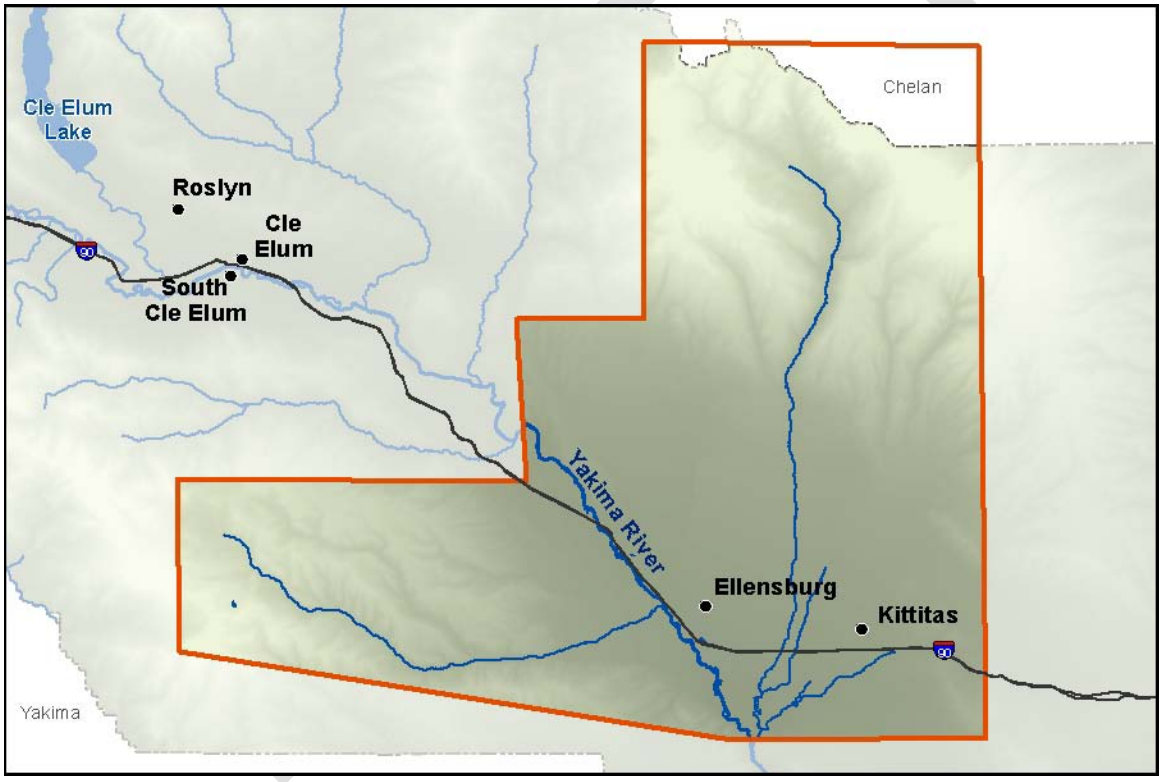
CHAPTER 4. KITTITAS VALLEY

This chapter describes the conditions within the shoreline inventory area of the Kittitas Valley (including the City of Ellensburg). Kittitas Valley shorelines include the Yakima River and its tributaries between the Taneum Creek confluence and the Wilson Creek confluence (Figure 4-1). The 11 streams and 7 lakes and ponds within the Kittitas Valley are described in terms of their physical characteristics, ecological conditions, and human environment/land use characteristics. Readers are encouraged to review Chapter 2 and the maps in Appendix A for additional context on the information presented here.

Figure 4-1. "Kittitas Valley" shorelines.



Characteristics for the shoreline reaches are detailed on "reach sheets" included in this chapter. The information on the reach sheet is based upon available county-wide data sources that describe key physical, ecological, and land use characteristics. A description of the available data sources, including data limitations, is presented in Appendix B. Shoreline reaches that are located entirely on federal lands (e.g., National Forest lands) and therefore are generally not subject

to shoreline jurisdiction do not have reach sheets and are only briefly described below.

4.1 Yakima River: Kittitas Valley Reaches

This section describes the portion of the Yakima River that flows through the Kittitas Valley, from the Taneum Creek confluence to the Wilson Creek confluence. The river is designated as a "shoreline of statewide significance" because its mean annual flow exceeds 200 cubic feet per second. Major right-bank tributaries located within this portion of the river are Taneum Creek and Manastash Creek, and the major left-bank tributary is Wilson Creek.

The Yakima River flows past the City of Ellensburg; the river shoreline within the city is described below.

4.1.1 Physical Characterization

This portion of the Yakima River watershed is drier than the upper Yakima River because the lower elevation areas receive less rainfall. Most of the native shrub-steppe habitat here has been concerted to agricultural land which has resulted in considerable alteration and hydrologic change to the landscape.

The Kittitas Valley reaches of the Yakima River are crossed by two railroads, the John Wayne Heritage Trail, I-90, and three other roads. A large irrigation diversion structure/dam is located at approximately river mile (RM) 161. Highway 10 and I-90, located on the left bank of the river, constrain channel movement, and other hydromodifications are present along the river. The city's wastewater treatment plant outfall is located within this segment of the river and has extensive bank armoring associated with it to help prevent erosion (Akers 2012). Upstream from the confluence with Wilson Creek, the river has multiple braided channel complexes with associated side channels (Haring 2001). The forested riparian corridor is relatively continuous along both banks of the river, but it becomes patchy to non-existent in places where residential and industrial development or more extensive agricultural land uses have encroached into the corridor.

The FEMA 100-year floodplain occupies the majority of the valley and is well over a mile wide in some areas of reaches 3 and 4 (FEMA 1996). The entire length of Yakima River reaches 3 and 4 are mapped as having potential for channel migration (Ecology 2011).

Unnamed Waterbody 03 (Gladmar Pond) is located on the right bank of the Yakima River, while Unnamed Waterbodies 02 and 01 along with Unnamed Pond 04 are

located on the left bank. All of these aquatic features are old gravel pits located in the Yakima River floodplain, which is the most heavily mined floodplain in the state (Haring 2001). Gravel mining impacts both the structure and function of floodplains. Prior to gravel mining, peripheral floodplains store seasonal overbank flows and often support dense and diverse riparian habitat. Yakima River floodplains are typically located at points where the river shifts from a high-gradient stream course to a sinuous river system, resulting in slower stream velocity where sediments and gravels suspended in the water column tend to settle (Kosters 2010).

Gladmar Pond (Unnamed Waterbody 03) measures approximately 0.2 mile long and 0.15 mile wide. The Yakima River courses around the northern and eastern boundaries of the pond, while agricultural land use, a diversion channel, a road, and the Iron Horse Trail are located along the western and southern boundaries. Currently, a single channel located to the north allows flow into the pond and two channels drain the pond to the south. One building is located near the southeast boundary of the pond. A Yakima River irrigation diversion is located adjacent to the eastern bank of Gladmar Pond, carrying water to the east.

The FEMA 100-year floodplain is mapped within the entire inventory area of the waterboday (FEMA 1996).

Unnamed Waterbody 02 is approximately 0.3 mile long and 0.2 mile wide. The Yakima River and associated side channels flank the western and southern boundaries of the waterbody. Several smaller gravel pits, located to the north, feed water to Unnamed Waterbody 02. I-90 is adjacent to the waterbody's eastern boundary.

The FEMA 100-year floodplain is mapped within the majority of the waterbody inventory area (FEMA 1996).

Unnamed Pond 04 is located at about the same latitude as Unnamed Waterbody 02, but on the east side of I-90. The pond is about 0.4 mile long and 0.1 mile wide and is generally oriented west-east. An active gravel processing facility is located adjacent to the southern boundary of the pond; agricultural land occupies the area north of the pond.

The FEMA 100-year floodplain is mapped within the western and southwestern portions of the waterbody inventory area (FEMA 1996).

Unnamed Waterbody 01 is located approximately 1 mile downstream from Unnamed Waterbody 02 and exhibits similar physical characteristics. The Yakima River and associated side channels flank the western shoreline of the waterbody; several smaller gravel pits, located to the north, drain to the waterbody; and I-90

forms the eastern boundary. The waterbody drains back to the Yakima River at its southern extent. Unnamed Waterbody 01 is about 0.3 mile long and 0.1 mile wide.

