

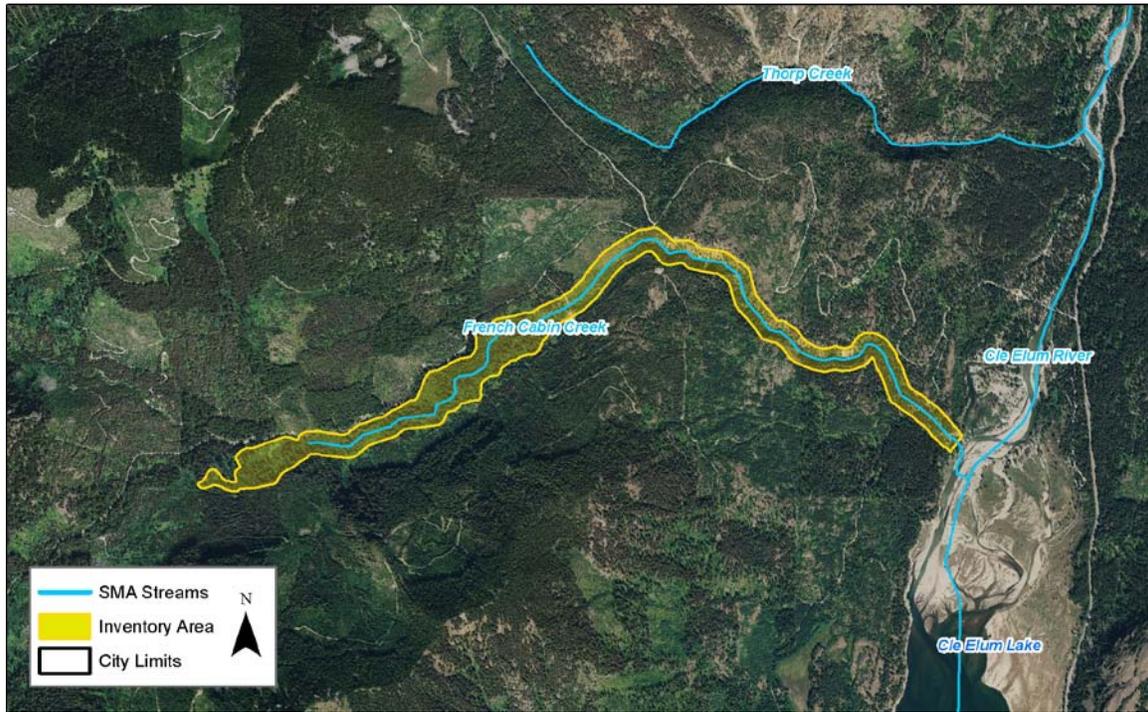
FRENCH CABIN CREEK

SHORELINE LENGTH:

2.9 Miles

REACH INVENTORY AREA:

175.2 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach begins in a large scrub-shrub and forested wetland, flowing to the northeast and then southwest, draining to the north end of Cle Elum Lake. The lower portion of the reach flows through a steep, narrow ravine.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is conifer-dominated forest (58%), riparian vegetation (35%), and harvested forest (7%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

A limited amount (3%) 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 rainbow trout and eastern brook trout within the reach. Approximately 43% of the reach is mapped as wetland. Priority big game is mapped within the reach.

WATER QUALITY

Temperature data are not sufficient for listing the reach, but raise concern about water quality, per the State's Water Quality Assessment.

BUILT ENVIRONMENT AND LAND USE

<p>SHORELINE MODIFICATIONS (MAP FOLIO #1) Two Forest Service roads cross the reach.</p>	<p>PUBLIC ACCESS (MAP FOLIO #4) A cross country ski/snowmobile trail/National Forest road borders the northern regulated stream area; primarily remaining outside of the regulated area.</p>
<p>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use within the reach is forestry (100%). Land ownership is 100% public (Forest Service).</p>	<p>CONTAMINATED SITES No identified contaminated sites are located within this reach.</p>
<p>ZONING (MAP #5) Lands within the reach are primarily zoned for commercial forest (98%), with limited other (2%) composed primarily of forest service roads.</p>	<p>CULTURAL AND ARCHAEOLOGICAL RESOURCES There are no recorded sites within the reach.</p>

SHORELINE FUNCTION ANALYSIS

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

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

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

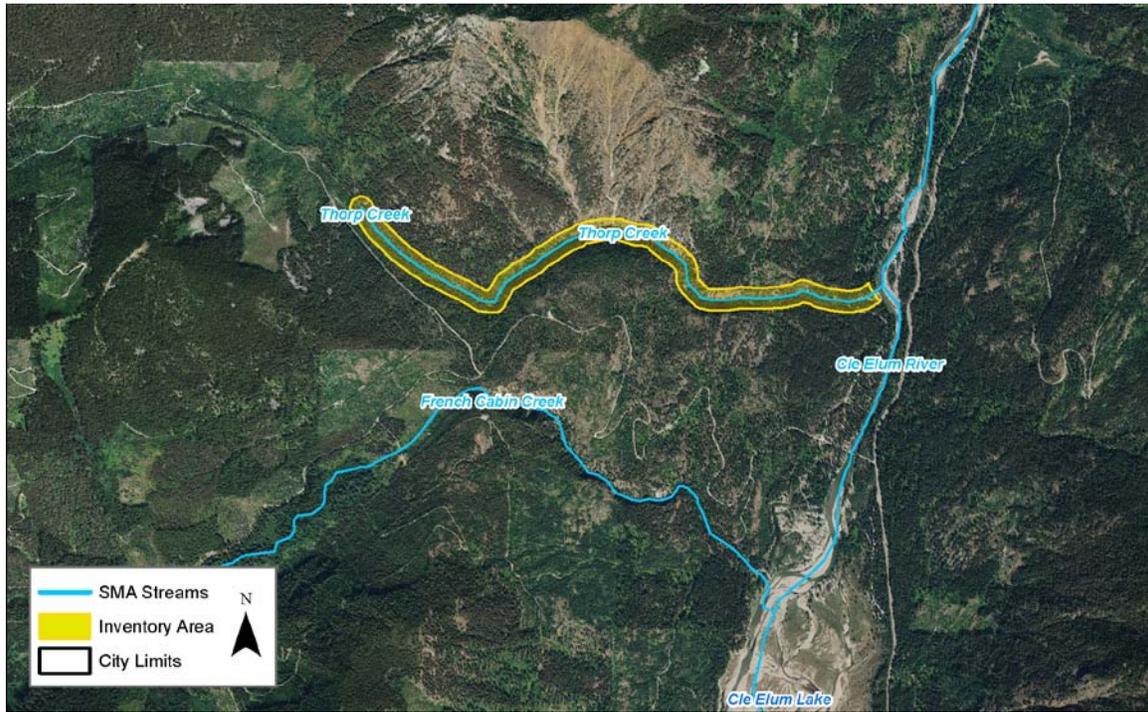
THORP CREEK

SHORELINE LENGTH:

2.2 Miles

REACH INVENTORY AREA:

107.8 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach flows west to east and is undeveloped..

LAND COVER (MAP FOLIO #3)

Land cover within the reach is conifer-dominated forest (90%), riparian vegetation (7%), harvested forest (2%), and shrubland (1%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

A 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 the presence of westslope cutthroat and eastern brook trout within the reach. No wetlands are mapped within the reach; no priority habitats or species are identified in this reach by WDFW.

WATER QUALITY

Temperature data are not sufficient for listing the reach, but raise concern about water quality, per the State's Water Quality Assessment.

BUILT ENVIRONMENT AND LAND USE

<p>SHORELINE MODIFICATIONS (MAP FOLIO #1) There are no shoreline modifications identified within the reach.</p>	<p>PUBLIC ACCESS (MAP FOLIO #4) A cross country ski/snowmobile trail/Forest Service road borders the upstream regulated stream area, but does not enter into the regulated area.</p>
<p>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use within the reach is forestry (100%). Land ownership is 100% public (Forest Service).</p>	<p>CONTAMINATED SITES No identified contaminated sites are located within this reach.</p>
<p>ZONING (MAP #5) Lands within the reach are zoned for commercial forest (100%).</p>	<p>CULTURAL AND ARCHAEOLOGICAL RESOURCES There are no recorded sites within the reach.</p>

SHORELINE FUNCTION ANALYSIS

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

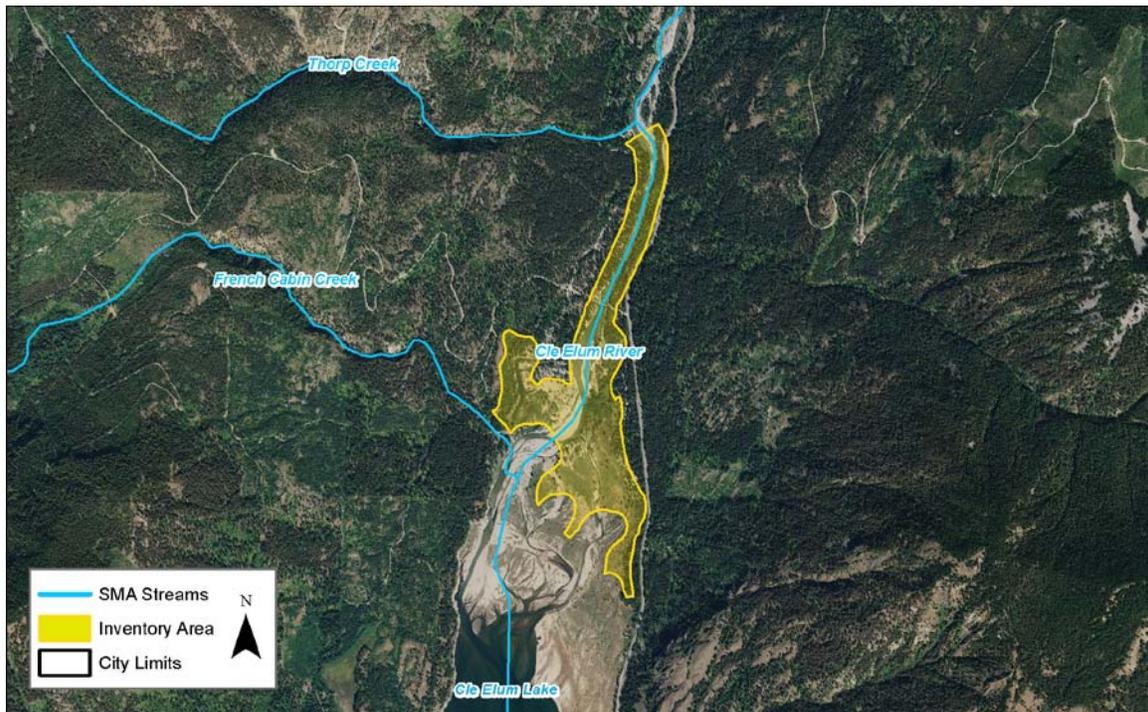
CLE ELUM RIVER-REACH 2

SHORELINE LENGTH:

1.1 Miles

REACH INVENTORY AREA:

165.1 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach is undeveloped. A Forest Service road located west of the stream and Salmon La Sac Road to the east flank the stream. A Forest Service bridge crosses the reach near its mouth. The southern portion of the reach becomes inundated when Cle Elum Lake is full.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is conifer-dominated forest (34%), riparian vegetation (27%), unvegetated (2%), developed (1%), harvested forest (1%), open water (1%), and other (34%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

A majority (89%) of the reach is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach. The majority of the reach (81%) has potential for channel migration.

HABITATS AND SPECIES (MAP FOLIO #1)

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

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.

Wetlands are mapped within 34% of the reach and Priority big game and elk winter concentrations are mapped within the reach.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1)

Salmon la Sac Road borders the eastern side of the reach, and a Forest Service road crosses the stream at the lower end of the reach.

PUBLIC ACCESS (MAP FOLIO #4)

A cross country ski/snowmobile trail/Forest Service road crosses the middle portion of the reach. A snowmobile trail/Forest Service road parallels the eastern border of the regulated stream area. A campground, Cle Elum River, is located adjacent to the eastern regulated stream area, near the stream mouth.

EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use within the reach is forestry (9%) and parks & open space (1%). Land ownership is 1% private and 99% public (Forest Service).

CONTAMINATED SITES

No identified contaminated sites are located within this reach.

ZONING (MAP #5)

Lands within the reach are primarily zoned for commercial forest (89%), with some other (11%) composed primarily of bare ground associated with the stream mouth.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no recorded sites within the reach.

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY

High: The stream is largely unaltered and provides habitat for several priority fish species, including spawning habitat for Kokanee and sockeye salmon (likely).

TERRESTRIAL HABITAT QUALITY

High: The reach is generally well-vegetated, contains significant wetland habitat, and is connected to a large area of contiguous forest habitat.

VEGETATION FUNCTIONS

High: The reach is dominated by riparian shrub and mature forest habitat.

HYDROLOGIC FUNCTIONS

High: The stream is largely unaltered and unconfined across a wide floodplain.

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.

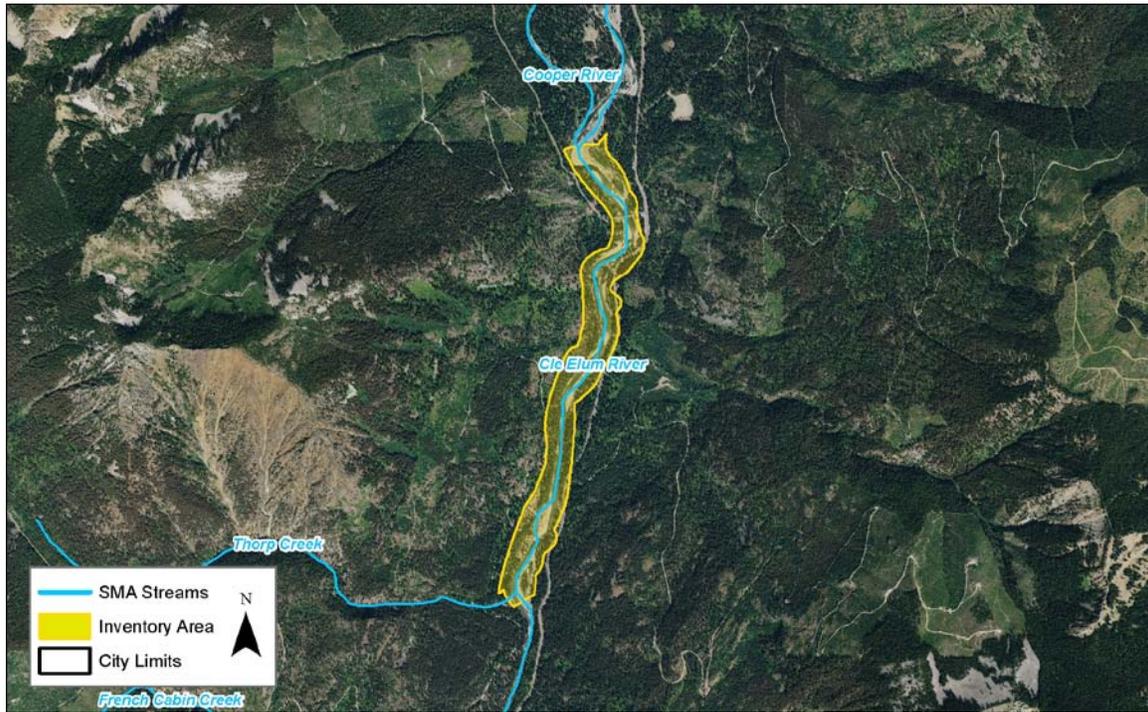
CLE ELUM RIVER-REACH 3

SHORELINE LENGTH:

2.1 Miles

REACH INVENTORY AREA:

161.1 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach flows north to south and is undeveloped.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is conifer-dominated forest (59%), riparian vegetation (20%), unvegetated (10%), open water (4%), developed (2%), harvested forest (1%), and other (4%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

Most (80%) of the reach is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach. The majority of the reach (79%) has potential for channel migration.

