim juvenile fish passage facilities were completed at Cle Elum Lake in 2005 to test the ability of juvenile fish to locate the passage facility and exit the reservoir (Reclamation 2007). Data gathered from the temporary passage facilities confirm that fish can navigate a downstream passage facility at the dam (Reclamation 2011).

No anadromous fish are present in the reservoir or the Cle Elum River upstream of the dam, with the exception of some sockeye and coho that have been introduced in recent years. Native resident fish in the lake include burbot, bull trout, kokanee salmon (spawning), westslope cutthroat, mountain and pygmy whitefish, rainbow trout, dace, suckers, sculpins, and a few other species. Introduced resident species in the lake include brown trout, eastern brook trout, and lake trout (StreamNet 2010, Reclamation and Ecology 2011b).

Cle Elum Reservoir is operated to meet irrigation demands, flood control, and instream flows for fish. Operational releases at Cle Elum Dam are affected by the presence of spring Chinook salmon redds in the Cle Elum River downstream from the dam (Reclamation and Ecology 2011b).

In 2001, Reclamation entered into an agreement with the Washington Department of Fish and Wildlife to assess the feasibility of providing passage for anadromous salmonids at five water storage projects in the Yakima River basin. The goal is to eventually restore anadromous salmonid runs to suitable habitats upstream from the dams and restore the connectivity of bull trout populations. State and tribal fisheries managers are developing a plan for the eventual phased reintroduction of sockeye salmon, coho salmon, Chinook salmon, and steelhead above the dams. The Yakama Nation and WDFW developed a reintroduction plan for anadromous fish species above the Yakima Project storage dams. The fish reintroduction plan helped

guide the development of alternatives for fish reintroduction at Cle Elum Dam (Reclamation 2007, 2011).

Between 2003 and 2005, biologists studied conditions in Cle Elum Lake to better understand the potential for reintroducing sockeye salmon. They found that Cle Elum Lake is relatively unproductive, with low nutrient levels, chlorophyll a concentrations, phytoplankton biovolume, zooplankton densities, and total organic carbon concentrations. The very low densities of zooplankton may limit the capacity of the lake to support fish. However, the carcasses of returning adult salmon are expected to return marine-derived nutrients to the system (Reclamation 2007, 2011).

The Integrated Water Resource Management Plan for the Yakima River basin proposes permanent fish passage facilities at the Cle Elum Dam including both downstream passage facilities for juvenile fish and upstream adult fish passage facilities. The Integrated Plan also proposes raising the maximum water level of Cle Elum Lake to increase the volume of available storage in the lake (Reclamation and Ecology 2011a).

### 3.13.2.2 *Water Quality*

Cle Elum Lake is listed by Ecology for high water temperatures at the upper and lower ends of the lake near the river inlet/outlet. The trophic status of the lake was classified as eutropic according to a 1993 assessment by Ecology (Rector 1996) indicating high mineral and organic nutrients and low dissolved oxygen content.

Dispersed recreational activity along the Cle Elum River and Cle Elum Lake may increase the delivery of fine sediments (Haring 2001).

### 3.13.2.3 *Riparian Habitat Conditions (Land Cover)*

The riparian zone of Cle Elum Reservoir consists of forested areas with limited and scattered residential development.

### 3.13.2.4 *Wetlands*

A small part of the lake's shoreline inventory area is mapped as freshwater emergent wetland.

### 3.13.2.1 *Wildlife Habitats and Species*

The area surrounding Cle Elum Lake is mapped as northern spotted owl critical habitat (federally listed threatened species), elk winter concentration area and mountain goat habitat. A bald eagle nest is mapped on the lake shoreline.

The forest and riparian habitat areas surrounding Cle Elum Reservoir are relatively undisturbed and provide high-quality habitat for a variety of native wildlife species. Many wildlife species in the Cle Elum River basin have a food web relationship with salmon as primary or secondary consumers (for example, black bear, bald eagle, river otter, common merganser, osprey) (Reclamation and Ecology 2011b).