The FEMA 100-year floodplain is mapped within the northern, western, and a portion of the southern waterbody inventory area (FEMA 1996).

4.1.1.1 City of Ellensburg

Portions of the regulated extent of Yakima River Reach 3 are located within the western and southern city boundaries. The upstream extent of this area contains a short stretch of the Yakima River and a large pond that was created by gravel mining in the river's floodplain. The pond is divided by a narrow, man-made berm that allows flow to pass between the two halves. The pond is separated from the river by a larger berm. Land south of the pond is primarily forested. The City of Ellensburg water treatment plant is located in the southern portion of this regulated area.

The regulated downstream extent of Yakima River Reach 4 is located within the western city limits. The area contains three ponds that were the result of gravel mining in the river's floodplain and a portion of outlet channel that carries flow for these ponds to the Yakima River. The land adjacent to the ponds is developed industrial, while that next to the outlet channel is vegetated.

The FEMA 100-year floodplain encompasses a substantial area land between the river and Canyon Road within the city limits, including the area adjacent to the water treatment plant (FEMA 1996). The entire reach along the Yakima River has potential for channel migration (Ecology 2011).

4.1.2 Habitats and Species

4.1.2.1 Fish Use

This portion of the Yakima River supports spawning and rearing of spring Chinook and summer steelhead. Middle Columbia River steelhead were federally listed as threatened in 1999. Other fish species present in this part of the river include coho salmon, Dolly Varden/brook trout, mountain whitefish, rainbow trout, westslope cutthroat, and eastern brook trout (an introduced species) (StreamNet 2010).

Fish habitat along this part of the river has been degraded by removal of riparian vegetation, lack of large wood, altered hydrologic regimes, and isolation of side channel habitats from the main channel (Haring 2001).

Table 4-1 lists fish species documented in the four unnamed waterbodies (ponds) located along this reach.

Table 4-1. Fish Use in Unnamed Waterbodies along Middle Yakima River (Source: StreamNet 2010)

Species	Unnamed Waterbody 01	Unnamed Waterbody 02	Unnamed Waterbody 03	Unnamed Pond 04
Dolly Varden/Bull Trout	P		P	
Rainbow Trout	P		P	
Westslope Cutthroat	P		P	
Eastern Brook Trout				
Spring Chinook	P		P	
Summer Steelhead	P		P	
Coho salmon	P		P	
Mountain whitefish	P			

P/M = presence/migration; S = spawning; R= rearing

Many factors have caused the decline of Yakima basin fish populations, including the following (Reclamation and Ecology Integrated Plan DPEIS 2011):

- In the 1900s, crib dams on the four natural glacial lakes (Cle Elum, Kachess, Keechelus, and Bumping) contributed to the extirpation of sockeye.
- Construction of five storage dams eliminated access to productive spawning and rearing habitat for sockeye, spring Chinook, coho, and steelhead salmon.
- Irrigation operations have altered streamflows, resulting in flows at certain times of the year that are too high in some reaches and too low in others to provide good fish habitat. This problem is worse during drought years.
- Land development (road construction, diking, gravel mining, and agriculture) has degraded riparian habitat and increased sediment in streams and rivers.
- Irrigation diversions have reduced flows and created fish passage barriers in tributary streams.

- The Columbia River dams and historic commercial fishing in the Columbia River and Pacific Ocean have also indirectly affected Yakima basin fisheries.

High summer flows in the Yakima River affect juvenile salmonid rearing habitat. The annual later summer "flipflop" operation disrupts salmonid habitat and impacts aquatic insect populations, while winter flows in the Yakima River are low, potentially impacting survival of overwintering juvenile salmonids (Reclamation and Ecology 2011a).

Mining in the Yakima River basin began in the early 1950s (Collins 2005). Gladmar Pond was created as a result of floodplain gravel mining from the 1960s through the 1980s (Kosters 2010). While the former gravel mine ponds along this part of the river provide habitat for some fish species, floodplain gravel mining in general has negative effects on fish habitat. Riverbanks may be armored to protect the gravel mine, constricting the floodplain and removing riparian vegetation and large wood. The river can avulse or suddenly change course into a gravel mine pit, creating a sink for sediments and increasing streamflow and erosion downstream. Avulsion into abandoned gravel pits occurred along the Yakima River at Parker, Selah Gap, and Gladmar Pond in 1996. Ponds located in abandoned gravel pits can warm adjacent river temperatures and act as reservoirs for introduced fish species that prey on or compete with native species. Roads are constructed to facilitate transport of the mined materials (Conley et al. 2009, Collins 1995, Kosters 2010, Reclamation 2004, Reclamation 2005).

Anadromous fisheries have improved in recent years as a result of better fisheries management, habitat and facility improvements, hatchery supplementation, and reintroduction efforts. Reintroduction of coho in the Yakima basin began in the mid-1980s. Summer Chinook reintroduction is currently being undertaken (Reclamation and Ecology 2011a). Efforts to restore coho salmon within the Yakima River basin rely largely upon releases of hatchery-produced fish. Natural reproduction of hatchery-reared coho salmon is now occurring in the Yakima River. The upper Yakima wild Chinook salmon population is supplemented with hatchery stock reared at the Cle Elum Supplementation and Research Facility (CESRF) and released from three acclimation sites (Reclamation 2011, Reclamation and Ecology 2011a). The CESRF has been operating since 1997 and is managed by WDFW and the Yakama Nation.

Additional major efforts to improve fish habitat and populations in the Yakima basin include the following (Reclamation and Ecology 2011a):

- The Yakima/Klickitat Fisheries Project is managed by WDFW and the Yakama Nation. Its goal is salmon reintroduction through supplementation along with habitat protection and restoration. Species currently being

enhanced include spring, summer and fall Chinook salmon, coho salmon, sockeye salmon, and steelhead trout.

- The Yakima River Side Channels Project is managed by WDFW and the Yakama Nation through the Yakima/Klickitat Fisheries Project. It focuses on restoring habitat in the Easton, Ellensburg, Selah, and Union Gap reaches on the Yakima River and the Gleed reach in the lower Naches. Active habitat restoration actions include reconnecting structurally diverse alcoves and side channels, introducing large woody debris, fencing, and revegetating riparian areas.

- The Yakima Tributary Access and Habitat Program has numerous participants including the Kittitas Conservation District. It seeks to restore fish passage to Yakima River tributaries that historically supported salmon and to improve habitat through measures such as fish screening and fish passage improvements, riparian plantings, fencing, and irrigation system improvements.

- Reclamation is leading a cooperative investigation to study the feasibility of providing fish passage at the five large storage dams of the Yakima Project (Bumping Lake, Kachess, Keechelus, Cle Elum, and Tieton). Fish passage efforts at each dam are discussed in the relevant sections of this report.

Pacific lamprey is another native fish species that has recently become a focus of restoration efforts. The Columbia River basin historically supported abundant Pacific lamprey populations, but the population has steeply declined and is virtually non-existent in the upper Yakima watershed. Major factors in the species' decline include fish passage barriers, poor water quality, floodplain degradation, and highly altered stream hydrology (CRITFC 2011; USFWS 2011).

4.1.2.1 City of Ellensburg

This portion of the Yakima River supports spawning and rearing of spring Chinook and summer steelhead. Middle Columbia River steelhead were federally listed as threatened in 1999. Other fish species present in this part of the river include coho salmon, Dolly Varden/brook trout, mountain whitefish, rainbow trout, westslope cutthroat, and eastern brook trout (an introduced species) (StreamNet 2010).

Fish habitat along this part of the river has been degraded by removal of riparian vegetation, lack of large wood, altered hydrologic regimes, and isolation of side channel habitats from the main channel (Haring 2001).

4.1.3 Water Quality

Several tributaries to the middle Yakima River are on Ecology's 303(d) list for pH, fecal coliform, low dissolved oxygen, and elevated temperatures. These tributaries are streams and irrigation canals with limited woody riparian cover that flow through agricultural and developed areas near Ellensburg.