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW mapping shows the presence of bull trout, rainbow trout, westslope cutthroat, eastern brook trout, Kokanee salmon, burbot, and mountain whitefish within the reach. The reach now likely provides spawning habitat for sockeye salmon.

WATER QUALITY

Temperature data are not sufficient for listing the reach, but raise concern about water quality, per the State's Water Quality Assessment.

A small area (9%) of the reach is mapped as wetland. No priority habitats or species are identified in this reach by WDFW.

BUILT ENVIRONMENT AND LAND USE

<p>SHORELINE MODIFICATIONS (MAP FOLIO #1) Salmon La Sac Road parallels the entire eastern border of the reach. A Forest Service road bridge crosses the upstream portion of the reach; another Forest Service road borders the western bank downstream.</p>	<p>PUBLIC ACCESS (MAP FOLIO #4) A snowmobile trail/Forest Service Road borders the eastern regulated stream area; crossing the upstream portion of the reach. The Red Mountain Campground is located on the eastern shoreline of the reach, near the confluence with Thorp Creek.</p>
<p>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use within the reach is forestry (100%). Land ownership is 100% public (Forest Service).</p>	<p>CONTAMINATED SITES No identified contaminated sites are located within this reach.</p>
<p>ZONING (MAP #5) Lands within the reach are zoned for commercial forest (100%).</p>	<p>CULTURAL AND ARCHAEOLOGICAL RESOURCES There is 1 precontact site and 2 historic sites recorded within the reach. One of the historic sites consists of a refuse scatter that is potentially eligible for listing on the National Register.</p>

SHORELINE FUNCTION ANALYSIS

<p>FISH HABITAT QUALITY Medium: The stream provides habitat for several priority fish species, but no spawning or rearing habitat is identified.</p>	<p>TERRESTRIAL HABITAT QUALITY High: The reach is generally well-vegetated and is connected to a large area of contiguous forest habitat.</p>
<p>VEGETATION FUNCTIONS High: The majority of the reach area consists of dense, mature forest cover.</p>	<p>HYDROLOGIC FUNCTIONS Medium: The stream contains a fairly wide floodplain, but the floodplain connection is disturbed by Salmon La Sac Road.</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.

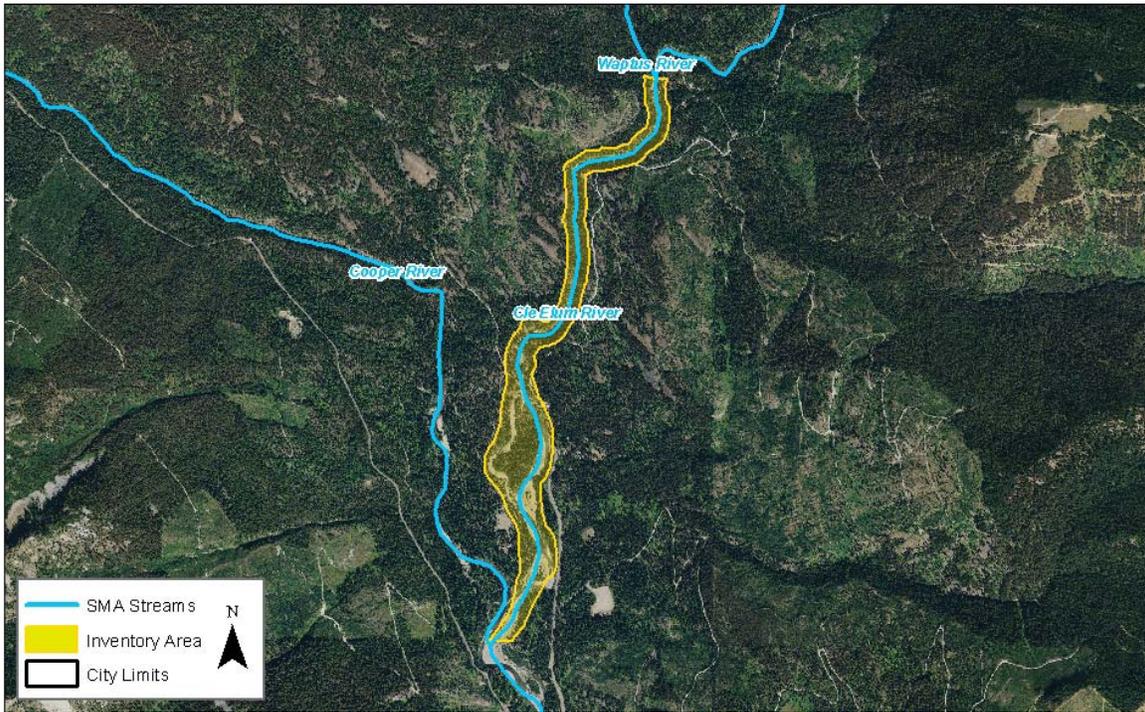
CLE ELUM RIVER-REACH 4

SHORELINE LENGTH:

2.5 Miles

REACH INVENTORY AREA:

157.4 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The upstream portion of the reach is confined to a single channel in a steep, narrow valley. Near the confluence with the Cooper River, the topography becomes less severe and the river splits into multiple channels with large gravel bars.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is primarily conifer-dominated forest (81%), and riparian vegetation (11%), with patches of other (4%), developed lands (2%), and grassland (2%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

A little more than half (55%) of the reach is located within the FEMA 100-year floodplain and a limited amount of landslide hazard area (1%) is mapped at the upstream end of the reach. Over half (61%) of the reach has potential for channel migration.

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW maps the presence of burbot, bull trout, eastern brook trout, mountain whitefish, rainbow trout, and westslope cutthroat within the reach. The reach now likely provides spawning habitat for sockeye salmon. Wetland habitat is mapped along much of the river reach (7% of the reach). No priority habitats or species are identified in this reach by WDFW.

WATER QUALITY

The reach meets water quality criteria for temperature, per the State's Water Quality Assessment.

BUILT ENVIRONMENT AND LAND USE

<p>SHORELINE MODIFICATIONS (MAP FOLIO #1) There are no shoreline modifications identified within the reach.</p>	<p>PUBLIC ACCESS (MAP FOLIO #4) This reach can be accessed by cross country ski and snowmobile trails/Forest Service roads at several locations.</p>
<p>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use along the reach is forestry (100%). Land ownership is 45% private and 55% public (Forest Service).</p>	<p>CONTAMINATED SITES No identified contaminated sites are located within this reach.</p>
<p>ZONING (MAP #5) Lands within the reach are zoned for commercial forestry (97%) and other (3%).</p>	<p>CULTURAL AND ARCHAEOLOGICAL RESOURCES There is 1 recorded precontact site, and 2 recorded historic sites within the reach. The Salmon la Sac Guard Station (built 1912) is listed on state and national historic registries.</p>

SHORELINE FUNCTION ANALYSIS

<p>FISH HABITAT QUALITY Medium: The stream provides habitat for several priority fish species, but no spawning or rearing habitat is identified.</p>	<p>TERRESTRIAL HABITAT QUALITY High: The reach is connected to a large area of contiguous forest habitat, and contains minimal existing development.</p>
<p>VEGETATION FUNCTIONS High: The majority of the reach area consists of dense, mature forest cover.</p>	<p>HYDROLOGIC FUNCTIONS High: The stream channel and its floodplain are generally unaltered.</p>

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Privately-owned forest lands within the reach have the potential to be converted to more intensive uses (e.g., from forestry 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, forested floodplain areas within the reach.
- Manage recreational activity to reduce impacts on vegetation and subsequent erosion.
- Educate shoreline property owners about measures to protect and restore riparian areas.

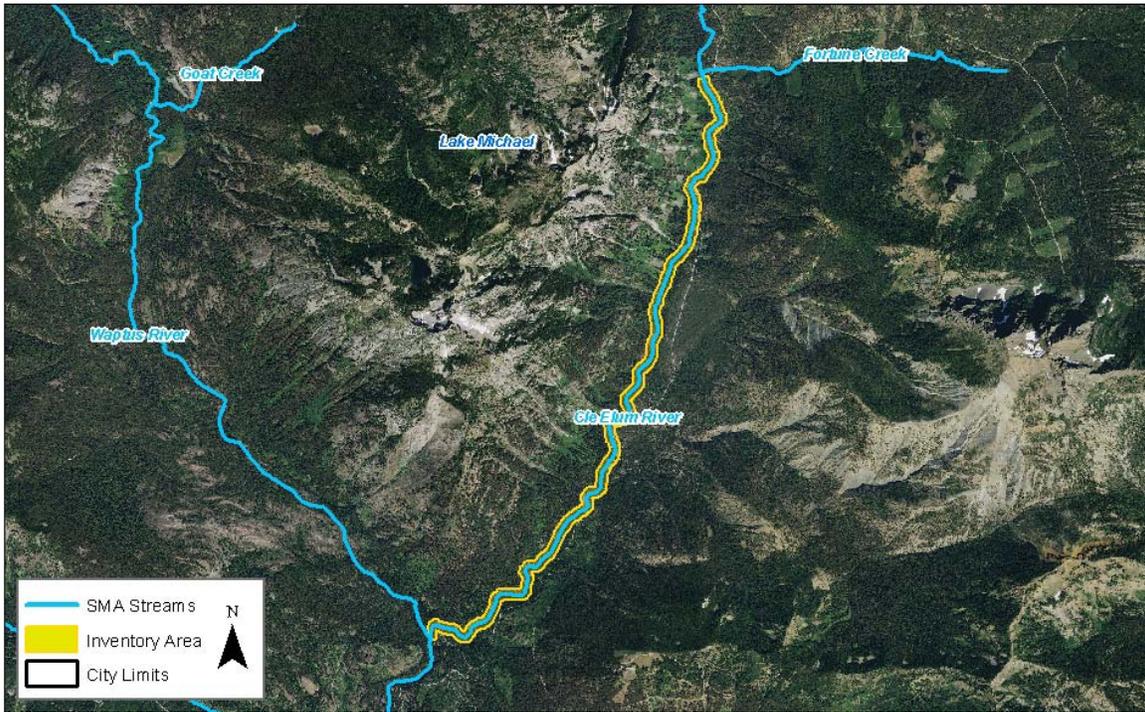
CLE ELUM RIVER-REACH 5

SHORELINE LENGTH:

5.4 Miles

REACH INVENTORY AREA:

257.3 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach is located within a narrow valley with moderate to steep topographic relief; the river is generally confined within a single channel with numerous gravel bars.

LAND COVER (MAP FOLIO #3)

This reach is mostly conifer-dominated forest (93%), and developed (4%), with limited riparian vegetation (2%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

The reach is not located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach.

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW maps the presence of bull trout, eastern brook trout, mountain whitefish, rainbow trout, and westslope cutthroat within the reach. The reach now likely provides spawning habitat for sockeye salmon.

WATER QUALITY

The reach meets water quality criteria for temperature, per the State’s Water Quality Assessment.

Very limited wetland habitat is mapped along the river (<1% of reach total), primarily along the downstream portion of the reach. No priority habitats or species are identified in this reach by WDFW.

The upper Cle Elum River shoreline inventory area supports one rare plant species mapped by the Washington Natural Heritage Program.

BUILT ENVIRONMENT AND LAND USE

<p>SHORELINE MODIFICATIONS (MAP FOLIO #1) A Forest Service road parallels most of the reach on the left bank.</p>	<p>PUBLIC ACCESS (MAP FOLIO #4) The Davis Peak Trail crosses the downstream extent of the stream and a snowmobile trail/Forest Service road provides access at multiple locations.</p>
<p>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use along the reach is forestry (100%). Land ownership is 14% private and 86% public (Forest Service).</p>	<p>CONTAMINATED SITES No identified contaminated sites are located within this reach.</p>
<p>ZONING (MAP #5) Lands within the reach are zoned for commercial forestry (97%) and other (3%).</p>	<p>CULTURAL AND ARCHAEOLOGICAL RESOURCES There are 4 recorded historic sites within the reach. Recorded historic sites feature material related to the mining boom of the early 20th century and include historic structures and a mine.</p>

SHORELINE FUNCTION ANALYSIS

<p>FISH HABITAT QUALITY Medium: The stream provides habitat for several priority fish species, but no spawning or rearing habitat is identified.</p>	<p>TERRESTRIAL HABITAT QUALITY High: The reach is connected to a large area of contiguous forest habitat, and contains minimal existing development, with the exception of a Forest Service Road.</p>
<p>VEGETATION FUNCTIONS High: The majority of the reach area consists of dense, mature forest cover.</p>	<p>HYDROLOGIC FUNCTIONS High: The stream channel and its floodplain are generally unaltered, with the exception of a Forest Service Road.</p>

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Privately-owned forest lands within the reach have the potential to be converted to more intensive uses (e.g., from forestry 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, forested floodplain areas within the reach.
- Manage recreational activity to reduce impacts on vegetation and subsequent erosion.
- Educate shoreline property owners about measures to protect and restore riparian areas.
- The reach contains a rare plant species, mapped by the Washington Natural Heritage Program.