Grizzly bear observations have been recorded in the vicinity of Cle Elum Reservoir (WDFW, 2009a; WSDOT 2005). The grizzly bear is a federal threatened and state endangered species. Grizzly bears are wide-ranging and omnivorous, and they make heavy use of salmon as a food source. Suitable habitat existed in the Cle Elum Reservoir area historically, but fairly high road densities, development, and increased human use have decreased the quality of the habitat. Small numbers of grizzlies may also be found in other areas of the Cle Elum River basin (Reclamation and Ecology 2011b).

Reproducing pairs of northern spotted owls have been observed in the Cle Elum Reservoir area. This species was federally listed as threatened in 1990 and is state-listed as endangered. It is known to be declining in the Cle Elum and Wenatchee areas. Spotted owls generally rely on older forested habitats. Critical habitat for northern spotted owl is designated near Cle Elum Reservoir and Cle Elum River. The U.S. Forest Service approach to managing habitat for this species is shifting away from site-specific reserves toward a landscape approach that recognizes the role of fires in east side, dry forest ecosystems (Reclamation and Ecology 2011b; USFS restoration strategy 2010).

### 3.13.3 Land Use

Over three-quarters of the Lake Cle Elum shoreline inventory area is located on National Forest lands. The remaining inventory area consists of moderate-density residential subdivisions and vacant land that is zoned for rural residential development.

According to National Forest mapping data, there are six “special use” authorizations identified within the inventory area. A National Forest special use authorization allows for non-federal and temporary occupancy, use, rights, or privileges of National Forest lands.

### 3.13.4 Public Access

Several National Forest recreation areas border Lake Cle Elum, including Speelyi Beach, Wish Poosh Campground (contains a boat launch), and Cle Elum River Campground. In addition, the northeastern shore of Lake Cle Elum is bordered by a snowmobile trail/Forest Service road.

### 3.13.5 Reach Sheet



## LAKE CLE ELUM

**SHORELINE LENGTH:**  
43.9 Miles

**WATERBODY AREA:** 4,509.9 Acres  
**REACH INVENTORY AREA:** 5,095.1 Acres



## PHYSICAL AND ECOLOGICAL FEATURES

### PHYSICAL CONFIGURATION

The lake is located in a valley, oriented northwest to southeast. The 165-foot-high dam, located at the south end of the lake, regulates pool elevations between 2,240 feet and 2,210 feet.

### LAND COVER (MAP FOLIO #3)

Land cover within the reach is mainly open water (56%) and unvegetated (30%). Other (6%), conifer-dominated forest (5%), and riparian vegetation (2%) are also present.

### HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

A significant portion of the reach (75%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach.

### HABITATS AND SPECIES (MAP FOLIO #1)

WDFW mapping shows that the reach provides spawning habitat for Kokanee salmon, and the lake now provides rearing habitat for sockeye salmon. The presence of burbot, bull trout, eastern brook trout, mountain whitefish, rainbow trout, and westslope cutthroat are also mapped.

### WATER QUALITY

The reach is listed on the State's Water Quality Assessment list of 303 (d) Category 5 waters for temperature.

Approximately 14% of the reach is mapped as wetland habitat. Priority elk winter concentration area is located east and south of the lake and unique habitat features (e.g., cliffs, outcroppings, talus slopes) are located in the southern portion of the reach, suitable for mountain goat.

## BUILT ENVIRONMENT AND LAND USE

### SHORELINE MODIFICATIONS (MAP FOLIO #1)

The lake level is controlled by a dam (barrier to fish passage).

### PUBLIC ACCESS (MAP FOLIO #4)

Several National Forest recreation areas border Lake Cle Elum, including Speelyi Beach, Wish Poosh Campground (contains a boat launch), and Cle Elum River Campground. In addition, the northeastern shore of Lake Cle Elum is bordered by a snowmobile trail/Forest Service road.

### EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use along the lake is primarily rural along the eastern and southern shores (55%) and forestry along the western and northern shores (38%), with patches of parks & open space (8%). Land ownership is 23% private and 77% public (Forest Service).

### CONTAMINATED SITES

No identified contaminated sites are located within this reach.

### ZONING (MAP #5)

Lands within the reach are zoned primarily for rural residential (43%) along the east and south lake shores commercial forestry (37%) along the west and north shores, with some areas of forest & range (9%) and other (11%).