During spring and summer, levels of organochlorine pesticides, turbidity, and suspended sediments in the upper Yakima River basin sometimes exceed state water quality standards. In addition to concerns associated with turbidity in streams, suspended sediments also act as a transport mechanism for pesticides. Ecology completed an assessment of suspended sediment, turbidity, organochlorine pesticides, bacteria, and metals in the upper Yakima River basin in 1999, focusing on the mainstem river and major tributaries from Selah upstream to Cle Elum. A TMDL for suspended sediment, turbidity, and pesticides in the upper Yakima River and major tributaries was completed in 2002 (Creech 2003b).

The Department of Ecology has recently undertaken the Yakima River Watershed Toxics Study to evaluate levels of toxic contaminants in streams, rivers, reservoirs, and lakes from the Yakima River's headwaters near Snoqualmie Pass to its confluence with the Columbia River. Levels of toxic compounds in Yakima River fish were recognized as a concern in the 1990s. During 2006 - 2008, Ecology collected hundreds of samples of fish and water to evaluate current levels of toxic compounds such as DDT, PCBs, and several others, many of which were historically used in agriculture or utilities but have been banned in recent years. These compounds attach to soil particles which are then washed downstream by precipitation or irrigation. Although the compounds have not been applied in recent years, they can persist in the environment. Ecology's study found that fish in the upper Yakima River are currently meeting or close to meeting human health criteria for all toxic substances tested except PCBs. The level of toxics generally increases in downstream areas. The months of greatest concern for human-caused turbidity, suspended sediment loading, and pesticide transport are during the irrigation season, April through October. Sediments and pesticides can also be mobilized during storms or rain-on-snow events (Johnson et al. 2010; Ecology 2009; Joy 2002).

Ecology found that irrigation returns are the dominant cause of degraded water quality in the Yakima River and are the most important sources to control for reducing turbidity, pesticides, and PCBs. However, urban stormwater runoff from cities including Ellensburg also appears to be a significant source of these pollutants (Johnson et al. 2010).

4.1.3.1 City of Ellensburg

See Section 4.1.3.

4.1.4 Riparian Habitat Conditions (Land Cover)

Riparian vegetation along this part of the Yakima River is largely forested with some agricultural and rural residential areas and very limited industrial development. In a few locations, riparian vegetation is limited to a very narrow strip where the river abuts I-90 or local roads (e.g., between RM 157 and RM 158 and near the Manastash Creek confluence).

Sporadic tree cover occupies the northern, eastern, and southern shorelines of Gladmar Pond, while the western shoreline contains relatively continuous forest cover. The northern shoreline of Unnamed Waterbody 02 contains sporadic shrub/tree cover, while the western and southern boundaries have continuous shrub and tree cover. The shoreline of Unnamed Pond 04 contains a patchwork of dense to sparse shrub and tree cover.

4.1.4.1 City of Ellensburg

Riparian vegetation along the Yakima River within city limits is largely forested..

4.1.5 Wetlands

Nearly one-quarter of the shoreline inventory area of the middle Yakima River is mapped as wetlands. Large palustrine forested and scrub-shrub wetlands are mapped within the floodplain. Several ponds within the floodplain are mapped as open water wetlands (including the unnamed waterbodies/ponds within shoreline jurisdiction).

4.1.5.1 City of Ellensburg

The most extensive and least disturbed riverine wetlands in Ellensburg are associated with the Yakima River. These forested and scrub-shrub wetlands are dominated by black cottonwood and willows. Shrubs include rose, hawthorn, snowberry, and dogwood. Aspen stands are also present. These riverine wetlands have a high level of functions (Adolfson 2005).

4.1.6 Wildlife Habitats and Species

The Yakima River floodplain provides an important wildlife movement corridor, along with feeding, breeding, and refuge habitat. Species such as bald eagle, great blue heron, and osprey are likely to use the Yakima River riparian area, along with a diversity of other species (Adolfson 2005)

The middle Yakima River valley is part of a mapped mule deer winter range area. A bald eagle communal roost is also mapped along the river. The Woodhouse Ponds wetland complex provides habitat for waterfowl, songbirds, and mammals.

Approximately one-quarter of the Yakima River shoreline inventory area is mapped as shrub-steppe habitat (USGS 1993). Shrub-steppe habitat is dominated by perennial bunchgrasses and shrubs such as sagebrush (WDFW 2008). Kittitas County has several types of shrub-steppe communities with different combinations of plant species, as described in Section 2.3.2 in Chapter 2. Shrub-steppe habitat supports numerous unique plant and wildlife species (Azerrad et al. 2011). While it was historically a common type of vegetation community in eastern Washington, shrub-steppe habitat has been largely converted to agriculture and is considered a priority habitat by WDFW (see Section 2.6.3.1).

4.1.6.1 City of Ellensburg

As described above, the Yakima River provides important wildlife habitat and connects riparian habitats in Ellensburg with other habitat areas in the county. The Irene Reinhart Park near the Manastash Creek confluence is a cottonwood riparian wetland area that includes a nature trail and wildlife habitat. The park is the largest contiguous tract of native habitat in Ellensburg (Adolfson 2005).

4.1.7 Land Use

From the Wilson Creek confluence upstream to near Thrall Road (approximately 1 mile), the Yakima River is bordered by undeveloped land zoned for forest and range to the west and Canyon Road to the east. North of Thrall Road, the river is bordered primarily by agricultural land and low-density rural residential uses. Land use intensifies near the City of Ellensburg, where the river is bordered by I-90 to the northeast and moderate-density residential development to the southwest.

From north of Ellensburg to approximately 4 miles upstream, the river is bordered by I-90 to the east and agricultural land to the west. From the I-90 bridge to the Taneum Creek confluence, the river flows through agricultural lands.

4.1.7.1 City of Ellensburg

Within the City of Ellensburg, the Yakima River is bordered by Irene Rinehart Riverfront Park, located north of Umtanum Road and south of the Manastash Creek confluence.

4.1.8 Public Access

The "Kittitas Valley" reaches of the Yakima River can be accessed at the following locations:

- Irene Rhinehart Riverfront Park in Ellensburg;
- The Thrall Access area off of Ringer Loop Road, which also contains a boat launch;
- Helen McCabe/Yakima Canyon State Park;
- The John Wayne Heritage Trail, which crosses the river downstream of Gladmar Pond and upstream of the I-90 crossing.

Gladmar Pond (Unnamed Waterbody 03) can be accessed from Gladmar Park Road.

4.1.8.1 City of Ellensburg

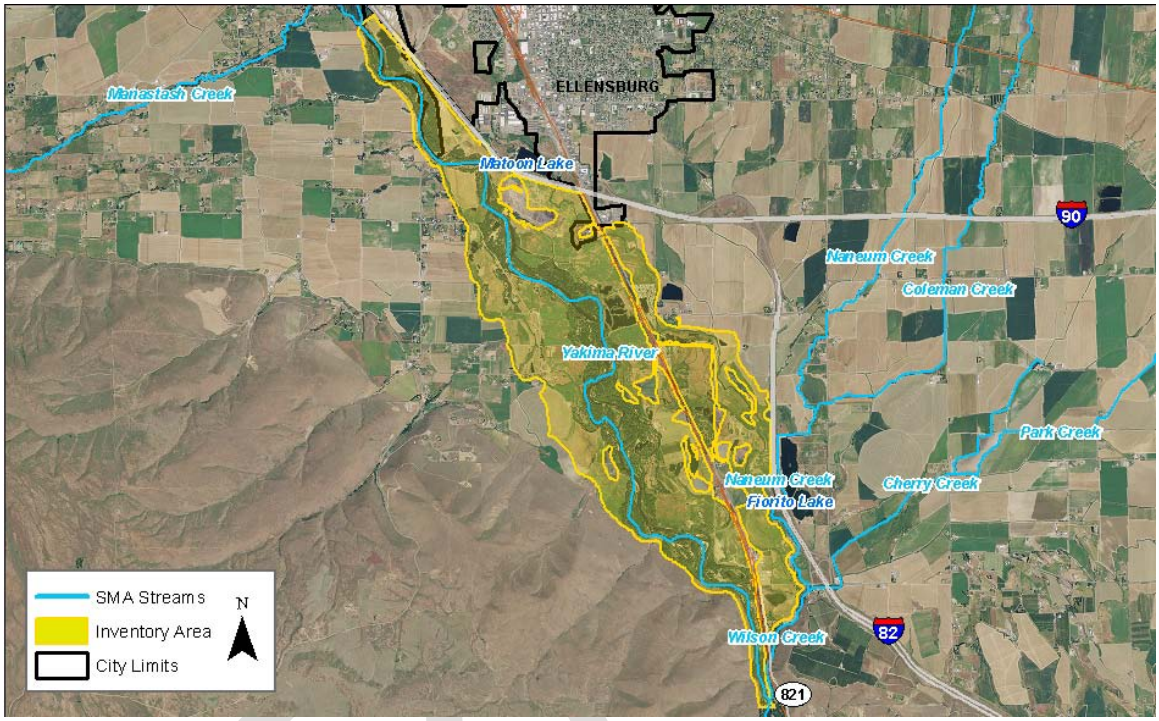
Within the City of Ellensburg, the Yakima River can be accessed from Irene Rhinehart Riverfront Park.