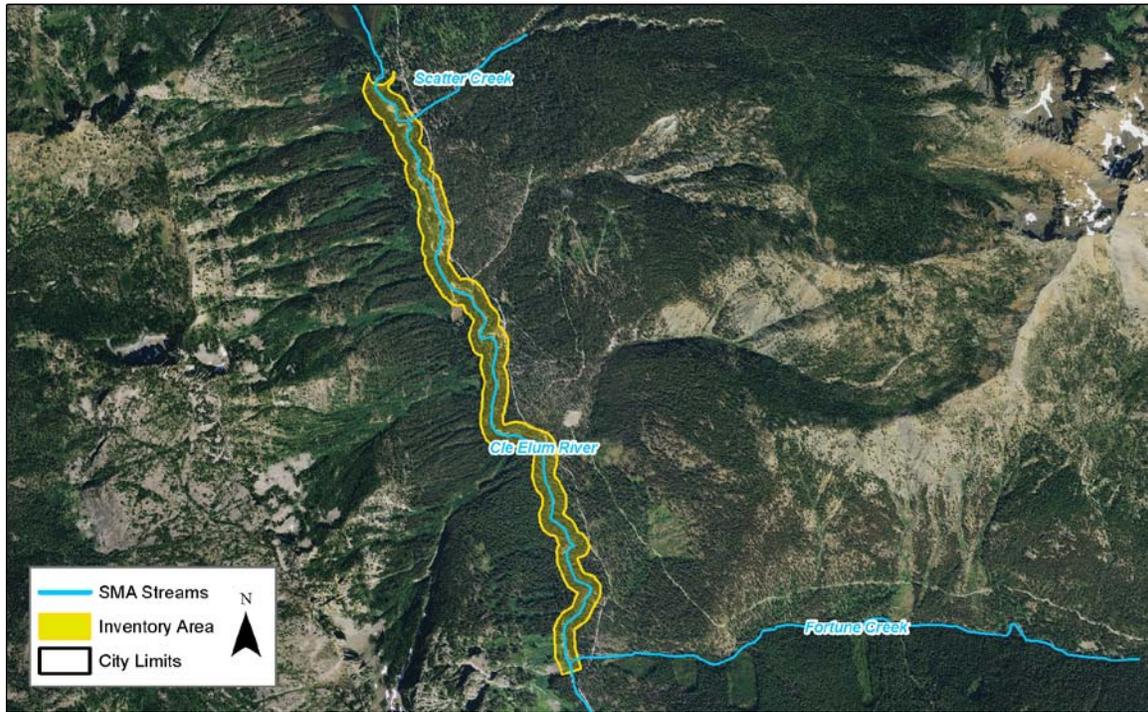
CLE ELUM RIVER-REACH 6

SHORELINE LENGTH:

2.9 Miles

REACH INVENTORY AREA:

157.5 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach roughly flows to the south in a flat valley bottom.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is conifer-dominated forest (83%), riparian vegetation (13%), and developed (4%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

A very limited extent (<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 maps the presence of bull trout, eastern brook trout, mountain whitefish, rainbow trout, and westslope cutthroat within the reach. The reach now likely provides spawning habitat for sockeye salmon.

WATER QUALITY

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

A small area (8%) of the reach is mapped as wetland. Priority mountain goat range is mapped within the reach.

BUILT ENVIRONMENT AND LAND USE	
<p>SHORELINE MODIFICATIONS (MAP FOLIO #1) Salmon la Sac Road borders the eastern bank of the stream.</p>	<p>PUBLIC ACCESS (MAP FOLIO #4) A snowmobile trail/Forest Service road is adjacent to the downstream regulated stream area; traversing into a small portion of this area.</p>
<p>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use within the reach is forestry (100%). Land ownership is 100% public (Forest Service).</p>	<p>CONTAMINATED SITES No identified contaminated sites are located within this reach.</p>
<p>ZONING (MAP #5) Lands within the reach are zoned for commercial forest (100%).</p>	<p>CULTURAL AND ARCHAEOLOGICAL RESOURCES There are 3 recorded historic sites located within the reach. The historic sites feature refuse scatters and a cabin site related to mining.</p>

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

KEY MANAGEMENT ISSUES AND OPPORTUNITIES
<ul style="list-style-type: none"> • 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.

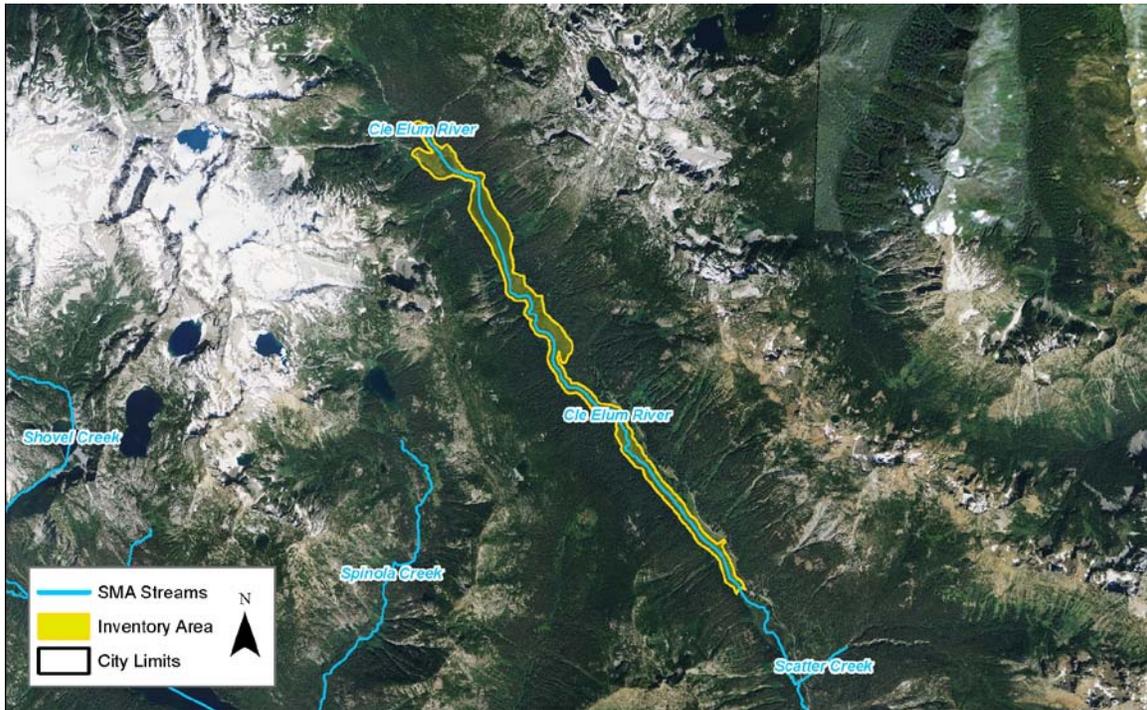
CLE ELUM RIVER-REACH 7

SHORELINE LENGTH:

5.7 Miles

REACH INVENTORY AREA:

466.1 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach generally flows to the southeast within a flat valley bottom, through Hyas Lake to Tucquala Lake.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is conifer-dominated forest (57%), open water (21%), riparian vegetation (13%), and other (9%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

Approximately 41% of the reach is located within the FEMA 100-year floodplain and a small number of landslide hazard areas (6%) are mapped.

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW maps the presence of bull trout, eastern brook trout, mountain whitefish, rainbow trout, and westslope cutthroat within the reach. The reach now likely provides spawning habitat for sockeye salmon.

WATER QUALITY

pH data are not sufficient for listing the reach, but raise concern about water quality, per the State's Water Quality Assessment.

Wetlands are mapped within approximately 31% of the reach. Priority elk and mountain goat range are mapped within the reach.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1)

A Forest Service road parallels the downstream portion of the reach along the eastern bank.

PUBLIC ACCESS (MAP FOLIO #4)

A hiking/horse trail crosses the middle portion of the reach. A different portion of this trail borders the eastern boundary of the regulated stream area, but only enters this area at the northern reach extent. The Fish Lake Campground is adjacent to the eastern regulated stream area and the Tucquala Meadows Trailhead is located approximately mid-reach.

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

There are no recorded sites within the reach.

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY

High: The stream provides habitat for several priority fish species, including spawning or rearing habitat is identified.

TERRESTRIAL HABITAT QUALITY

High: The reach is well-forested, connected to a large area of contiguous forest habitat, and contains minimal existing development.

VEGETATION FUNCTIONS

High: The majority of the reach area consists of dense, mature forest cover.

HYDROLOGIC FUNCTIONS

Medium: The stream is largely unaltered, but a road separates the river from portions of its floodplain.

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

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

TUCQUALA LAKE

SHORELINE LENGTH:
3.6 Miles

WATERBODY AREA: 37.2 Acres
REACH INVENTORY AREA: 97.1 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach is oriented roughly north to south. The Cle Elum River flows through the lake.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is conifer-dominated forest (31%), riparian vegetation (22%), open water (21%), and other (25%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

Over half (54%) 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 the presence of bull trout, rainbow trout, westslope cutthroat, and eastern brook trout within the reach. The presence of sockeye salmon is now likely in the reach.

WATER QUALITY

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

Approximately one-third (34%) of the reach is mapped as wetland. Priority mountain goat range is mapped within the entire reach.

BUILT ENVIRONMENT AND LAND USE	
<p>SHORELINE MODIFICATIONS (MAP FOLIO #1) A Forest Service road parallels the eastern lakeshore.</p>	<p>PUBLIC ACCESS (MAP FOLIO #4) The Lake can be accessed from Forest Service road 4330, and there are primitive campsites present.</p>
<p>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use within the reach is forestry (100%). Land ownership is 100% public (Forest Service).</p>	<p>CONTAMINATED SITES No identified contaminated sites are located within this reach.</p>
<p>ZONING (MAP #5) Lands within the reach are zoned for commercial forest (100%).</p>	<p>CULTURAL AND ARCHAEOLOGICAL RESOURCES There is 1 recorded historic site within the reach that features a can isolate.</p>

SHORELINE FUNCTION ANALYSIS	
<p>FISH HABITAT QUALITY Medium: The lake is largely unaltered and provides habitat for several priority fish species, but no spawning or rearing habitat is identified.</p>	<p>TERRESTRIAL HABITAT QUALITY High: The lakeshore is generally well-forested and is connected to a large area of contiguous forest habitat.</p>
<p>VEGETATION FUNCTIONS High: The lake is bordered primarily by dense, unaltered forest habitat.</p>	<p>HYDROLOGIC FUNCTIONS High: The lakeshore is generally unaltered, and the lake has significant water storage potential.</p>

KEY MANAGEMENT ISSUES AND OPPORTUNITIES
<ul style="list-style-type: none"> • Protect the high-quality forest and wetland habitat within the reach. • There is no identified public access to the lake. • Decommission and revegetate any unused roads along the shoreline.

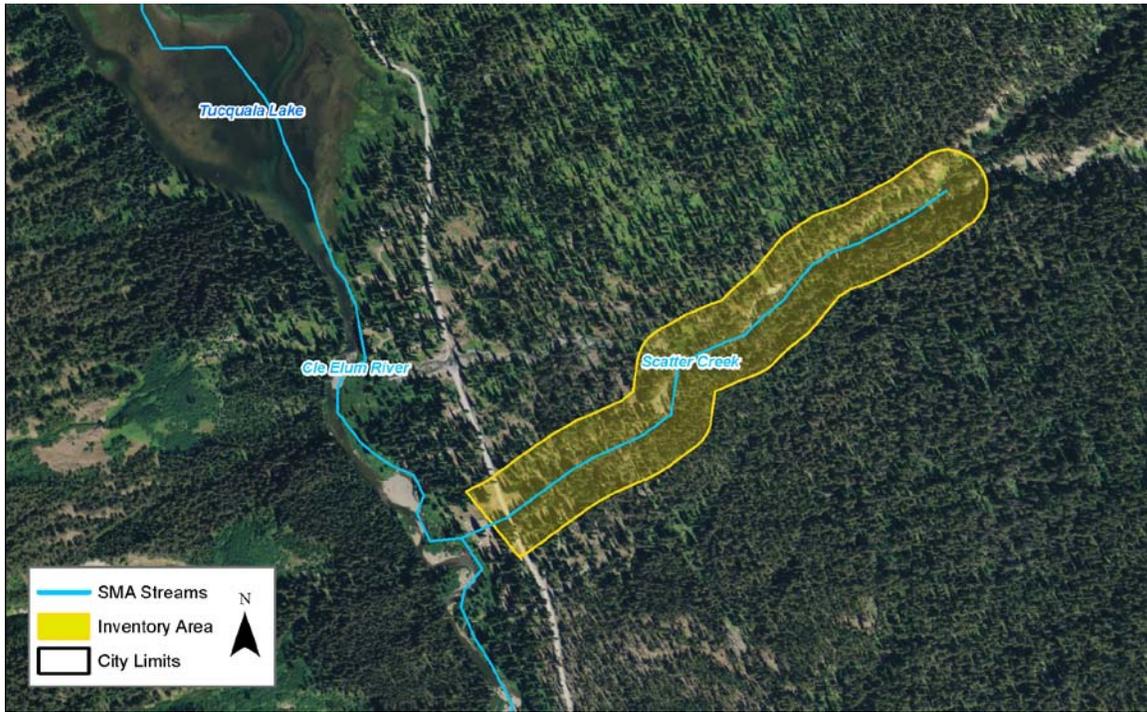
SCATTER CREEK

SHORELINE LENGTH:

0.5 Miles

REACH INVENTORY AREA:

27.7 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach flows to the west. It is undeveloped and located in a relatively flat valley bottom.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is conifer-dominated forest (99%) and developed (1%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

The reach is not located within the FEMA 100-year floodplain; a small number of landslide hazard areas (7%) are mapped.