### CULTURAL AND ARCHAEOLOGICAL RESOURCES

A total of 27 recorded precontact and historic sites are located in the reach. Recorded sites include 17 precontact sites, 5 historic sites, and 5 sites that feature both precontact and historic features.

## SHORELINE FUNCTION ANALYSIS

### FISH HABITAT QUALITY

**Medium:** The lake provides habitat for several priority fish species, but is primarily managed as an irrigation reservoir and has a listed water quality impairment (high temperatures).

### TERRESTRIAL HABITAT QUALITY

**High:** The shorelands consist primarily of dense forest cover, and the lake has significant, unaltered connections to large areas of relatively unaltered habitat.

### VEGETATION FUNCTIONS

**High:** Nearly the entire lakeshore consists of dense, mature forest habitat

### HYDROLOGIC FUNCTIONS

**Medium:** The lake provides significant floodwater storage, but it is managed as an irrigation reservoir.

## KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- In the recent past, large tracts of resource lands within the reach have been converted to more intensive uses (e.g., from forestry to residential subdivisions). Future new structures should be set back an adequate distance from the lakeshore to protect riparian functions.
- Fish passage has recently been constructed at Cle Elum dam, and sockeye have been re-introduced to the lake and its tributary streams.
- Many important cultural and archaeological sites are located within the reach.
- Protect existing forested areas and high-quality wildlife habitat.
- Educate shoreline property owners about measures to protect and restore riparian areas.
- Decommission and revegetate any unused roads along the shoreline.

## 3.14 Lake Cle Elum Tributaries

Tributaries to Lake Cle Elum with mean annual flows greater than 20 cfs include French Cabin Creek, Thorp Creek, Upper Cle Elum River, Scatter Creek, Fortune Creek, Cooper River, Delate Creek, Lemah Creek, Waptus River, Goat Creek, Trail Creek, Spinola Creek, Spade Creek, Chief Creek, and Shovel Creek. Lakes in the upper Cle Elum watershed larger than 20 acres include Tuck Lake, Robin Lake, Tucquala Lake, Cooper Lake, Spectacle Lake, Glacier Lake, Chikamin Lake, Pete Lake, Lake Michael, Deep Lake, Circle Lake, Waptus Lake, Spade Lake, Venus Lake, Lake Ivanhoe, Shovel Lake, and Lake Rowena.

The following streams are designated as “shorelines of statewide significance”: Cooper River upstream to Cooper Lake, the Waptus River upstream to Waptus Lake, and the Cle Elum River two miles upstream of the confluence with Fortune Creek.

Delate Creek, Spectacle Lake, Chikamin Lake, the upper reaches of Lemah Creek, Pete Lake, Lake Ivanhoe, Lake Rowena, Shovel Creek, Shovel Lake, Chief Creek, Spade Creek, Spade Lake, Waptus Lake, Spinola Creek, Waptus River, Trail Creek, Goat Creek, Venus Lake, Circle Lake, Deep Lake, Lake Michael, Tuck Lake, Glacier Lake, and Robin Lake are located within the Alpine Lakes Wilderness Area, and are only briefly discussed below.

For this analysis, the upper Cle Elum River was divided into 6 reaches: Reach 2 (1.1 miles) extends from the Lake Cle Elum inlet to the Thorp Creek confluence, Reach 3 (2.1 miles) extends from the Thorp Creek confluence to the Cooper River confluence, Reach 4 (2.5 miles) extends from the Cooper River confluence to the Waptus River confluence, Reach 5 (5.4 miles) extends from the Waptus River confluence to the Fortune Creek confluence, Reach 6 (2.9 miles) extends from the Fortune Creek confluence to the Tucquala Lake outlet, and Reach 7 extends from the Tucquala Lake inlet to 5.7 miles upstream. The lower Cle Elum River (Reach 1) is described above in Section 3.12.

Cooper River was divided into 2 reaches: Reach 1 (4.5 miles) extends from the Cle Elum River confluence to the outlet of Cooper Lake and Reach 2 (4.7 miles) extends from the Cooper Lake inlet to the Lemah Creek confluence.