4.1.9 Reach Sheets

YAKIMA RIVER-REACH 3

SHORELINE LENGTH:
8.4 Miles

REACH INVENTORY AREA:
3,359.6 Acres



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PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach transitions between single and multiple channels several times and contains numerous gravel bars. The upstream portion of the channel is confined by I-90 on the left bank and by topographic relief downstream, on the right bank. Several gravel pits are located on the left bank of the river. The river flows through low topographic relief within this reach.

LAND COVER (MAP FOLIO #3)

This reach contains significant agricultural lands (63%) and conifer-dominated forest (18%). A number of other land cover types are also present, including: developed lands (9%), riparian vegetation (6%), grassland (2%), and open water (1%).

HAZARD AREAS (MAP FOLIO #2)

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

WATER QUALITY

The reach is on the State's Water Quality Assessment list of 303 (d) Category 5 waters for pH, temperature, and fecal coliform; a TMDL is in place for the latter.

HABITATS AND SPECIES (MAP FOLIO #1)

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

Wetland habitat is mapped along the river at several locations (20% of the reach). Priority bald eagle habitat, mule deer winter range, and biodiversity areas and corridors are mapped along the downstream portion of the reach. Priority bighorn sheep, elk winter range, and great blue heron are also mapped .

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1)

Approximately one-third of the shoreline is constrained by linear hydromodifications, particularly at the upstream end of the reach.

PUBLIC ACCESS (MAP FOLIO #4)

The reach can be accessed from Irene Rhinehart Riverfront Park off of Duke Road. A boat launch is located near the downstream end of the reach at the Thrall Access off of Ringer Loop Road. Helen McCabe/Yakima Canyon State Park can be accessed from Canyon Road.

EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use within the reach is rural (61%) in the southern end of the reach and west of the river, agricultural areas (14%) in the southeast; and urban (20%), parks & open space (3%), industrial (1%), and other (1%) uses near the City of Ellensburg. Land ownership is 86% private, 8% public (State, WDFW, State Parks, and BLM), and 6% other.

CONTAMINATED SITES

One toxics cleanup site is located within the reach.

ZONING (MAP #5)

Lands within the reach are zoned primarily for agriculture (69%), with areas of industrial (11%), urban/suburban residential (9%), parks & open space (4%), mobile home park (1%), forest & range (1%), and other (6%) [right-of-way] zoning.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are 2 recorded National Register sites, and 1 recorded historic property within the reach. The National Register sites are barns that were built in the late 1800s and early 1900s.

1

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY

Medium: The reach provides spawning and juvenile rearing habitat for priority fish species (including spring Chinook salmon), but has some significant water quality impairments and hydromodification areas.

TERRESTRIAL HABITAT QUALITY

Medium: Areas directly adjacent to the river are generally well-vegetated, but surrounding areas are disturbed. However, the reach has an unaltered connection to a large area of relatively unaltered habitat to the south.

VEGETATION FUNCTIONS

Medium: Much of the area bordering the river contains dense forest and shrub habitat, but large areas have been altered by agriculture and development.

HYDROLOGIC FUNCTIONS

Medium: Portions of the river's floodplain are constrained by hydromodifications within the reach, but the river still has a connection to its floodplain in some areas.

2

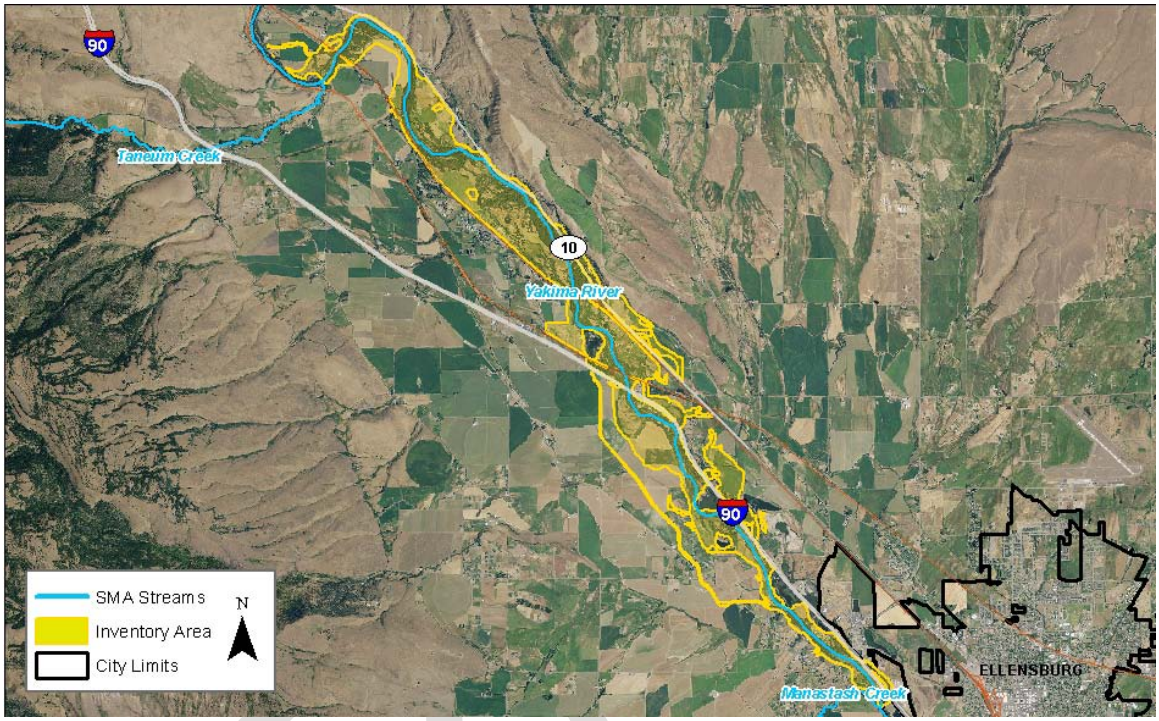
KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- The reach has a wide floodplain; there is significant development and undeveloped land that lies within flood-prone areas.
- New development should be set back an adequate distance from the shoreline to protect riparian functions and protect structures from flooding and channel migration hazards.
- Protect the remaining high-value, forested floodplain areas within the reach.
- Work with the Kittitas Conservation District to encourage landowners to enroll shoreline areas in the conservation reserve program.
- Support programs such as the Yakima/Klickitat Fisheries Project, Yakima River Side Channels Project, and Yakima Tributary Access and Habitat Program.
- Encourage use of agricultural best management practices to reduce erosion and transport of legacy pesticides.

YAKIMA RIVER-REACH 4

SHORELINE LENGTH:
11.2 Miles

REACH INVENTORY AREA:
2,642.1 Acres



1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The upstream portion of the reach is primarily a single channel, with multiple gravel bars, while downstream the river flows through multiple channels over short stretches. Upstream, the channel is confined by Highway 10 on the left bank and a railway on the right bank. Further downstream, I-90 confines the left bank. Multiple roads, railways, I-90, and the John Wayne Trail cross the reach.

LAND COVER (MAP FOLIO #3)

This reach is primarily agricultural lands (40%), conifer-dominated forest (35%), and developed (11%). Limited riparian vegetation (8%), grassland (2%), shrubland (2%), and open water (2%) are also present.