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW mapping does not indicate the presence of any priority fish species within the reach.
No wetlands are mapped within the reach. Priority mountain goat range is mapped within the entire 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>SHORELINE MODIFICATIONS (MAP FOLIO #1) A Forest Service road crosses the downstream end of the reach.</p>	<p>PUBLIC ACCESS (MAP FOLIO #4) A hiking trail traverses the majority of the regulated stream area, crossing the stream once. The Scatter Creek Trailhead is also located within this regulated area. A hiking/horse trail is located adjacent to the southern regulated stream area.</p>
<p>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use within the reach is forestry (100%). Land ownership is 100% public (Forest Service).</p>	<p>CONTAMINATED SITES No identified contaminated sites are located within this reach.</p>
<p>ZONING (MAP #5) Lands within the reach are zoned for commercial forest (100%).</p>	<p>CULTURAL AND ARCHAEOLOGICAL RESOURCES There is 1 recorded historic cabin site located within the reach.</p>

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

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

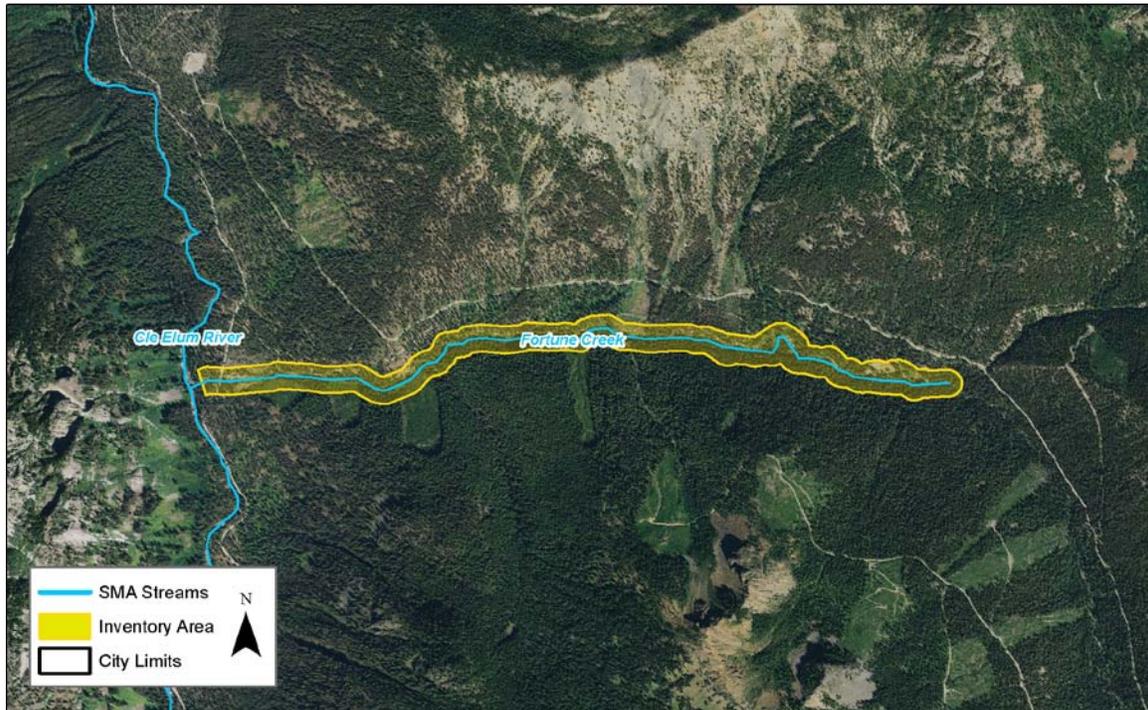
FORTUNE CREEK

SHORELINE LENGTH:

2.3 Miles

REACH INVENTORY AREA:

116.2 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach flows east to west in a relatively narrow valley that experiences disturbance from avalanches. Several clear-cuts are located along the southern bank of the stream.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is conifer-dominated forest (99%) and developed (1%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

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

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW mapping shows the presence of bull trout, rainbow trout, westslope cutthroat, and eastern brook trout within the reach.

WATER QUALITY

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

Limited (1%) wetland area is mapped within the reach and priority mountain goat range is also mapped within the reach.

BUILT ENVIRONMENT AND LAND USE

<p>SHORELINE MODIFICATIONS (MAP FOLIO #1) A Forest Service road crosses the downstream end of the reach.</p>	<p>PUBLIC ACCESS (MAP FOLIO #4) A hiking/ATV trail borders the majority of the northern regulated stream area. The hiking trail branches into the regulated area, crossing the stream several times. A snowmobile trail/Forest Service road crosses the stream near the confluence with the Cle Elum River.</p>
<p>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use within the reach is forestry (100%). Land ownership is 100% public (Forest Service).</p>	<p>CONTAMINATED SITES No identified contaminated sites are located within this reach.</p>
<p>ZONING (MAP #5) Lands within the reach are zoned for commercial forest (100%).</p>	<p>CULTURAL AND ARCHAEOLOGICAL RESOURCES There are 2 recorded historic sites that feature a wagon road from the late 1800s, and a cabin site related to mining. The wagon road was determined eligible for listing on the National Register.</p>

SHORELINE FUNCTION ANALYSIS

<p>FISH HABITAT QUALITY Medium: The stream is largely unaltered and provides habitat for several priority fish species, but no spawning or rearing habitat is identified.</p>	<p>TERRESTRIAL HABITAT QUALITY High: The reach is generally well-forested and is connected to a large area of contiguous forest habitat.</p>
<p>VEGETATION FUNCTIONS High: The lake is bordered primarily by dense, unaltered forest habitat.</p>	<p>HYDROLOGIC FUNCTIONS Medium: 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.

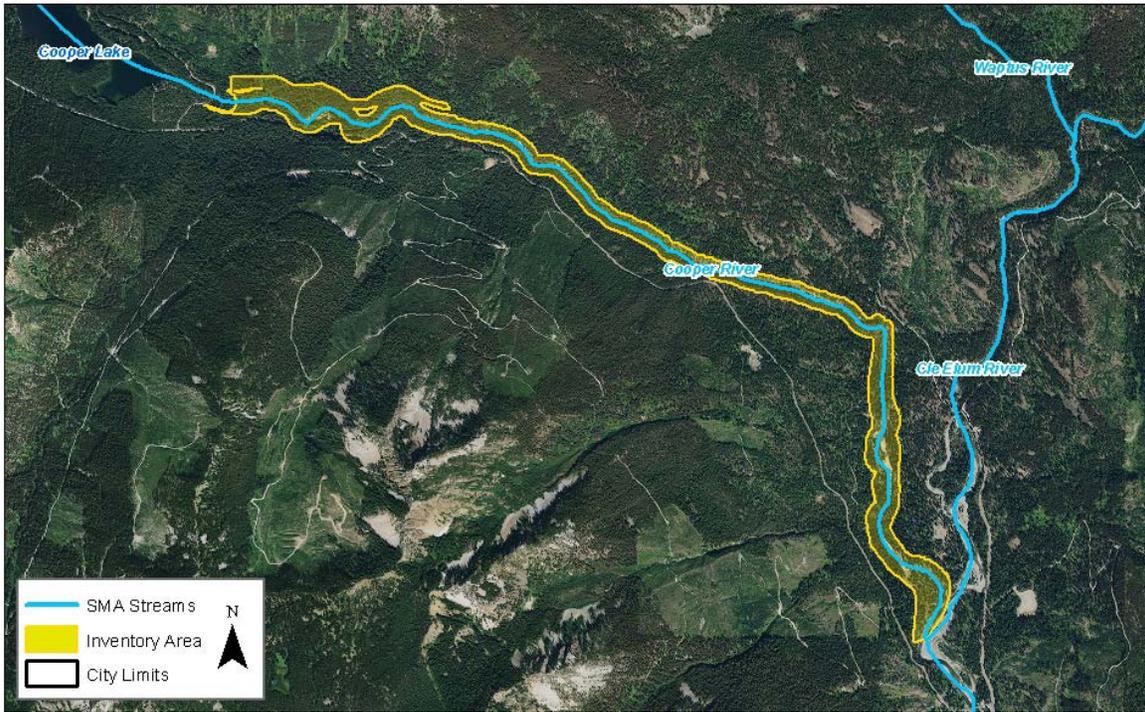
COOPER RIVER-REACH 1

SHORELINE LENGTH:

4.5 Miles

REACH INVENTORY AREA:

278.2 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach is located within a narrow ravine with steep to moderate (upstream to downstream) topographic relief. The river is generally confined within a single channel with few gravel bars.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is principally conifer-dominated forest (81%) and riparian vegetation (18%), with some harvested forest (1%) and other (1%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

Approximately one-third of the reach (73%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach. Over half of the reach (56%) has potential for channel migration.

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW maps the presence of burbot, kokanee salmon, eastern brook trout, mountain whitefish, rainbow trout, and westslope cutthroat within the reach. The reach now likely provides spawning habitat for sockeye salmon.

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 at the upstream and downstream portions of the reach (16% of reach total). No priority habitats or species are identified in this reach by WDFW.

BUILT ENVIRONMENT AND LAND USE

<p>SHORELINE MODIFICATIONS (MAP FOLIO #1) No shoreline modifications are mapped within the reach.</p>	<p>PUBLIC ACCESS (MAP FOLIO #4) The Cooper River Trail, a snowmobile trail/Forest Service road, and cross country ski trails allow stream access.</p>
<p>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use along the reach is forestry (100%). Land ownership is 3% private and 97% public (Forest Service).</p>	<p>CONTAMINATED SITES No identified contaminated sites are located within this reach.</p>
<p>ZONING (MAP #5) Lands within the reach are zoned for commercial forestry (99%) and other (1%).</p>	<p>CULTURAL AND ARCHAEOLOGICAL RESOURCES There are no recorded sites within the reach.</p>

SHORELINE FUNCTION ANALYSIS

<p>FISH HABITAT QUALITY Medium: The stream provides habitat for several priority fish species, but no spawning or rearing habitat is identified.</p>	<p>TERRESTRIAL HABITAT QUALITY High: The reach is connected to a large area of contiguous forest habitat, and contains minimal existing development.</p>
<p>VEGETATION FUNCTIONS High: The majority of the reach area consists of dense, mature forest cover.</p>	<p>HYDROLOGIC FUNCTIONS Medium: The stream channel is relatively unaltered, but the channel is located within a narrow ravine and has limited floodplain functions.</p>

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Privately-owned forest lands within the reach have the potential to be converted to more intensive uses (e.g., from forestry to residential subdivisions). New development should be set back an adequate distance to protect stream functions and protect structures from flooding.
- Protect the high-value, forested floodplain areas within the reach.
- Manage recreational activity to reduce impacts on vegetation and subsequent erosion.
- Educate shoreline property owners about measures to protect and restore riparian areas.

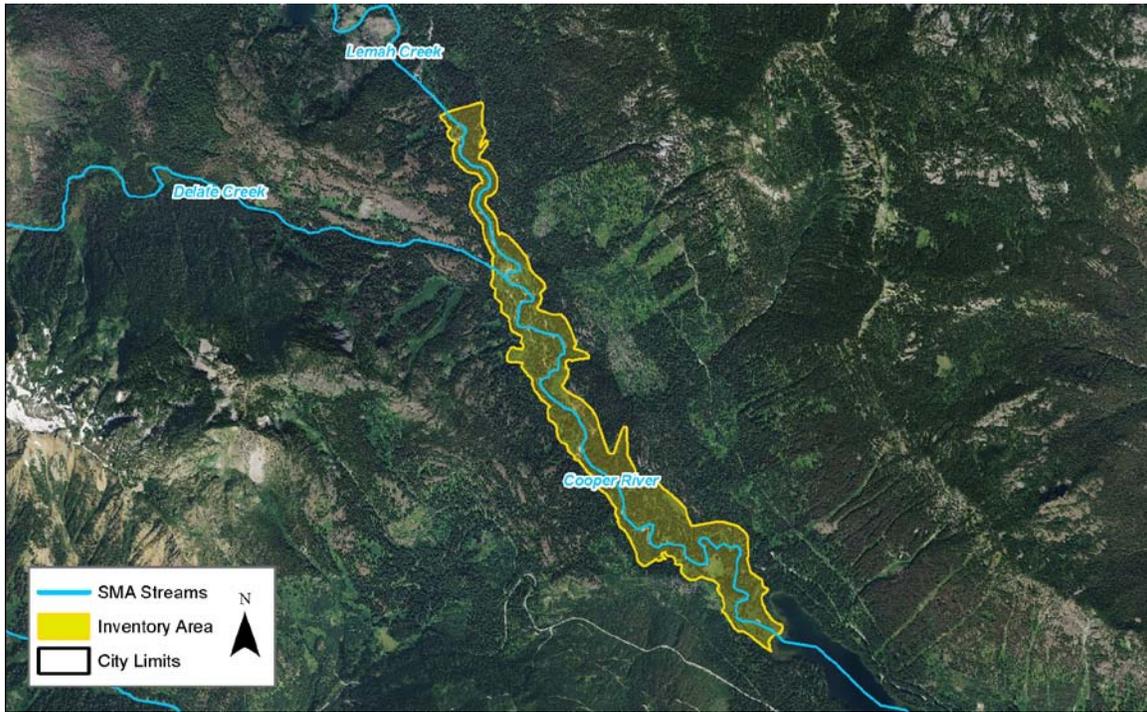
COOPER RIVER-REACH 2

SHORELINE LENGTH:

4.7 Miles

REACH INVENTORY AREA:

424.0 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach flows southward in a flat, relatively broad valley. The stream is undeveloped and sinuous, particularly near the confluence with Delate Creek and at Cooper Lake.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is riparian vegetation (63%), conifer-dominated forest (34%), and other (3%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

About 39% of the reach is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach. Most of the reach (81%) has potential for channel migration.

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW mapping shows the presence of bull trout, eastern brook trout, Kokanee salmon, mountain whitefish, rainbow trout, and westslope cutthroat within the reach. The reach now likely provides spawning habitat for sockeye salmon.

WATER QUALITY

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

Wetlands are mapped within a significant portion (74%) of the reach. No priority habitats or species are identified in this reach by WDFW.

BUILT ENVIRONMENT AND LAND USE

<p>SHORELINE MODIFICATIONS (MAP FOLIO #1) There are no shoreline modifications identified within the reach.</p>	<p>PUBLIC ACCESS (MAP FOLIO #4) A hiking/horse trail is adjacent to the eastern regulated stream area and crosses into this area at the upstream and downstream reach extents. The Pete Lake Trailhead is located adjacent to the regulated stream area, near the confluence with Cooper Lake.</p>
<p>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use within the reach is forestry (100%). Land ownership is 100% public (Forest Service).</p>	<p>CONTAMINATED SITES No identified contaminated sites are located within this reach.</p>
<p>ZONING (MAP #5) Lands within the reach are zoned for commercial forestry (100%).</p>	<p>CULTURAL AND ARCHAEOLOGICAL RESOURCES A recorded historic cabin built in the 1930s is located within the reach. The site is potentially eligible for listing on the National Register.</p>

SHORELINE FUNCTION ANALYSIS

<p>FISH HABITAT QUALITY Medium: The stream provides habitat for several priority fish species, but no spawning or rearing habitat is identified.</p>	<p>TERRESTRIAL HABITAT QUALITY High: The reach is connected to a large area of contiguous forest habitat, and contains minimal existing development.</p>
<p>VEGETATION FUNCTIONS High: The majority of the reach area consists of dense, mature forest cover.</p>	<p>HYDROLOGIC FUNCTIONS Medium: The stream channel is relatively unaltered and unconfined across are relatively wide floodplain.</p>