### 3.14.1 Physical Characterization

The headwaters of the Cle Elum River are located at the northern extent of Kittitas County, in the Alpine Lakes Wilderness of the Cascade Mountain Range. The majority of the Cle Elum River watershed is located above Cle Elum Lake Dam. The

watershed occupies approximately 208 square miles and contains 14 streams and rivers with mean annual flows greater than 20 cfs. Most of the rivers in the watershed drain to one of three major rivers: Waptus, Cooper, and Cle Elum Rivers. The Waptus and Cooper Rivers are tributaries to the Cle Elum River, which empties to the north end of Cle Elum Lake. The other shoreline regulated stream, which drains directly to Cle Elum Lake, is French Cabin Creek. An estimated 554 miles of Type 1 through Type 5 streams flow through the watershed.

A potential landslide area is mapped near the headwaters of the Cle Elum River (WDNR 2010). The Waptus, Cooper, and Cle Elum Rivers originate and flow through the Cascade Mountain Range and have steep slopes associated with some of their shorelines. However, in many areas, the rivers flow through narrow, relatively flat valleys, with steep slopes located at some distance from their shorelines (Kittitas County 2012). The FEMA 100-year floodplain is mapped in most of the downstream inventory area of Cle Elum River Reach 4 (FEMA 1996). The lower reaches of the Cle Elum and Cooper River have mapped channel migration zones, which overlap much of the Salmon la Sac campground and other recreation areas.

The upper watershed is primarily composed of National Forest lands, in addition to industrial forest and private development. Approximately half of the watershed contains mature forest habitat. From the early 1880s to the 1930s, significant coal and hard rock mining occurred in the upper watershed, which likely impacted the quality of fish habitat (Haring 2001).

Cooper Lake is located in a broad valley, oriented northwest to southeast, and is approximately 1.0 mile long and 0.2 mile wide. The Cooper River enters the lake at the northwest shoreline and exits at the southeast shoreline. A large stream delta/wetland complex is located at the mouth of the stream along the northwest shoreline. Steep slopes are located near portions of the lake's northern and southern shorelines (Kittitas County 2012). The northern shoreline inventory area is mapped in the FEMA 100-year floodplain (FEMA 1996).

The Cooper River is a right-bank tributary to the Cle Elum River. The river is listed as a shoreline of statewide significance in this reach. The river is generally confined within a single channel in a narrow ravine. A bridge, associated with a residential development at the southeast end of the lake, crosses the reach near its upstream extent. Steep slopes are located along the upstream and middle portions of the river reach (Kittitas County 2012). A small portion of the upstream inventory area of the river, on the left bank, and some of the downstream segments of the river are mapped in the FEMA 100-year floodplain (FEMA 1996).

## 3.14.2 Habitats and Species

### 3.14.2.1 *Fish Use*

The upper Cle Elum watershed supports kokanee and bull trout, as well as other resident salmonid and non-salmonid species. Kokanee and bull trout in this area spend their life in Cle Elum Reservoir, except for spawning and egg incubation to emergence (Haring 2001). No anadromous fish are present in the reservoir or the Cle Elum River upstream of the dam, with the exception of some sockeye and coho that have been introduced in recent years (Reclamation and Ecology 2011b). It is likely that the upper Cle Elum and Cooper river now provide spawning habitat for sockeye salmon.

Table 3-3 summarizes fish use in the upper Cle Elum watershed. Fish use has not been recorded by StreamNet (2010) for many of the small lakes in the upper watershed, likely as a result of fish passage barriers such as waterfalls in these steep upper reaches.



**Table 3-3. Fish Use in Lake Cle Elum Tributaries (Source: StreamNet 2010) <sup>1</sup>**

Species	French Cabin Creek	Thorp Creek	Upper Cle Elum River	Scatter Creek	Robin Lake	Tucquala Lake	Fortune Creek	Cooper River	Cooper Lake	Lemah Creek	Pete Lake	Waptus River	Goat Creek	Lake Michael	Trail Creek	Spinola Creek	Deep Lake	Circle Lake	Waptus Lake	Spade Creek	Spade Lake	Venus Lake	Chief Creek	Shovel Creek	Lake Ivanhoe	Shovel Lake	Lake Rowena	
ull Trout			P/M			P/M	P/M	P/M	P/M										P/M									
Rainbow Trout	P/M		P/M			P/M	P/M	P/M	P/M			P/M			P/M				P/M					P/M	P/M			
Westslope Cutthroat		P/M	P/M		P/M	P/M	P/M	P/M	P/M	P/M	P/M	P/M	P/M	P/M		P/M	P/M	P/M	P/M	P/M	P/M	P/M	P/M	P/M	P/M	P/M	P/M	P/M
Eastern Brook Trout	P/M	P/M	P/M			P/M	P/M	P/M	P/M	P/M	P/M	P/M							P/M	P/M			P/M					
Kokanee Salmon			S					P/M	P/M																			
Burbot			P/M					P/M																				
Mountain whitefish			P/M					P/M	P/M																			
Sockeye salmon			S <sup>2</sup>					S <sup>2</sup>																				