HAZARD AREAS (MAP FOLIO #2)

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

WATER QUALITY

The reach is listed on the State's Water Quality Assessment list of 303 (d) Category 5 waters for dissolved oxygen, fecal coliform, pH, and temperature.

HABITATS AND SPECIES (MAP FOLIO #1)

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

Patches of wetland habitat is mapped at several locations adjacent to the river (14% of the reach). Priority mule deer winter range habitat is mapped at the upstream end of the reach, on the left bank.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1)

The reach is constrained along most of its length by Highway 10, I-90, the John Wayne trail, and other hydromodifications areas.

PUBLIC ACCESS (MAP FOLIO #4)

The John Wayne Heritage Trail crosses the reach downstream of Gladmar Pond (Unnamed Waterbody 03) and upstream of the I-90 crossing.

EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use along the reach is primarily rural (91%), with some agricultural areas (6%) west of the river, and urban (2%) and commercial (1%) uses near the City of Ellensburg. Land ownership is 97% private and 3% public (State and WDFW).

CONTAMINATED SITES

No identified contaminated sites are located within this reach.

ZONING (MAP #5)

Lands within the reach are zoned primarily for agriculture (85%), with areas of rural residential (2%), urban/suburban residential (2%), industrial (1%), and other (11%) [right-of-way].

CULTURAL AND ARCHAEOLOGICAL RESOURCES

The Cabin Creek Diversion (circa 1930) is associated with early agriculture infrastructure and is potentially eligible for listing with the National Register.

1

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY

Medium: The reach provides spawning and juvenile rearing habitat for priority fish species (including spring Chinook salmon), but has some significant water quality impairments and hydromodification areas.

TERRESTRIAL HABITAT QUALITY

Medium: There is some remaining riparian vegetation along the river along and areas of wetland habitat, but connections to other habitat areas are largely altered.

VEGETATION FUNCTIONS

Medium: Some areas bordering the river contain dense forest and shrub habitat, but large areas have been altered by agriculture, roads, and other development.

HYDROLOGIC FUNCTIONS

Medium: Much of the river's outer floodplain is constrained by hydromodifications within the reach, but the river still has a connection to its floodplain in some areas.

2

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

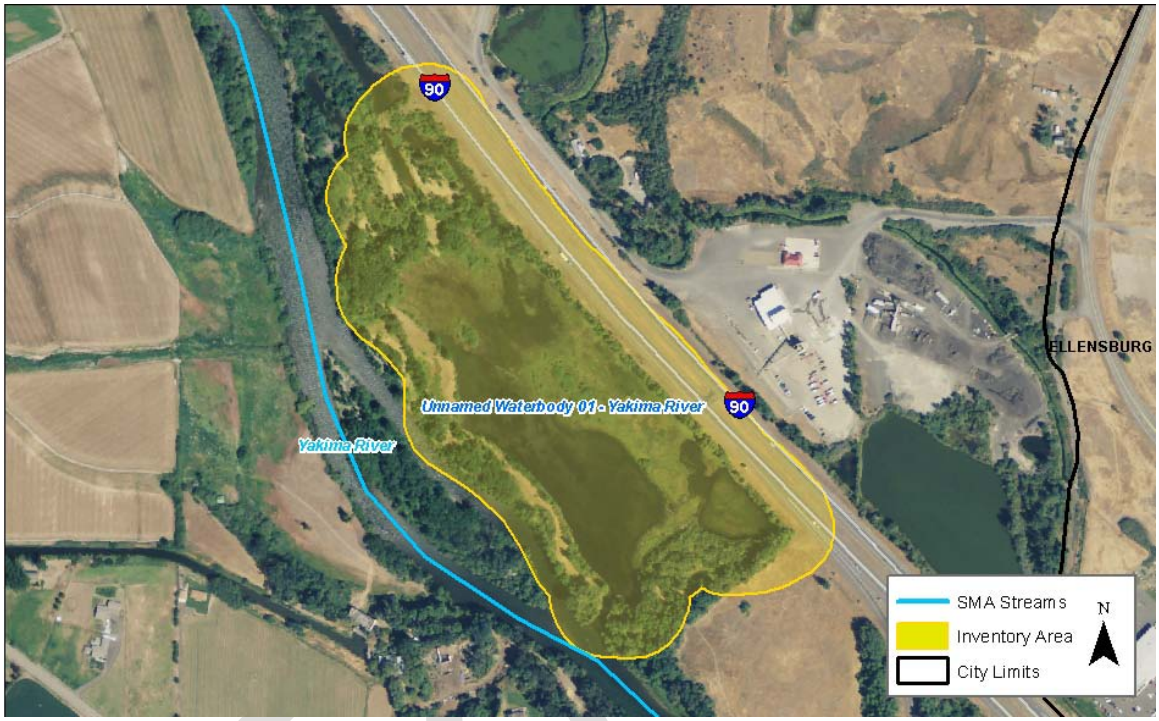
- There is significant development and undeveloped land that lies within flood-prone areas
- New development should be set back an adequate distance from the shoreline to protect riparian functions and protect structures from flooding and channel migration hazards.
- Protect the remaining high-value, forested floodplain areas within the reach.
- There is a proposed project to secure a conservation easement for approximately 0.5-0.75 mile of high quality riparian vegetation along the river. (YBFWRB, 2011).
- Work with the Kittitas Conservation District to encourage landowners to enroll shoreline areas in the conservation reserve program.
- Support programs such as the Yakima/Klickitat Fisheries Project, Yakima River Side Channels Project, and Yakima Tributary Access and Habitat Program.
- Encourage use of agricultural best management practices to reduce erosion and transport of legacy pesticides.

3

UNNAMED WATERBODY 1

SHORELINE LENGTH:
1.6 Miles

REACH INVENTORY AREA:
51.3 Acres



1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The waterbody is located adjacent to I-90 and is separated from the Yakima River by a wide berm. The Yakima River connects to the waterbody at its southwest boundary. This feature is an artifact of gravel mining in the river's floodplain.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is mainly developed lands (41%), conifer-dominated forest (32%), and open water (19%), with patches of grassland (5%), riparian vegetation (3%), and agricultural lands (1%).

HAZARD AREAS (MAP FOLIO #2)

More than half of the reach area (58%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach.

HABITATS AND SPECIES (MAP FOLIO #1)

The presence of spring Chinook, summer steelhead, brown trout, coho salmon, Dolly Varden/bull trout, mountain whitefish, rainbow trout, and westslope cutthroat is mapped by WDFW.

WATER QUALITY

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

Wetland habitat is mapped along the northern, eastern, and southern shorelines of the waterbody (20% of the reach). No priority habitats or species are identified in this reach by WDFW.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1) The eastern shoreline of the reach is constrained by I-90.	**PUBLIC ACCESS (MAP FOLIO #4)** There is no public access to the waterbody.
EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use in the reach is rural (100%). 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 agriculture (55%) and other (45%) [right-of-way].	**CULTURAL AND ARCHAEOLOGICAL RESOURCES** There are no recorded sites within the reach.

1

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY **Medium:** The lake is a manmade artifact of gravel mining, but has mapped priority fish use and a surface water connection to the Yakima River.	**TERRESTRIAL HABITAT QUALITY** **Medium:** The reach contains some forested areas and is directly adjacent to the Yakima River, but is also disturbed by development (primarily I-90).
VEGETATION FUNCTIONS **Medium:** Much of the lakeshore is disturbed (primarily by I-90) but riparian forest areas are present, primarily near the Yakima River.	**HYDROLOGIC FUNCTIONS** **Low:** The lake is a manmade artifact of gravel mining.

2

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Protect the remaining forest cover and high-value wetland areas within the reach.
- Explore restoration of former gravel pits to create more natural floodplain and riverine habitat.

3

UNNAMED WATERBODY 2

SHORELINE LENGTH:
1.0 Mile

REACH INVENTORY AREA:
45.0 Acres

1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The waterbody is located adjacent to I-90 and is separated from the Yakima River by a wide berm. This feature is an artifact of gravel mining in the river's floodplain.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is dominated by developed lands (39%), open water (27%), and conifer-dominated forest (27%), with limited cover provided by riparian vegetation (3%), agricultural lands (2%), grassland (1%), and shrubland (1%).

HAZARD AREAS (MAP FOLIO #2)

A significant portion of the reach (81%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach.