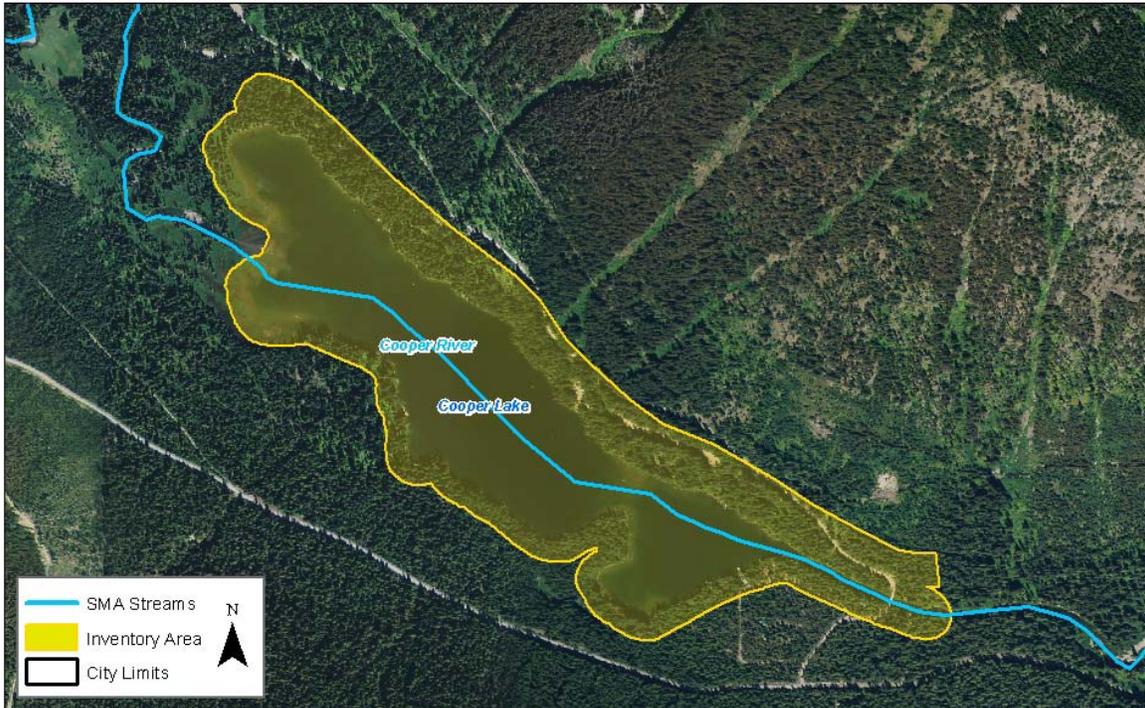
KEY MANAGEMENT ISSUES AND OPPORTUNITIES

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

COOPER LAKE

SHORELINE LENGTH:
6.3 Miles

WATERBODY AREA: 121.1 Acres
REACH INVENTORY AREA: 242.0 Acres



PHYSICAL AND ECOLOGICAL FEATURES

PHYSICAL CONFIGURATION

The lake shoreline is mostly undeveloped and is oriented northwest to southeast. The lake inlet is located to the northwest; it drains to the southeast. A large stream delta/wetland complex is located on the western lake shoreline.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is largely open water (47%), conifer-dominated forest (43%), with some riparian vegetation (9%) and other (1%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

The majority of the reach (61%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach.

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW maps the presence of kokanee salmon, bull trout, eastern brook trout, mountain whitefish, rainbow trout, and westslope cutthroat within the reach. The presence of sockeye salmon is now likely within the reach.

WATER QUALITY

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

Wetland habitat is mapped primarily at the northwest shoreline of the lake (7% of reach total). No priority habitats or species are identified in this reach by WDFW.

BUILT ENVIRONMENT AND LAND USE

<p>SHORELINE MODIFICATIONS (MAP FOLIO #1) No shoreline modifications are mapped within the reach.</p>	<p>PUBLIC ACCESS (MAP FOLIO #4) The Cooper River Trail provides public access to the northern shoreline of the lake, as does the Owhi Campground and associated boat launch.</p>
<p>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use along the reach is forestry (100%). Land ownership is 6% private and 94% public (Forest Service).</p>	<p>CONTAMINATED SITES No identified contaminated sites are located within this reach.</p>
<p>ZONING (MAP #5) Lands within the reach are zoned for commercial forestry (69%) and other (31%) [right-of-way].</p>	<p>CULTURAL AND ARCHAEOLOGICAL RESOURCES There are no recorded sites within the reach.</p>

SHORELINE FUNCTION ANALYSIS

<p>FISH HABITAT QUALITY Medium: The lake provides habitat for several priority fish species, but no spawning or rearing habitat is identified.</p>	<p>TERRESTRIAL HABITAT QUALITY High: The reach is connected to a large area of contiguous forest habitat, contains a significant wetland complex, and is relatively unaltered.</p>
<p>VEGETATION FUNCTIONS High: The majority of the reach area consists of dense, mature forest cover.</p>	<p>HYDROLOGIC FUNCTIONS High: The lakeshore is relatively unaltered and the lake helps maintain Cooper River base flows.</p>

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Privately-owned forest lands within the reach have the potential to be converted to more intensive uses (e.g., from forestry to residential subdivisions). New development should be set back an adequate distance to protect riparian functions and protect structures from flooding.
- Protect the high value wetland complex at the northwest end of the lake.
- Educate shoreline property owners about measures to protect and restore riparian areas.
- Manage recreational activity to reduce impacts on vegetation and subsequent erosion.

3.15 Teanaway River and Tributaries

The Teanaway River is a left-bank tributary to the Yakima River at RM 176.1 (Haring 2001). Tributaries to the Teanaway River with mean annual flows greater than 20 cfs are the North, Middle, and West Forks of the Teanaway, and Stafford Creek. The mainstem Teanaway and its forks generally flow from the northwest to south. The mainstem, downstream of the forks, is identified as a “shoreline of statewide significance.”

3.15.1 Physical Characterization

The reach flows along the southern portion of a broad valley, with low topographic relief. The river is generally confined within a single, wide channel. The channel is confined at several locations by bridges, including the Highway 10 crossing, and by Highway 970 in places.

Active landslide hazard areas are mapped at a several locations in the upper watershed, adjacent to portions of the North and Middle Forks (WDNR 2010). In addition, steep slopes are mapped in the upper reaches of all river forks, as the river traverses through the eastern slopes of the Cascade Mountain Range (Kittitas County 2012). The FEMA 100-year floodplain is mapped in much of the mainstem and North Fork inventory areas, notably extending outside of this area where Highway 970 travels east away from the mainstem. The downstream halves of the West Fork and Middle Fork inventory areas also have mapped floodplain with their boundaries, but to a lesser extent. Near the confluence with the North Fork reach, Stafford Creek has mapped FEMA 100-year floodplain in its inventory area (FEMA 1996).

The mainstem Teanaway and its three forks are mapped as having potential for channel migration. There is substantial residential and agricultural development located within the channel migration zones, particularly along the mainstem river. In recent years, the migrating river has threatened Highway 970 in multiple locations, which has necessitated the installation of rock barbs, large woody debris, and bank armoring by WSDOT to protect the road (WSDOT, 2012).

The mainstem, Middle Fork, and West Fork of the Teanaway experience low flows and associated high water temperatures during the summer and fall, partially the result of multiple stream diversions. Several diversions have been converted to pump and pipeline irrigation systems, which have allowed more flow to remain in the river (Haring 2001).

This stretch of the river has been largely disconnected from its floodplain since the late 1800s. Human alterations have impacted river system processes: ponds and wetlands have been drained and side channels filled; the river has been straightened; and channels have been confined and consolidated. Beaver populations have been reduced so there are fewer dams to retain and disperse flows. Logging and splash damming in the upper watershed have increased the rate of runoff and reduced channel complexity. Downstream of the confluence of the three forks, the river has been moved to the edge of the valley, channelized, and armored to facilitate agricultural activities (Haring 2001).

3.15.2 Habitats and Species

3.15.2.1 *Fish Use*

The Teanaway River system provides rearing and spawning habitat for bull trout, summer steelhead, and spring Chinook. Other salmonids present in this river system include coho salmon, rainbow trout, westslope trout, eastern brook trout, and mountain whitefish (StreamNet 2010).

Approximately 51 miles of the Teanaway River and its tributaries are accessible to steelhead trout. Steelhead have been observed spawning in the mainstem Teanaway and in the lower West Fork (YSFWPB 2004).

It is unclear whether bull trout were ever abundant in Yakima River tributaries. The North Fork Teanaway River supports a bull trout population, but it is believed to be at risk of extinction due to limited habitat area and isolation from other populations (Haring 2001, USFWS 2002; YSFWPB 2004). Current legal fisheries in the basin are highly regulated to reduce negative impacts on steelhead and bull trout (Conley et al. 2009).

The Teanaway River system historically produced large numbers of spring Chinook salmon. Today small numbers of spring Chinook salmon spawn and rear in the mainstem Teanaway River and the North Fork as far as Stafford Creek (RM 8.3). In 1997 the Cle Elum Supplementation and Research Facility (CESRF) began a program to determine if introducing hatchery fish could increase the abundance of spring Chinook. Smolts have been released at the Jack Creek facility on the North Fork Teanaway River. Spawner returns and redds in the Teanaway River increased from near zero to 110 redds in 2002 and 31 redds in 2003. However, there are concerns that hatchery fish may compete with natural origin fish for space and food resources. (Conley et al. 2009).

Spawning conditions suitable for spring Chinook salmon, steelhead, and coho salmon are still present in much of the mainstem Teanaway River and the lower

portions of the forks. However, human changes to the river system have substantially altered fish habitats. Beginning in the late 19th century, the rivers were used to transport millions of board feet of timber downstream. The removal of large woody debris from the channel led to streambed scouring, channel incision, and lowering of the water table. As settlement continued, stream channels were consolidated or confined to protect homes and fields; while this reduced flooding, it also reduced the recharge of shallow aquifers by cold spring runoff and eliminated off-channel habitat. The lack of large wood in the Teanaway River reduced the number of pools and other important in-channel rearing habitats (Haring 2001, Conley et al. 2009).

Streamflows in the Teanaway River system continue to be a challenge for fisheries. Low flows can prevent salmon access to spawning areas, while excessive peak flows can scour the streambed and reduce the survival of incubating eggs and overwintering juveniles (Conley et al. 2009). The upper Teanaway River has not been subject to extensive water diversions, but below RM 9.6 there is significant diversion for irrigation, especially during the natural low-flow period of late July through mid-September (Reclamation 2002). Low flows and associated increased temperatures limit the availability of summer and early fall rearing habitat in affected tributary and lower mainstem reaches and create passage barriers for migrating and rearing steelhead (Conley et al. 2009). Irrigation systems have been modified to conserve water, reduce diversions, and increase streamflow in the Teanaway River. However, these gains may be partially offset by water used for residential development and drilling of permit exempt wells (Reclamation and Ecology 2011a).

Because the Teanaway watershed has a south-facing aspect, steep slopes, and is in the rain-on-snow zone, it is prone to increases in peak flows resulting from forest road networks and timber harvest. The Teanaway River is considered a high priority for identifying and reducing impacts from forest practices (Conley et al. 2009, YSFWPB 2004).

3.15.2.2 *Water Quality*

Ecology's 2008 303(d) list does not identify water quality issues in the Teanaway River or its tributaries. The Teanaway River watershed had past problems with high water temperatures. Development of a TMDL for temperature in 2003 (Ecology) resulted in removal of the basin's streams from the 303(d) list (Reclamation and Ecology 2011a).

The Teanaway River has elevated levels of sediment. This is due partly to natural sources such as landslides and partly to high road densities, agriculture, and recreational uses that remove vegetation and cause additional bank erosion. The

Teaway is estimated to contribute a third of the total sediment load in the upper Yakima River (Haring 2001, YSFWPB 2004). A TMDL has been implemented for suspended sediment in the Teaway River (Ecology, 2002).

3.15.2.3 *Riparian Habitat Conditions (Land Cover)*

The upper Teaway River watershed is dominated by coniferous forest. Harvested forest, agriculture, and riparian vegetation are more common along the lower mainstem Teaway. The growth of native riparian vegetation has been hampered by historic and ongoing human activities. For example, where roads have been located near stream channels the streambanks are reinforced with riprap, eliminating riparian vegetation. Historic use of streams to transport logs scoured the channels and lowered the groundwater table, making it more difficult for riparian species to grow (YSFWPB 2004).

3.15.2.4 *Wetlands*

The Teaway River system historically had extensive riparian wetland habitats. In order to develop valley bottomland for agriculture, wet meadows were drained and side channels were filled. Removal of beavers, along with diking and channelization, further eliminated remaining wet meadows and wetlands (YSFWPB 2004).

A large wet meadow/wetland complex along the lower mainstem has been identified a priority for preservation. This complex has remnant off-channel backwaters and springs that provide important habitat for fish and wildlife (YSFWPB 2004, Haring 2001). Overall, mapped wetlands occupy less than a quarter of the shoreline inventory area along the Teaway River and its forks. No wetlands are mapped along Stafford Creek.

3.15.2.1 *Wildlife Habitats and Species*

The upper Teaway River watershed is mapped as critical habitat for northern spotted owl, a federally listed threatened species associated with structurally complex coniferous forest. Forests used by spotted owls in the lower and middle slopes of the eastern Cascade Range tend to be younger than forests used elsewhere in Washington. Owls in those areas nest in abandoned northern goshawk nests or clumps of branches infected by mistletoe (WDFW 2011c). The northern goshawk (a state candidate species and a federal species of concern) has been recorded throughout the upper Teaway watershed, including in and near the shoreline inventory areas.

Despite conservation efforts, northern spotted owl populations continue to decline in Washington. Reasons for the decline include habitat loss and competition with barred owls. Habitat loss has resulted from forest conversion, timber harvest, fire, windthrow, insect outbreak and disease. In the Teanaway River basin area, an ongoing spruce budworm outbreak has impacted large patches of spotted owl habitat (WDFW, 2011c).

The Teanaway River watershed is also used by elk as a calving area. Elk calving areas are considered a state priority habitat, along with elk migration corridors and wintering areas (WDFW 2008).

Another notable wildlife species that has recently been documented in the Teanaway River area is the gray wolf, a federally listed endangered species. The federal listing covers the western half of Washington, including the Yakima basin. Gray wolves were once common throughout the state but were eliminated during ranching and farming during the late 1800s and early 1900s. The species is a wide-ranging, top-level predator that affects the behavior of prey such as elk, in turn influencing vegetation patterns. In July 2011 a gray wolf pack was confirmed in the Teanaway region and appeared to be successfully breeding (WDFW, 2011a; Reclamation and Ecology 2011a).

3.15.3 Land Use

The mainstem Teanaway River is bordered by agricultural lands (primarily irrigated hayfields) and undeveloped forest land that is zoned for commercial forest and forest and range. Some moderate- and low-density residential subdivisions are also located along the downstream end of the river.

The lower approximately 7 miles of the West Fork Teanaway River is bordered primarily by undeveloped commercial forest-zoned lands, while the upper West Forks is located within National Forest lands. The lower approximately 3 miles of the Middle Fork is bordered by undeveloped forest and range-zoned land to the west, and low- to moderate-density residential development to the east. The remainder of the Middle Fork flows through undeveloped, commercial forest-zoned land and National Forest.

The lower approximately 2 miles of the North Fork Teanaway River is bordered by moderate-density residential development. The remainder of the North Fork flows through undeveloped commercial forest-zoned land and National Forest.