1. P/M = presence/migration; S = spawning

2. Sockeye spawning in these stream is likely, due to the re-introduction of this species to Lake Cle Elum

This Page Intentionally Left Blank

### 3.14.2.2 *Water Quality*

Dispersed recreational activity along the Cle Elum River and Cle Elum Lake may increase the delivery of fine sediments (Haring 2001).

The Cle Elum River has water temperatures that are higher than the standard acceptable levels for fish immediately above and downstream of the reservoir. Higher water temperatures in the upper reach of the Cle Elum River are likely a result of water flowing slowly through warm, shallow Tucquala Lake. Much of the upper Cle Elum watershed lies within the Alpine Lakes Wilderness Area and is therefore not affected by forest practices. Both Thorp Creek and the Cooper River, tributaries to the upper Cle Elum River, are also listed on the 303(d) list for temperature (Reclamation and Ecology 2011b).

### 3.14.2.3 *Riparian Habitat Conditions (Land Cover)*

Most of the upper Cle Elum River, upstream of Cle Elum Reservoir, is located in a steep, rocky canyon. The riverbed consists mainly of large boulders, cobbles, and gravels. Stream habitats are varied and include cascades, riffles, and pools suitable for spawning and rearing fish. Log jams and large woody debris are abundant in the river channel. The river valley widens and the gradient is low where the Cle Elum River flows through the wide and shallow Tucquala Lake. The mixed conifer forests and alpine meadows bordering the river are relatively undisturbed except for a gravel road and hiking trails (Reclamation and Ecology 2011b).

Human activities have altered riparian vegetation and reduced sources of large wood along several tributary streams in the upper watershed. Fortune Creek has been affected by timber harvest and motorized trail encroachment into the riparian area. The riparian zones of Thorp Creek and French Cabin Creek have been impacted by timber harvest, road encroachment, and dispersed recreation (Haring 2001).

Extensive areas of the lower Cooper River drainage have a high erosion risk. There is a checkerboard ownership between the National Forest and Plum Creek Timber Company (Haring 2001).

### 3.14.2.4 *Wetlands*

Scattered wetlands are mapped along streams and lakes in the upper Cle Elum watershed. Large wetland systems are mapped on the Waptus River, Delate Creek, Lemah Creek, and the Cooper River.

### 3.14.2.1 *Wildlife Habitats and Species*

The upper Cle Elum watershed is mapped as mountain goat habitat. Several northern spotted owl occurrences are mapped in the upper watershed, and much of the area is designated as critical habitat for this federally listed threatened species.

### 3.14.3 Land Use

The tributary lakes and streams to Lake Cle Elum are located on National Forest lands, with the following exceptions:

- The Cle Elum River is bordered by private land between Cooper and Waptus Rivers. Land use in this area is primarily commercial forest, but some high-density residential subdivisions are located adjacent to Cooper and Cle Elum Rivers.
- North of the Waptus River confluence, the Cle Elum River is bordered by private commercial forest-zoned lands, portions of which have been subdivided into moderate-density residential lots.
- A high-density residential subdivision borders the southeast corner of Cooper Lake.

According to National Forest mapping data, there are two “special use” authorizations identified within the inventory area (Thorp Creek and the Cle Elum River). A National Forest special use authorization allows for non-federal and temporary occupancy, use, rights, or privileges of National Forest lands.

### 3.14.4 Public Access

The Lake Cle Elum tributary streams and lakes can be accessed from adjacent National Forest recreation areas and roads and a network of hiking, horse, and snowmobile trails.

### 3.14.5 Reach Sheet