HABITATS AND SPECIES (MAP FOLIO #1)

No priority fish use is mapped by WDFW.

Wetland habitat is primarily mapped along the eastern and southern shorelines of the waterbody (20% of the reach). No priority habitats or species are identified in this reach by WDFW.

WATER QUALITY

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

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1) The eastern shoreline of the reach is constrained by I-90.	**PUBLIC ACCESS (MAP FOLIO #4)** There is no public access to the waterbody.
EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use in the reach is rural (100%). Land ownership is 30% private and 70% public (WDFW).	**CONTAMINATED SITES** No identified contaminated sites are located within this reach.
ZONING (MAP #5) Lands within the reach are zoned for agriculture (55%) in the west and other (45%) [right-of-way] in the east.	**CULTURAL AND ARCHAEOLOGICAL RESOURCES** There are no recorded sites within the reach.

1

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY **Low:** The lake is a manmade artifact of gravel mining with no surface water connection to the Yakima River.	**TERRESTRIAL HABITAT QUALITY** **Medium:** The reach contains some forested areas and is directly adjacent to the Yakima River, but is also disturbed by development (primarily I-90).
VEGETATION FUNCTIONS **Medium:** Much of the lakeshore is disturbed (primarily by I-90) but riparian forest areas are present, primarily near the Yakima River.	**HYDROLOGIC FUNCTIONS** **Low:** The lake is a manmade artifact of gravel mining.

2

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

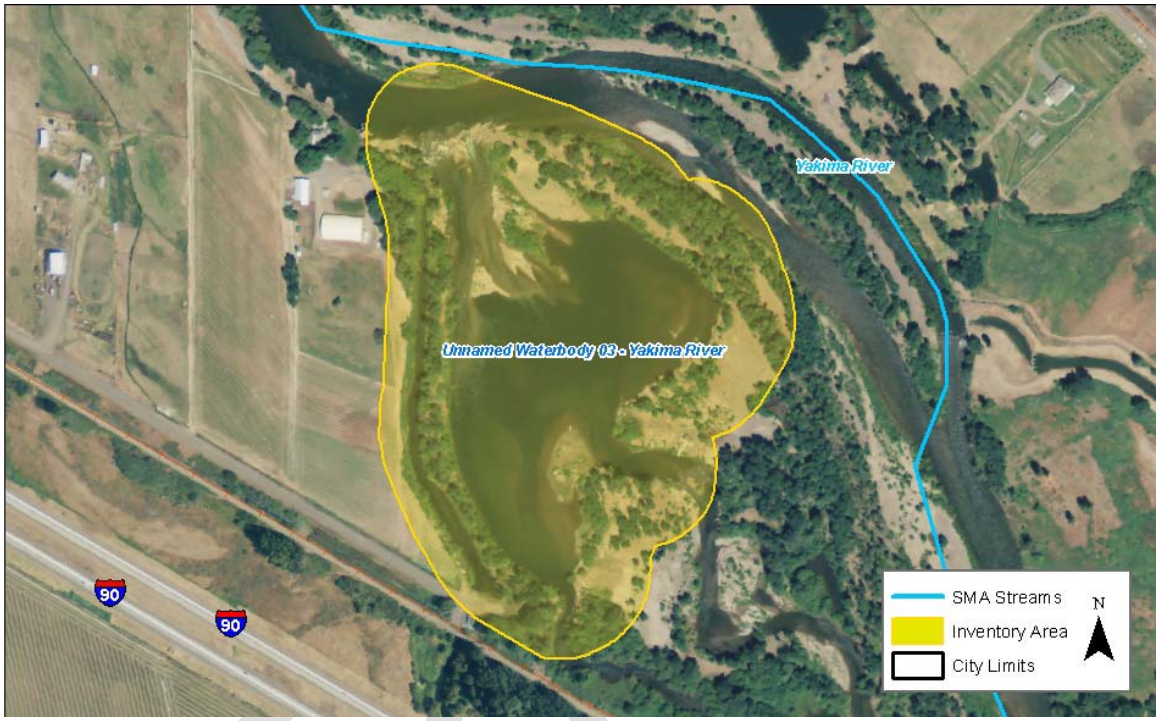
- Protect the remaining forest cover and high-value wetland areas within the reach.
- Explore restoration of former gravel pits to create more natural floodplain and riverine habitat.

3

UNNAMED WATERBODY 3 (GLADMAR POND)

SHORELINE LENGTH:
0.7 Mile

REACH INVENTORY AREA:
36.2 Acres



1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The waterbody (Gladmar Pond) is bordered by agricultural land use and an irrigation canal to the west and a road/John Wayne Trail to the south. The Yakima River flows through the waterbody north to south. This feature is an artifact of gravel mining in the river's floodplain.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is largely conifer dominated forest (40%), open water (24%), and riparian vegetation (12%). The reach also contains the following land cover types: grassland (9%), shrubland (9%), and agricultural lands (6%).

HAZARD AREAS (MAP FOLIO #2)

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

HABITATS AND SPECIES (MAP FOLIO #1)

The presence of spring Chinook, summer steelhead, brown trout, coho salmon, Dolly Varden/bull trout, rainbow trout, and westslope cutthroat is mapped by WDFW.

WATER QUALITY

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

Wetland habitat is mapped in small patches along the shoreline of the waterbody (17% of the reach). No priority habitats or species are identified in this reach by WDFW.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1) There are no shoreline modifications identified within the reach.	**PUBLIC ACCESS (MAP FOLIO #4)** The reach can be accessed from the south end of Gladmar Park Road.
EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use in the reach is rural (100%). 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 agriculture (78%) and other (22%) [right-of-way].	**CULTURAL AND ARCHAEOLOGICAL RESOURCES** There are no recorded sites within the reach.

1

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY **Medium:** The waterbody is a manmade artifact of gravel mining, but has mapped priority fish use and a surface water connection to the Yakima River.	**TERRESTRIAL HABITAT QUALITY** **Medium:** The reach contains some forested areas and is directly adjacent to the Yakima River, but contains some altered areas.
VEGETATION FUNCTIONS **Medium:** Much of the shoreline is disturbed from park development, adjacent development, and agriculture, but riparian forest areas are present, primarily near the Yakima River.	**HYDROLOGIC FUNCTIONS** **Low:** The waterbody is a manmade artifact of gravel mining.

2

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

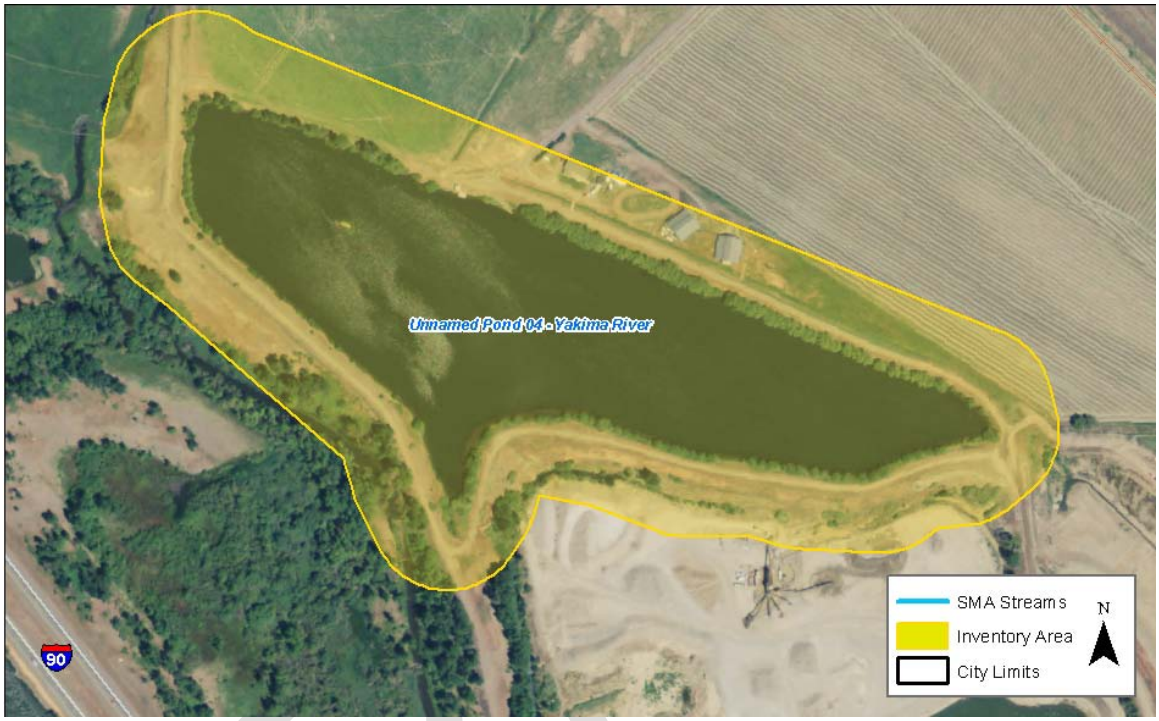
- CWU and the Cascade Land Conservancy are now managing Gladmar, for use as an outdoor research facility for university students.