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

3.15.4 Public Access

The mainstem Teanaway can be accessed off of Red Bridge Road, at the WDFW Masterson access area. In the upper watershed, the Teanaway River forks are crossed by a snowmobile trail/National Forest road and can also be accessed from numerous hiking/horse trails within the National Forest.

3.15.5 Reach Sheets

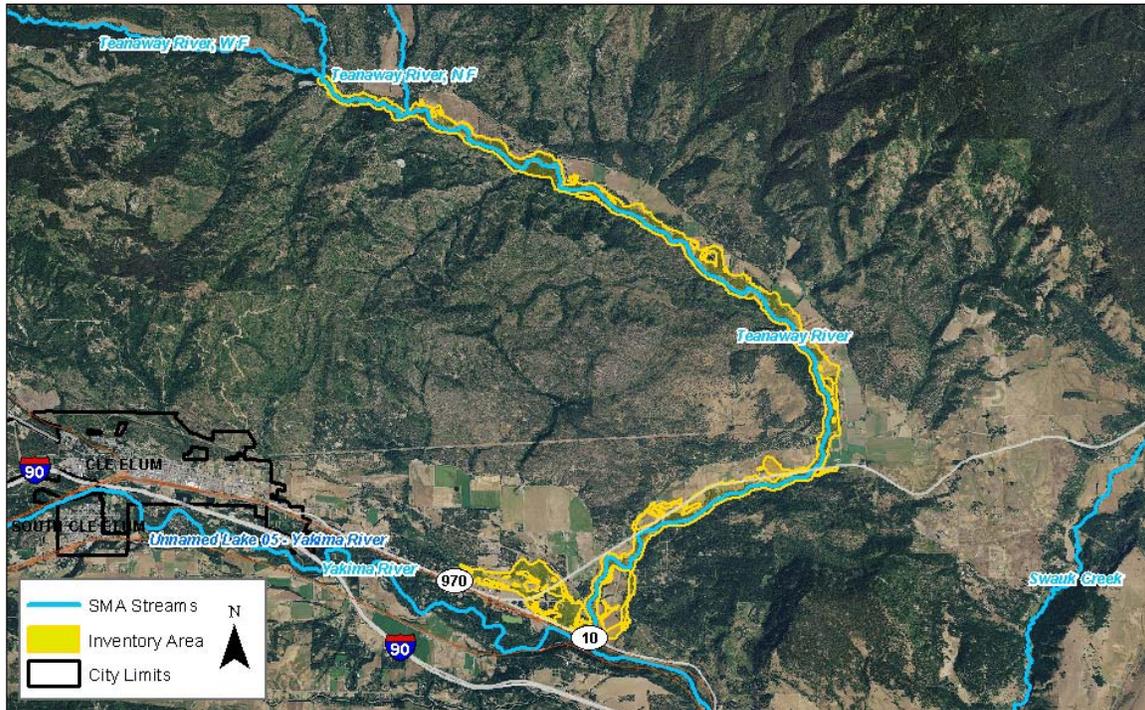
TEANAWAY RIVER (MAINSTEM)

SHORELINE LENGTH:

12.4 Miles

REACH INVENTORY AREA:

1,337.4 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach flows along the southern portion of a broad valley, with low topographic relief. The river is generally confined within a single, wide channel that allows flows though a significant number of gravel bars. The channel is confined at several locations highway infrastructure. The entire reach has migration potential.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is primarily agriculture (37%), forest (27%), and riparian woodland/shrubland (19%), with patches of other (6%), harvested forest (4%), shrubland (3%), developed lands (3%), and grassland (1%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

About three-quarters of the reach (73%) are located within the FEMA 100-year floodplain, and a few landslide hazard areas (1%) are mapped on the right bank of the river. Most of the reach (87%) has potential for channel migration.

HABITATS AND SPECIES (MAP FOLIO #1)

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

WATER QUALITY

A TMDL has been implemented for temperature and suspended sediment in this reach.

Patches of wetland habitat are mapped along the river throughout the reach (17% of the reach), and a large wetland complex near the Yakima River confluence is identified as priority wood duck nesting habitat. Priority elk calving habitat is also mapped within the reach along with a limited area of mule deer winter range.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1)

Much of the channel within the reach is constrained by hydromodifications. In addition, SR 970 runs parallel to the lower 4 miles river, thus cutting it off from its natural floodplain.

PUBLIC ACCESS (MAP FOLIO #4)

The River can be accessed off Red Bridge Road at the WDFW Masterson access area.

EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

The primary land uses along the reach are rural (83%) and forestry (17%). Land ownership is 100% private.

CONTAMINATED SITES

No identified contaminated sites are located within this reach.

ZONING (MAP #5)

Lands within the reach are zoned for rural residential (36%), agriculture (24%), forest & range (17%), commercial forest (16%), and other (7%).

CULTURAL AND ARCHAEOLOGICAL RESOURCES

The historic irrigation ditch (circa 1885) is associated with early agriculture in the Teanaway and is potentially eligible for listing on the National Register.

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY

Medium: The reach provides spawning and juvenile rearing habitat for priority fish species (including spring Chinook salmon), but low summer flows are a limiting factor for fish use.

TERRESTRIAL HABITAT QUALITY

Medium: There is significant development and agriculture usage along the river, but area of dense riparian cover and connections to large, relatively-undisturbed habitat areas exist

VEGETATION FUNCTIONS

Medium: Areas of dense forest and shrub cover are present in the reach, but much of the area has been altered by agriculture and residential development.

HYDROLOGIC FUNCTIONS

Low: The floodplain of the reach is highly altered by development, agriculture, and hydromodifications.

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- In the recent past, some resource and agriculture land within the reach have been converted to more intensive uses (e.g., from agriculture to residential subdivisions). Future new structures should be set back an adequate distance to protect stream functions and protect structures from flooding and channel migration.
- There is no public access within the reach.
- Low summer flows in the river are a limiting factor for salmon. Irrigation systems have been modified to conserve water, reduce diversions, and increase streamflow in the Teanaway River. However, these gains may be partially offset by water used for residential development and drilling of permit exempt wells.
- Encourage private irrigators and/or landowners to work with the Yakima Tributary Access & Habitat Program to install fish screen on irrigation diversions and correct fish passage barriers.
- Encourage use of agricultural best management practices to reduce erosion and transport of legacy pesticides.
- Protect the high value wetland complex at the downstream end of the reach (YSFWPB, 2004).
- Correct a fish passage barrier resulting from the January 2009 flood event that caused a headcut of the channel and required water right holders to create rock and gravel dams to direct water into their pump stations. The project will construct four channel spanning rock weirs to stabilize the streambed and return water flows to pump stations (YBFWRB, 2011).
- Educate shoreline property owners about measures to protect and restore riparian areas.
- Protect high-quality forest and wildlife habitat in the upper reaches.

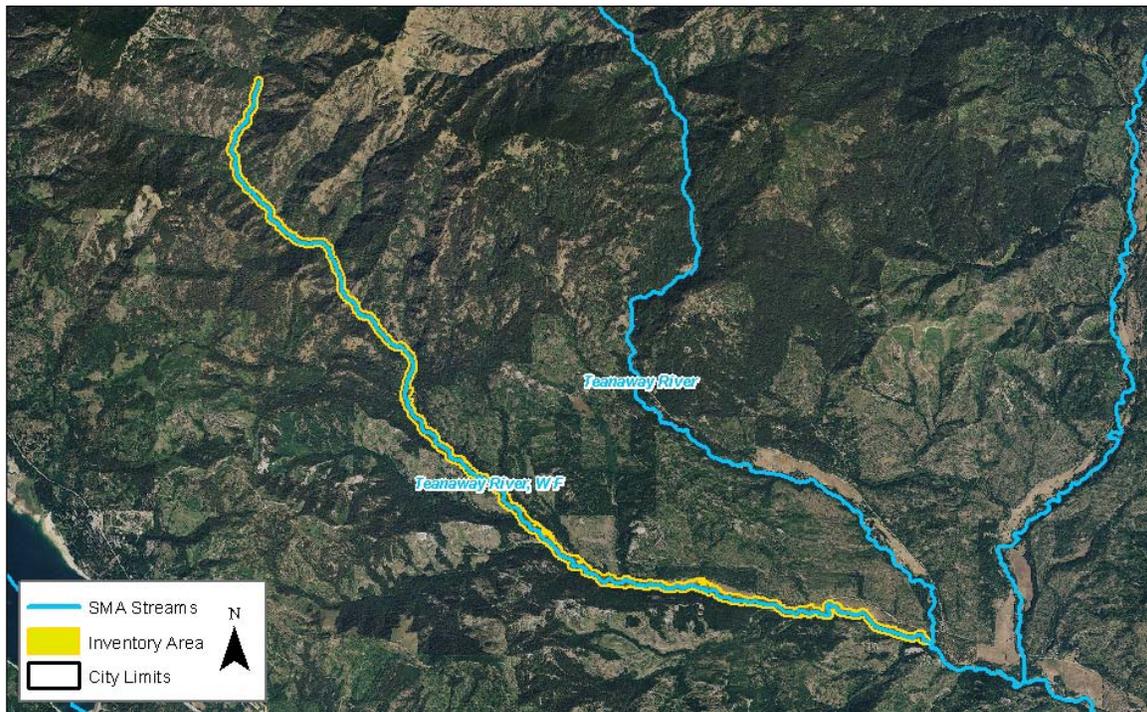
WEST FORK TEANAWAY RIVER

SHORELINE LENGTH:

11.1 Miles

REACH INVENTORY AREA:

559.2 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The upstream portion of the reach flows through a valley with moderate topographic relief, while downstream, the ravine widens to a flat valley bottom. The river is generally confined within a single, wide channel that migrates within its banks. West Fork Teanaway Road parallels much of the left bank of the river.

LAND COVER (MAP FOLIO #3)

This reach is mostly forest (81%), with some riparian vegetation (9%), harvested forest (5%), agricultural lands (3%), and developed lands (1%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

Approximately 33% of the reach is located within the FEMA 100-year floodplain and multiple landslide hazard areas (3%) are mapped on the right bank of the reach. The majority of the reach area has potential for channel migration.

HABITATS AND SPECIES (MAP FOLIO #1)

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

WATER QUALITY

A TMDL has been implemented for temperature in this reach.

Limited wetland habitat is mapped along the river throughout the reach (5% of the reach). Priority elk winter range and calving habitat is mapped within the lower portion of the reach.

BUILT ENVIRONMENT AND LAND USE

<p>SHORELINE MODIFICATIONS (MAP FOLIO #1)</p> <p>Much of the reach is bordered by West Fork Teanaway Road.</p>	<p>PUBLIC ACCESS (MAP FOLIO #4)</p> <p>A snowmobile trail/National Forest road crosses the middle portion of the reach; the West Fork Teanaway Trail provides access at several locations in the upstream section of the reach.</p>
<p>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)</p> <p>Land use along the reach is primarily forestry (92%) with rural lands along the downstream end (8%). Land ownership is 73% private and 27% public (Forest Service).</p>	<p>CONTAMINATED SITES</p> <p>No identified contaminated sites are located within this reach.</p>
<p>ZONING (MAP #5)</p> <p>Lands within the reach are zoned for commercial forestry (96%), rural residential (2%), and other (2%).</p>	<p>CULTURAL AND ARCHAEOLOGICAL RESOURCES</p> <p>There are no recorded sites within the reach.</p>

SHORELINE FUNCTION ANALYSIS

<p>FISH HABITAT QUALITY</p> <p>Medium: The reach is minimally altered and provides spawning and juvenile rearing habitat for priority fish species, but low summer flows are a limiting factor for fish use.</p>	<p>TERRESTRIAL HABITAT QUALITY</p> <p>Medium: The downstream end of the reach is in agricultural protection and a road bordered much of the stream, but a majority of the reach is covered with dense riparian forests and is connected to large, relatively-undisturbed habitat areas.</p>
<p>VEGETATION FUNCTIONS</p> <p>Medium: Most of the reach consists of dense forest cover, but vegetation is disturbed by agriculture at the downstream end and by West Fork Teanaway Road, which parallels much of the stream channel.</p>	<p>HYDROLOGIC FUNCTIONS</p> <p>Medium: Portions of the river's floodplain are altered by a road and agricultural development at the downstream end, but much of the floodplain is intact.</p>

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- In the recent past, some resource and agriculture lands along the Teanaway have been converted to more intensive uses (e.g., from forestry to residential subdivisions). Future new structures should be set back an adequate distance to protect stream functions and protect structures from flooding and channel migration.
- Low summer flows in the river are a limiting factor for salmon.
- Protect high-quality forest and wildlife habitat in the upper portion of the reach.
- Manage recreational activity to reduce impacts on vegetation and subsequent erosion.
- Educate shoreline property owners about measures to protect and restore riparian areas.

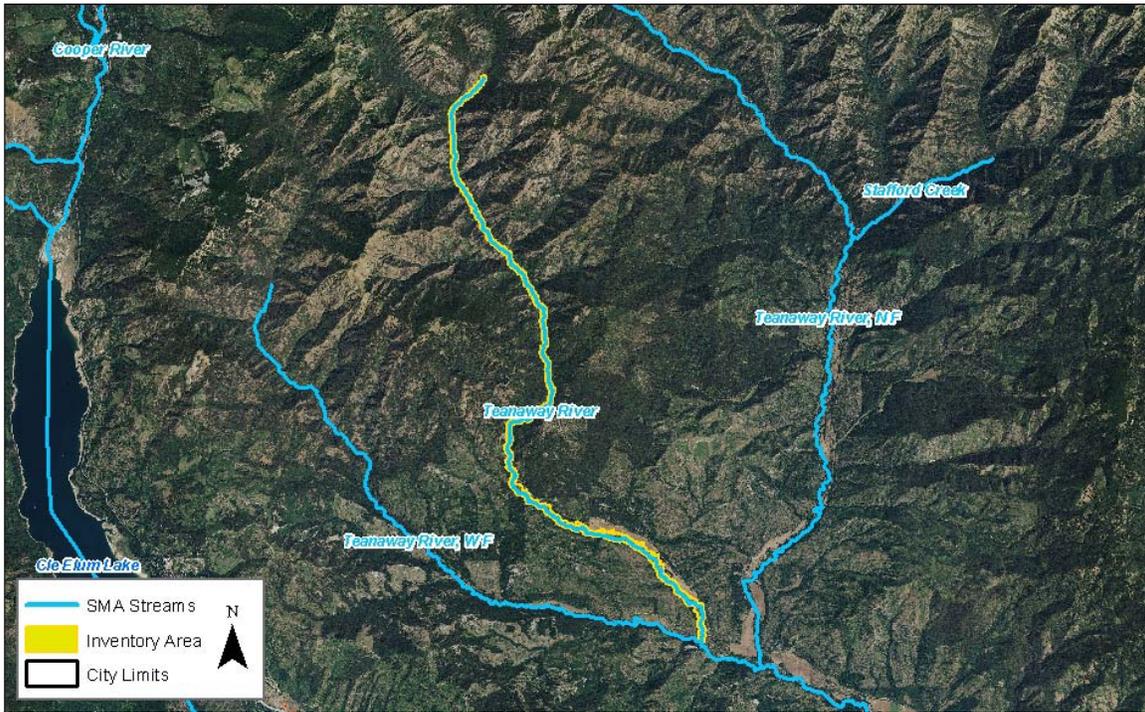
MIDDLE FORK TEANAWAY RIVER

SHORELINE LENGTH:

12.5 Miles

REACH INVENTORY AREA:

639.6 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

Upstream, the river flows through a narrow valley with steep slopes as a single channel; a forest service road is mapped in the river channel for most of this section. Downstream, the river flows along the southern portion of a flat valley, through many gravel banks.