3

UNNAMED POND 4

SHORELINE LENGTH:
1.1 Miles

REACH INVENTORY AREA:
49.1 Acres



1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The shoreline of the lake, which is oriented northwest to southeast, contains limited development and is separated by from the Yakima River by I-90. The lake does not drain to the Yakima River and was created by gravel mining.

LAND COVER (MAP FOLIO #3)

This reach contains significant amount of agricultural lands (46%) and open water (30%). A number of other land cover types are also present, including: shrubland (9%), grassland (8%), developed lands (5%), and conifer-dominated forest (2%).

HAZARD AREAS (MAP FOLIO #2)

A limited area of the reach (27%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach.

HABITATS AND SPECIES (MAP FOLIO #1)

No priority fish use is identified by WDFW.

Wetland habitat is mapped along the southern shoreline of the waterbody (11% of the reach). No priority habitats or species are identified in this reach by WDFW.

WATER QUALITY

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

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1)

The reach is bordered by roads for the majority of its circumference.

PUBLIC ACCESS (MAP FOLIO #4)

There is no public access to the waterbody.

EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use in the reach is rural (100%). 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 industrial uses (80%), with some agriculture zoning (20%) in the west.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no recorded sites within the reach.

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY

Low: No priority fish use is mapped; the pond does not have a surface water connection to the Yakima River.

TERRESTRIAL HABITAT QUALITY

Low: The shoreline is highly altered, and riparian vegetation is generally absent.

VEGETATION FUNCTIONS

Low: The shoreline is largely devoid of riparian vegetation.

HYDROLOGIC FUNCTIONS

Low: The pond is a manmade artifact of gravel mining.

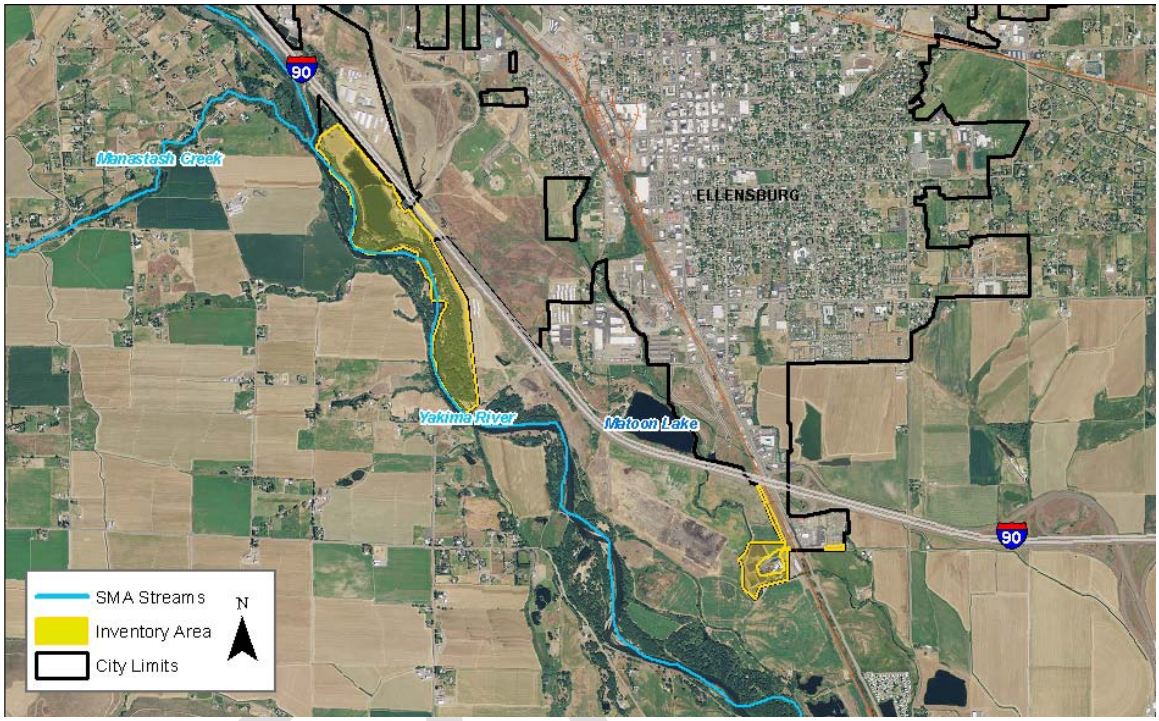
KEY MANAGEMENT ISSUES AND OPPORTUNITIES

None identified

YAKIMA RIVER-CITY OF ELLENSBURG-REACH 3A

SHORELINE LENGTH:
0.5 Miles

REACH INVENTORY AREA:
139.3 Acres



1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach is located in a low topographic relief valley and a large gravel pit pond is located on the left bank of the river. The water treatment site is approximately 0.5 mile from the Yakima River.

HAZARD AREAS (MAP FOLIO #2)

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

WATER QUALITY

The reach is on the State's Water Quality Assessment list of 303 (d) Category 5 waters for pH, temperature, and fecal coliform; a TMDL is in place for the latter.

LAND COVER (MAP FOLIO #3)

This reach contains significant conifer-dominated forest (32%), agricultural lands (27%), developed lands (25%), and open water (10%). The two other land cover types present include: grassland (3%) and shrubland (2%).

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW mapping shows this reach provides spawning and juvenile rearing habitat for spring Chinook and summer steelhead. The presence of brown trout, coho salmon, Dolly Varden/bull trout, mountain whitefish, rainbow trout, and westslope cutthroat is also mapped.

Wetland habitat is mapped along the river and at several locations adjacent to the river, ponds, and water treatment plant (27% of the reach). No priority habitat or species are mapped in this reach.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1) The northeastern end of the reach is constrained by I-90.	**PUBLIC ACCESS (MAP FOLIO #4)** The reach can be accessed from Irene Rinehart Riverfront Park off of Duke Road.
EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use along the reach is primarily parks & open space (85%), with some areas of commercial (1%) and other (13%) [I-90] uses. Land ownership is 11% private and 89% public (City and Bureau of Reclamation).	**CONTAMINATED SITES** No identified contaminated sites are located within this reach.
ZONING (MAP #5) Lands within the reach are zoned for parks & open space (89%), commercial (2%), and other (9%) [I-90].	**CULTURAL AND ARCHAEOLOGICAL RESOURCES** There are no recorded sites within the reach.

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY **Medium:** The reach provides spawning and juvenile rearing habitat for priority fish species (including spring Chinook salmon), but has some significant water quality impairments and hydromodification areas.	**TERRESTRIAL HABITAT QUALITY** **Medium:** Areas directly adjacent to the river are generally well-vegetated, but surrounding areas are disturbed.
VEGETATION FUNCTIONS **Medium:** Much of the area bordering the river contains dense forest and shrub habitat, but some areas have been disturbed by park development and a manmade gravel pond.	**HYDROLOGIC FUNCTIONS** **Medium:** Portions of the river's floodplain are constrained by hydromodifications within the reach, but the river still has a connection to its floodplain in some areas.