LAND COVER (MAP FOLIO #3)

The reach is dominated by forest (78%) and riparian vegetation (10%), with limited agricultural (7%), and harvested forest (5%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

Approximately one-quarter (25%) of the reach is located within the FEMA 100-year floodplain and numerous landslide hazard areas (10%) are mapped on both banks of the reach. The majority of the reach area has potential for channel migration.

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW mapping shows that the reach provides spawning habitat for summer steelhead. The presence of rainbow trout and westslope cutthroat is also mapped. A small extent of wetland habitat is mapped along the river throughout the reach (4% of the reach). Priority elk calving habitat is also mapped within the lower portion of the reach.

WATER QUALITY

A TMDL has been implemented for temperature in this reach.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1)

A Forest Service road parallels and crosses the reach in several locations. Also, a linear hydromodification is located along the eastern bank at the downstream end of the river.

PUBLIC ACCESS (MAP FOLIO #4)

The Middle Fork Teanaway Trail provides river access to the upstream half of the reach. A snowmobile trail/National Forest road crosses the reach downstream of the trail.

EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use along the reach is primarily forestry (73%) with rural lands along the downstream end (27%). Land ownership is 61% private and 39% 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 (73%), with forest & range (17%), rural residential (9%), and other (1%) 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 reach is minimally altered and provides habitat for priority fish species (including spawning habitat for spring Chinook), but low summer flows are a limiting factor for fish use.

TERRESTRIAL HABITAT QUALITY

Medium: The downstream end of the reach is in agricultural protection and a road bordered much of the stream, but a majority of the reach is covered with dense riparian forests and is connected to large, relatively-undisturbed habitat areas.

VEGETATION FUNCTIONS

Medium: Most of the reach consists of dense forest cover, but vegetation is disturbed by agriculture at the downstream end and by a Forest Service road, which parallels much of the stream channel.

HYDROLOGIC FUNCTIONS

Medium: Portions of the river's floodplain are altered by a road and agricultural development at the downstream end, but much of the floodplain is intact.

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- In the recent past, some 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 to protect stream functions and protect structures from flooding.
- Low summer flows in the river are a limiting factor for salmon.
- Manage recreational activity to reduce impacts on vegetation and subsequent erosion.
- Protect the high-quality forest and wildlife habitat in the upper portion of the reach.
- Educate shoreline property owners about measures to protect and restore riparian areas.

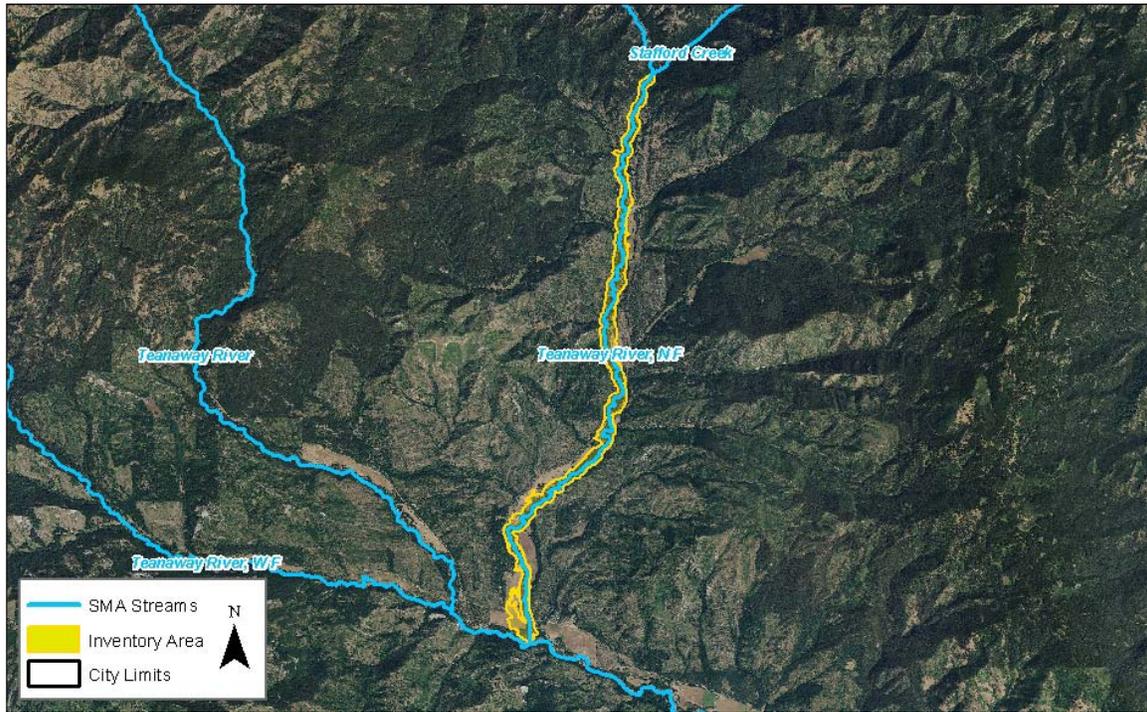
NORTH FORK TEAWAY RIVER

SHORELINE LENGTH:

9.8 Miles

REACH INVENTORY AREA:

643.8 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

Much of the reach flows through a broad valley via multiple channels. The reach also contains many gravel bars. Steep topographic relief on either side of the valley bottom and a Forest Service road confine the channel in areas.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is primarily forest (56%) and riparian vegetation (20%). Other cover types include: harvested forest (10%), agricultural lands (9%), other (4%), and developed lands (1%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

The majority of the reach (71%) is located within the FEMA 100-year floodplain and a limited number of landslide hazard areas (1%) are mapped within the reach. Most of the reach (88%) has potential for channel migration.

HABITATS AND SPECIES (MAP FOLIO #1)

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

WATER QUALITY

A TMDL has been implemented for temperature in this reach.

Wetland habitat is mapped along the downstream half of the reach (12% of reach total). A significant amount of priority elk calving habitat is also mapped within the reach; mountain goat habitat is located at the upstream extent of the reach.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1)

The reach is paralleled and crossed in several locations by North Fork Teanaway Road and Forest Service roads. Also, a linear hydromodification is located along the western bank at the downstream end of the river.

PUBLIC ACCESS (MAP FOLIO #4)

The North Fork Teanaway Trail provides river access to the upstream half of the reach. A snowmobile trail/Forest Service road crosses the reach downstream of the trail.

EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use along the reach is primarily forestry (74%) with rural lands along the downstream end (26%). Land ownership is 100% private.

CONTAMINATED SITES

No identified contaminated sites are located within this reach.

ZONING (MAP #5)

Lands within the reach are zoned primarily for commercial forestry (74%), with rural residential (24%) and other (2%) along the downstream end.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are 7 recorded precontact sites, and 1 recorded historic site located within the reach.

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY

High: The reach is minimally altered and provides habitat for priority fish species (including spawning habitat for spring Chinook).

TERRESTRIAL HABITAT QUALITY

Medium: The downstream end of the reach is in agricultural protection and a road bordered much of the stream, but a majority of the reach is covered with dense riparian forests and is connected to large, relatively-undisturbed habitat areas.

VEGETATION FUNCTIONS

Medium: Most of the reach consists of dense forest cover, but vegetation is disturbed by agriculture at the downstream end and by roads which parallel much of the stream channel.

HYDROLOGIC FUNCTIONS

Medium: Portions of the river's floodplain are altered by a road and agricultural development at the downstream end, but much of the floodplain is intact.

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- In the recent past, some 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 to protect stream functions and protect structures from flooding and channel migration.
- Several important cultural and archaeological sites are located within the reach.
- Protect the high-quality forest and wildlife habitat in the upper portion of the reach.
- Manage recreational activity to reduce impacts on vegetation and subsequent erosion.
- Identified restoration actions in the reach include:
 - Acquire a conservation easement on 5.8 miles of river and over 354 acres of floodplain, riparian forest, and meadow habitat along the river. Potential Phase I effort is to secure a conservation easement on the southern-most 96 acres of riparian area (YBFWRB, 2011).
 - Potential Phase II effort to fund a conservation easement on the middle two miles of stream and 100 acres of floodplain habitat between Dickey Creek and Jack Creek; this would be a continuation of Phase I (SRFB project 04-1672) efforts described above (YBFWRB, 2011).

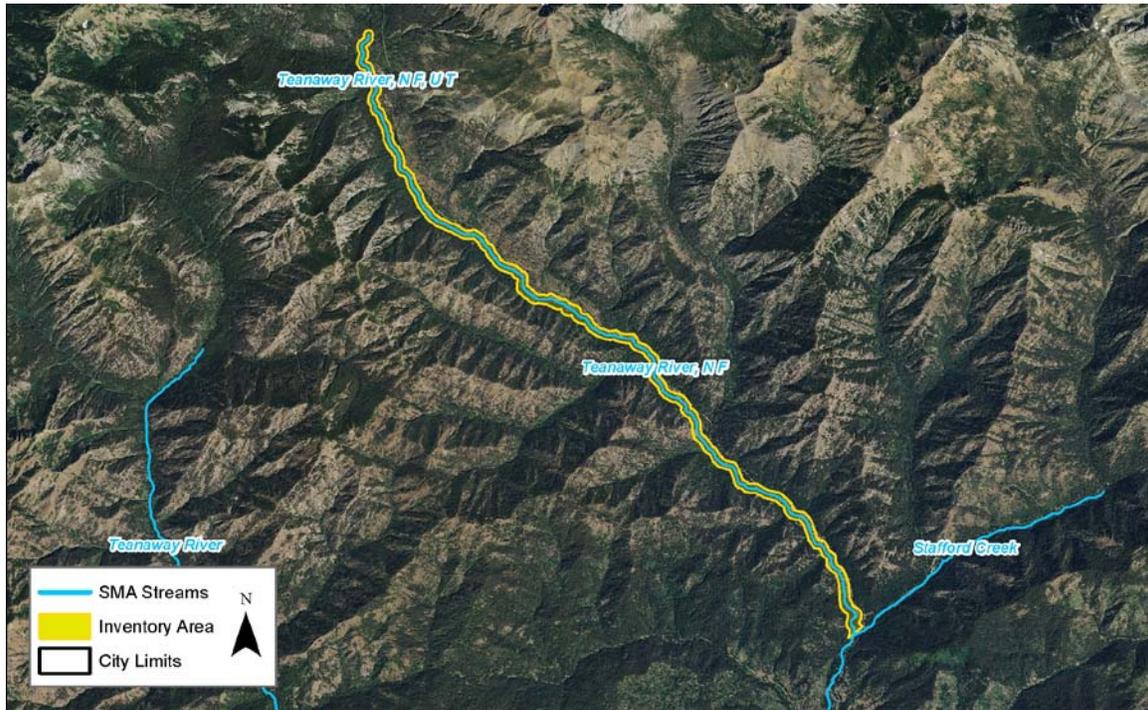
NORTH FORK TEANAWAY RIVER, UPPER TRIBUTARY

SHORELINE LENGTH:

7.7 Miles

REACH INVENTORY AREA:

387.1 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach drops roughly 1,000 feet in elevation and flows to the southeast. The stream flows through an undeveloped, narrow valley.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is conifer-dominated forest (96%), riparian vegetation (3%), and developed (1%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

A small amount (3%) of the reach is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach. Some portions of the reach (15%) has potential for channel migration.

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 and westslope cutthroat is also identified.

WATER QUALITY

A TMDL has been implemented for temperature.

No wetlands are mapped within the reach. Priority mountain goat range and elk calving area are mapped within the reach.

BUILT ENVIRONMENT AND LAND USE

<p>SHORELINE MODIFICATIONS (MAP FOLIO #1) A Forest Service road parallels the eastern shoreline.</p>	<p>PUBLIC ACCESS (MAP FOLIO #4) A hiking/horse trail crosses the upstream regulated stream area in two locations. The De Roux Campground is located adjacent to the reach, near the upstream extent. A cross country ski trail borders the entire northern regulated area and is shared with snowmobiles near the confluence with Stafford Creek/North Fork Teanaway River. A hiking/horse trail crosses the middle portion of the stream and is located upstream of the Beverly Campground.</p>
<p>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use within the reach is forestry (100%). Land ownership is 7% private and 93% public (Forest Service).</p>	<p>CONTAMINATED SITES No identified contaminated sites are located within this reach.</p>
<p>ZONING (MAP #5) Lands within the reach are zoned for commercial forest (100%).</p>	<p>CULTURAL AND ARCHAEOLOGICAL RESOURCES There are 3 recorded precontact sites and 5 recorded historic sites located within the reach. Two of the historic sites are CCC campsites and were determined eligible for listing on the National Register.</p>

SHORELINE FUNCTION ANALYSIS

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

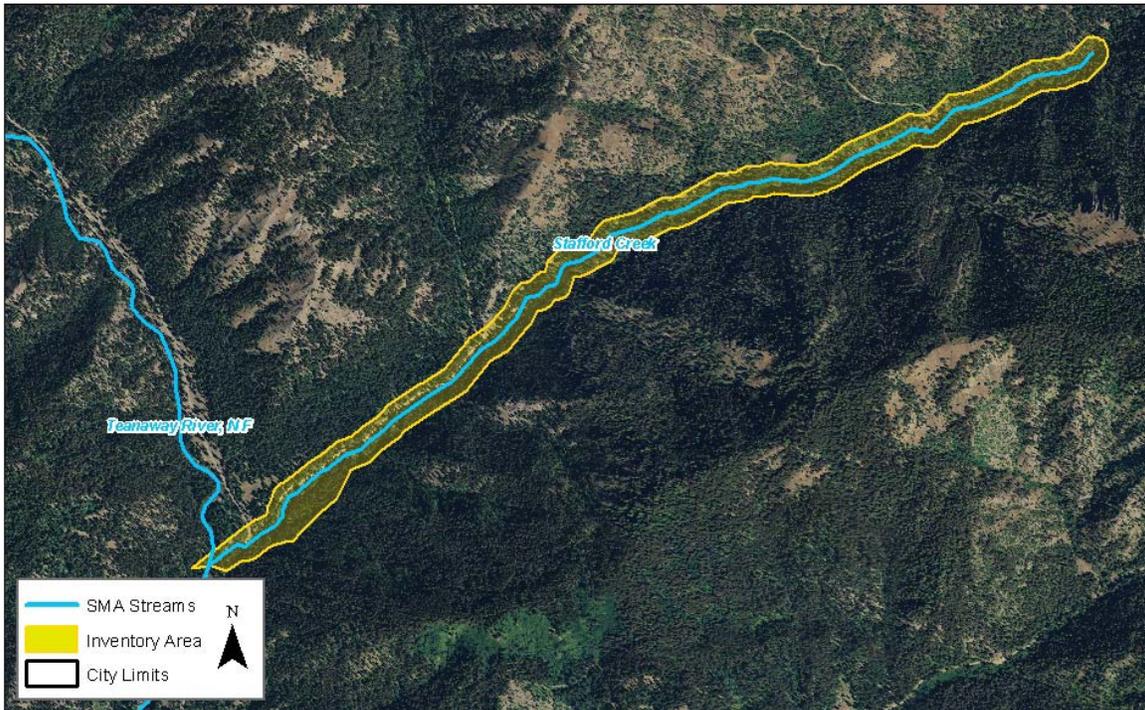
STAFFORD CREEK

SHORELINE LENGTH:

2.7 Miles

REACH INVENTORY AREA:

133.3 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach is located within a narrow valley with steep topographic relief. The stream is generally confined within a single channel that migrates within its banks.

LAND COVER (MAP FOLIO #3)

The reach is composed of conifer-dominated forest (88%) and riparian vegetation (11%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

Only 12% 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 summer steelhead and juvenile rearing habitat for bull trout. The presence of rainbow trout, and westslope cutthroat is also documented.

WATER QUALITY

A TMDL has been implemented for temperature in this reach.

No wetland habitat is mapped in the reach. The entire reach contains mapped priority elk calving habitat.

BUILT ENVIRONMENT AND LAND USE

<p>SHORELINE MODIFICATIONS (MAP FOLIO #1) A Forest Service road parallels the entire reach.</p>	<p>PUBLIC ACCESS (MAP FOLIO #4) A snowmobile trail/Forest Service road crosses the downstream portion of the reach and a cross country ski trail parallels the majority of the right bank.</p>
<p>EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use along the reach is forestry (100%). Land ownership is 66% private and 34% public (Forest Service).</p>	<p>CONTAMINATED SITES No identified contaminated sites are located within this reach.</p>
<p>ZONING (MAP #5) Lands within the reach are zoned for commercial forestry (100%).</p>	<p>CULTURAL AND ARCHAEOLOGICAL RESOURCES The Stafford, or Standup Lookout, is a historic road that was built by the CCC during the 1930s. Additionally, there are 2 precontact sites within the reach.</p>

SHORELINE FUNCTION ANALYSIS

<p>FISH HABITAT QUALITY High: The reach is minimally altered and provides habitat for priority fish species (including spawning and rearing habitat).</p>	<p>TERRESTRIAL HABITAT QUALITY Medium: A road borders much of the stream, but a majority of the reach is covered with dense riparian forests and is connected to large, relatively-undisturbed habitat areas.</p>
<p>VEGETATION FUNCTIONS High: Most of the reach consists of dense riparian forest cover.</p>	<p>HYDROLOGIC FUNCTIONS Medium: Portions of the river's floodplain are altered by a road, but there are generally minimal hydromodifications located within the reach.</p>

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). Future new structures should be set back an adequate distance to protect stream functions and protect structures from flooding and channel migration.
- Protect high-quality forest and wildlife habitat within the reach.

3.16 Swauk Creek

Swauk Creek enters the Yakima River at RM 169.9 as a left-bank tributary. The stream generally flows north to south.

3.16.1 Physical Characterization

Precipitation is limited in the Swauk Creek watershed, resulting in low streamflows during the dry season. During summer, flows become very low to intermittent downstream of RM 6, while flows typically become absent during the fall downstream of RM 4 to 6 (Haring 2001; Sullivan 2008). In addition to limited precipitation, low or absent flows are the result of irrigation diversions, which have cut off hyporheic connectivity between subsurface stream waters and floodplain waters (Sullivan 2008).

Seven roads and a railroad crossing are located over the stream, including Highways 970, 97 and 10, with the majority of crossings located in the upper watershed (WDFW 2010). In addition, two utility corridors cross the stream. Steep slopes are also mapped over most of the upper watershed and adjacent to the lower portion of the stream (Kittitas County 2012). The FEMA 100-year floodplain is mapped in the downstream half of the river's inventory area, occupying most of the area (FEMA 1996). Much of the inventory area of Swauk Creek is located within a mapped channel migration zone, although the migration zone in several areas has been effectively disconnected from the active channel by state highways.

Swauk Creek has a naturally confined stream corridor and physical alterations have significantly modified the corridor's extent. Road construction and mining have straightened and steepened the channel, resulting in downstream bank erosion (Haring 2001). Along the lower reaches, the stream is confined in areas by an old railroad bed, while further up the canyon, State Route 97 and another abandoned railroad bed impair floodplain functions and reduce channel sinuosity. Undersized culverts result in debris blockages, fish passage barriers, and localized erosion during peak flows at several locations along the stream.

Much of the upper canyon, upstream of RM 8, is forested, while the lower portions of the stream, downstream of RM 3, flow through an arid canyon. Substantial recreational and commercial gold prospecting occurs upstream of RM 11 (Haring 2001). Limited residential development is located adjacent to the stream in the lower portion of the upper watershed.

3.16.2 Habitats and Species

3.16.2.1 Fish Use

Swauk Creek supports bull trout and steelhead (Middle Columbia River Distinct Population Segment), both federally listed as threatened. This stream is considered a major steelhead producer in the upper Yakima basin (Conley et al. 2009). Other salmonid species in this stream include eastern brook trout, rainbow trout, and westslope cutthroat (StreamNet 2010).

Swauk Creek was historically a substantial producer of coho salmon. Coho were witnessed spawning in Swauk Creek in the early 1960s, but are now largely extirpated due to impairment of side channels and loss of meandering stream courses (StreamNet 2010, Haring 2001). Recently, coho salmon have recently been introduced to the creek.

Swauk Creek provides a stable rearing environment for spring Chinook salmon in the summer, when irrigation water is released from upstream reservoirs. Juvenile Chinook enter can Swauk Creek to escape high flows (Nason 2004).

Spawning habitat in much of Swauk Creek is fair to poor. Fish habitat has been impacted by sedimentation and a lack of large woody debris. Mining for gold has likely increased sedimentation and decreased successful incubation and emergence of salmonid eggs. Toxic chemicals such as arsenic may still be present as a remnant of historic gold mining and processing in the watershed. (Haring 2001, YSFWPB 2004)

Roads in the Swauk Creek watershed have also contributed to an increase in sediment and a loss of complexity in the stream system. Sediment loading from extreme rain and snowmelt events on Highway 97 can be disastrous to fish populations if it occurs during spawning times (Nason 2004).

Summer and early fall streamflows in lower Swauk Creek are very low or intermittent as far upstream as RM 6. The lack of flow prevents adult salmonids from reaching the upper watershed until fall rains occur. Low flows may result from a combination of natural conditions plus a loss of floodplain water storage, floodplain confinement, impaired riparian function, and water withdrawals (Haring 2001). Some diversions on Swauk and First Creeks have been dedicated to instream flow purposes through acquisition from the Mountain Star Resort (Reclamation and Ecology 2011a).

Other impacts to fisheries include undersized culverts that cause debris blockages, fish passage barriers, and localized erosion during peak flows (Haring 2001).

The Yakama Nation and Kittitas Conservation Trust are currently working to improve riparian conditions and floodplain connectivity within Swauk Creek. Specific projects include riparian plantings, engineered log jams, and grade controls which will increase bank retention of spring runoff.

3.16.2.2 *Water Quality*

Ecology's 2008 303(d) list identifies high temperature problems on the mainstem Swauk Creek, and a TMDL for temperature has been implemented (Ecology, 2005). However, some of its tributaries are listed for high water temperatures. Instream habitat has been degraded by sedimentation as discussed above.

3.16.2.3 *Riparian Habitat Conditions (Land Cover)*

The lower three miles of the Swauk Creek watershed are located in a steep, arid canyon. Deciduous trees and shrubs increase along the middle reach of the stream. The upper watershed is mainly coniferous forest. Upstream of RM 8 the riparian condition is generally good. Lower riparian areas have largely been modified by human activities. For example, a study along middle Swauk Creek found that the extent and density of riparian vegetation had been substantially reduced from historic levels. Riparian vegetation had been removed for crop production and by intensive livestock grazing (Sullivan 2008). Some high-quality riparian habitat remains in lower parts of the watershed that are protected by conservation easements (Nason 2004, YSFWPB 2004).

3.16.2.4 *Wetlands*

Today less than 10 percent of the Swauk Creek shoreline inventory area is mapped as scattered riparian wetlands. Wet meadows, beaver dams, and ponds were historically more abundant in the Swauk Creek basin. The elimination of beavers and intensive mining disconnected the stream from its floodplain. Adjacent wetlands were lost, along with their capacity to store spring runoff. The lack of water storage may contribute to low streamflow through the dry summer months. (Haring 2001, YSFWPB 2004)

3.16.2.1 *Wildlife Habitats and Species*

The Swauk Creek watershed provides mule deer winter range and both wintering and calving habitat for elk. The upper part of the watershed is mapped as northern spotted owl critical habitat (federally listed threatened species). Another federally listed threatened species, grizzly bear, has also been observed in the Swauk Creek watershed. The grizzly bear population in the North Cascades has been estimated at

less than 20 individuals. Factors affecting grizzly bear recovery in the North Cascades recovery zone include very small population size, human disturbance, and population fragmentation resulting in genetic isolation (WDFW 2011b).

The banks of lower Swauk Creek, upstream from the confluence with the Yakima River, contain small, disjunct stands of Oregon white oak (a state priority habitat). This represents the northernmost known extent of this species in eastern Washington (Nelson 2004).

3.16.3 Land Use

The land bordering the lower approximately 4 miles of Swauk Creek is primarily undeveloped forest and shrub land, zoned for agriculture. An electric power line corridor crosses the creek within the segment. Upstream of the agriculture-zoned area, the creek is bordered by low- to moderate-density residential development, agriculture, and some undeveloped forest land that is zoned for rural residential development. The upper creek flows through National Forest land.

According to National Forest mapping data, there is one “special use” authorization 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.

3.16.4 Public Access

The lower approximately 8 miles of Swauk Creek is bordered by private lands, and no public access is available. Upper Swauk Creek, within the National Forest, can be accessed from various hiking, snowmobile, and snowshoe/ski trails.

3.16.5 Reach Sheet

SWAUK CREEK

SHORELINE LENGTH:

16.8 Miles

REACH INVENTORY AREA:

855.1 Acres



PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

Upstream, the stream is located within a moderately narrow valley with steep topographic relief, and is generally confined within a single channel with multiple gravel bars. Downstream, terrain flattens and the channel is relatively unconfined.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is primarily forest (35%), riparian vegetation (34%), and developed lands (20%). Other cover types located within the reach include: agricultural lands (5%), shrublands (5%), and unvegetated (1%).

HAZARD AREAS (MAP FOLIO #2 & APPENDIX C)

Almost half of the reach (47%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach. Almost the entire reach (91%) has potential for channel migration.

HABITATS AND SPECIES (MAP FOLIO #1)

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

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

Several patches of wetland habitat are mapped along the river throughout the reach (6% of the reach). Priority habitat and species include: cliff/bluffs and oak woodland, and elk winter area and calving habitat, mule deer winter range, and rocky mountain elk habitat.

The Swauk Creek shoreline inventory area supports one rare plant species mapped by the Washington Natural Heritage Program.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1)

Seven roads and a railroad cross the reach, with the majority of crossings in the upper watershed. In the lower reach, the channel is confined in areas by a railroad bed, while Highway 97 and another railroad bed confine the channel upstream.

PUBLIC ACCESS (MAP FOLIO #4)

Upper Swauk Creek, upstream of approximately RM 8, can be accessed from hiking, ATV, and snowmobile trails at various locations.

EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use along the reach is primarily rural (73%) with forestry lands along the upstream end. Land ownership is 68% private and 32% public (Forest Service).

CONTAMINATED SITES

A voluntary toxics cleanup site is located at the downstream end of the reach and a previous enforcement action occurred mid-reach, north of Liberty Road.

ZONING (MAP #5)

Lands within the reach are zoned for commercial forestry at the upstream end (25%); agriculture at the downstream end (34%); and forest & range (12%), rural residential (13%), mixed use (9%), and other (9%) [right-of-way] in the middle region.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

A total of 33 recorded precontact and historic sites are located within the reach. The sites are primarily historic and related to early mining infrastructure built during the late 1800s and early 1900s.

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY

Medium: The reach provides habitat for priority fish species (including spawning and rearing habitat), but low summer flows are a limiting factor for fish use.

TERRESTRIAL HABITAT QUALITY

Medium: Vegetation is disturbed in some areas by development, agriculture, and roads, but a majority of the reach is covered with dense riparian forests and is connected to large, relatively-undisturbed habitat areas.

VEGETATION FUNCTIONS

Medium: Most of the reach consists of dense forest cover, but vegetation is disturbed in areas by agriculture and development at the downstream end, and Highway 97 which parallels the creek.

HYDROLOGIC FUNCTIONS

Medium: Much of the river's floodplain is altered by Highway 97 and agriculture and other development at the downstream end, but significant portions of the floodplain is intact.

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.
- Protect the high-quality forest and wildlife habitat within the reach.
- Low summer flows in the river are a limiting factor for salmon.
- Many important cultural and archaeological sites are located within the reach.
- Restoration actions identified within the reach include:
 - Grants are used to identify and design restoration alternatives for a 1.5-mile reach of Swauk Creek (RM 17.3-18.8). Alternatives will be designed to enhance groundwater storage, increase in-stream habitat complexity, and improve conditions of riparian habitat. Feasibility reports have been prepared and one alternative has been funded (SRFB 08-2001) (YBFWRB, 2011).
 - Fish screen projects have been completed over the last decade; stream restoration work is ongoing downstream of the US 97/Lauderdale Lane junction (Anna Lael, pers. comm.)
- Culverts within the reach are a barrier to fish passage.
- Manage recreational activity to reduce impacts on vegetation and subsequent erosion.
- Educate shoreline property owners about measures to protect and restore riparian areas.
- Protect the Oregon white oak habitat in lower portion of the reach.
- The reach contains a rare plant specie, mapped by the Washington Natural Heritage Program.