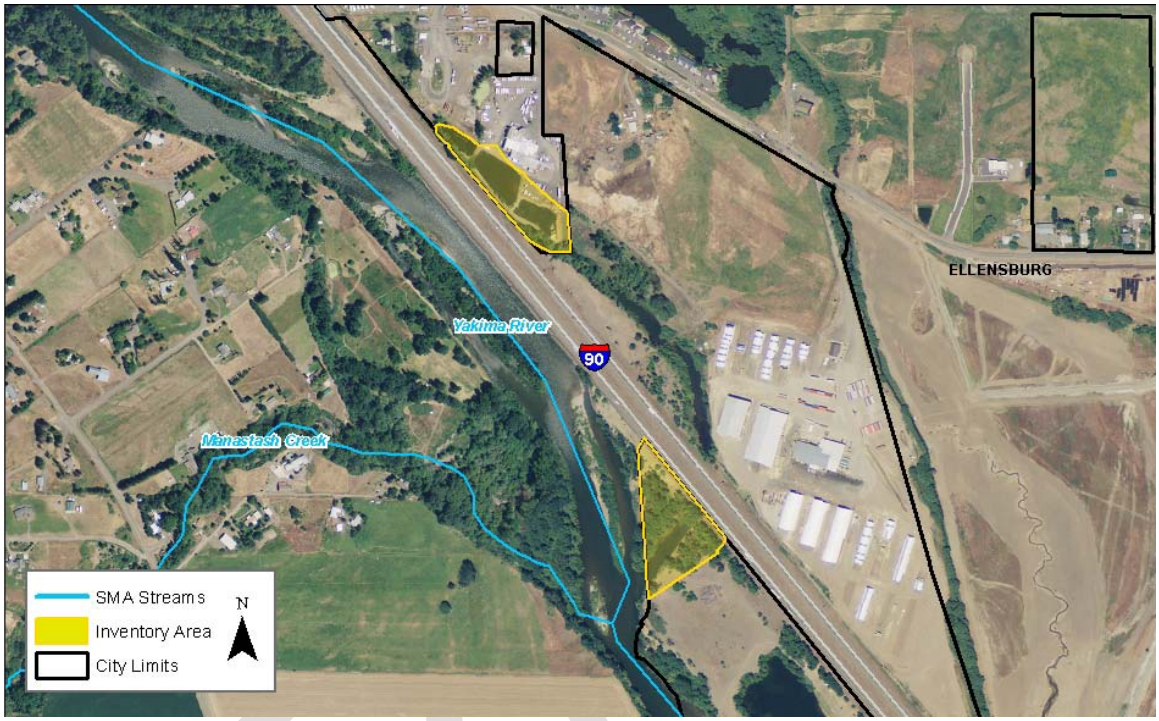
KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Protect the high-value, forested floodplain areas within the reach.
- There is significant development (including Irene Rinehart Riverfront Park) that lies within flood-prone areas.
- Most of the reach is contained within Irene Rinehart Riverfront Park. The park is the largest contiguous tract of native habitat in the City of Ellensburg.

YAKIMA RIVER-CITY OF ELLENSBURG-REACH 4A

SHORELINE LENGTH:
NA

REACH INVENTORY AREA:
9.1 Acres



1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION
The northern reach segment is a manmade artifact of gravel mining, while the southern segment is a portion of Yakima River floodplain.

LAND COVER (MAP FOLIO #3)
This reach primarily contains developed lands (72%), and conifer-dominated forest (25%). Grassland (2%) and agricultural lands (1%) are also mapped.

HAZARD AREAS (MAP FOLIO #2)
A significant area of the reach (86%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach. The southern portion of the reach has potential for channel migration.

HABITATS AND SPECIES (MAP FOLIO #1)
WDFW does not map any fish species in this reach.

Wetland habitat is mapped along the ponds and outlet channel (27% of the reach). No priority habitat or species are mapped in this reach.

WATER QUALITY
The reach is listed on the State's Water Quality Assessment list of 303 (d) Category 5 waters for dissolved oxygen, fecal coliform, pH, and temperature.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1) The northern portion of the reach is constrained by I-90 to the west, and the southern portion by I-90 to the east.	**PUBLIC ACCESS (MAP FOLIO #4)** Duke Road provides public access to the downstream portion of the reach.
EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use along the reach is commercial (52%) and parks & open space (48%). Land ownership is 54% private and 46% public (City).	**CONTAMINATED SITES** No identified contaminated sites are located within this reach.
ZONING (MAP #5) Lands within the reach are zoned for parks & open space (47%), commercial (10%), and other (43%) [I-90].	**CULTURAL AND ARCHAEOLOGICAL RESOURCES** There are no recorded sites within the reach.

1

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY **Low:** There no mapped fish use within the reach.	**TERRESTRIAL HABITAT QUALITY** **Low:** The reach is adjacent to I-90 and industrial development.
VEGETATION FUNCTIONS **Medium:** The northern reach segment is largely devoid of vegetation, while the southern segment consists primarily of riparian forest.	**HYDROLOGIC FUNCTIONS** **Low:** The northern reach segment is surrounding by I-90 and industrial development, and the southern segment is constrained by I-90 to the east.

2

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Protect the remaining high value, forested floodplain area within the reach, located in the southern reach segment.

3

4.2 Taneum Creek

Taneum Creek is a right-bank tributary to the Yakima River, flowing west to east and draining to the Yakima River at RM 166.1. The mainstem of Taneum Creek splits at RM 12.7 into the North and South Forks which are 12 and 9 miles long, respectively. For purposes of this inventory, there are 3 reaches: one for the mainstem and one for each of North and South forks.

4.2.1 Physical Characterization

Much of the Taneum Creek watershed is undeveloped, with the North and South Forks flowing through heavily forested areas, and the lower reach (below RM 1.5) of the mainstem traversing agricultural croplands. This lower reach also contains very limited residential development adjacent to the stream. The lower portions of the system have limited topographic relief (alluvial terraces), while higher in the drainage, steep-sided canyons and high ridges dominate the landscape.

Six road crossings, including I-90, are mapped over Taneum Creek. In addition, Taneum Ditch and Bruton Ditch divert water from the stream for irrigation. The John Wayne Heritage Trail crosses the stream near its confluence with the Yakima River. Numerous landslide hazards are mapped on both banks of the North and South Forks (WDNR 2010). Steep slopes are mapped along most of the stream, particularly upstream of RM 1.5 (Kittitas County 2012). The FEMA 100-year floodplain is mapped in more than half of the downstream portion of the mainstem, but does not extend throughout the entire reach area (FEMA 1996). Taneum Creek has a large and unpredictable floodplain and flood capacity suggesting development should be limited adjacent to the stream (Tetra Tech 2012). The entire mainstem reach is mapped as having potential for channel migration (Ecology 2011).

The lower 3.3 miles of the mainstem experiences very low summer and fall flows due to major diversions; the natural flow of the stream is fully appropriated for irrigation. A partial irrigation diversion is mapped upstream of the I-90 overpass and two other irrigation diversions, of unknown extent, are mapped upstream and downstream of this barrier (WDFW 2010).

The channel length, wetted width, and depth of Taneum Creek have only slightly decreased over the last half of the twentieth century, indicating limited channel aggradation. However, the stream has been channelized within the large floodplain reach from Heart-K Ranch downstream to Springwood Ranch (Haring 2001).

4.2.2 Habitats and Species

4.2.2.1 Fish Use

Taneum Creek provides rearing and spawning habitat for summer steelhead (federally listed threatened species). It also supports spawning of spring Chinook salmon. Other species present in Taneum Creek and its forks include eastern brook trout, rainbow trout and westslope cutthroat trout (StreamNet 2010).

Haring (2001) identified several constraints to salmonid production in Taneum Creek, including low summer and fall flows in the lower reaches (a result of irrigation diversions), barriers to fish passage, and a wastewater return downstream of the Bruton diversion that may present a false attraction flow. Screens and fish ladders were installed on irrigation diversions in the 1990s. In 1994, state, federal, and local agencies and the Yakama Nation agreed to transfer flows from the Yakima River through the KRD Canal to enhance instream flow in the lower reaches of Taneum Creek. These changes improved fish passage, but adult spring Chinook and coho passage remains impaired (Haring 2001).

Fish habitat downstream of I-90 is impaired by low channel complexity and a lack of large wood. Habitat quality improves in the upstream, forested portions of the stream system. Past logging and road construction have impacted habitat in the upper reaches (Haring 2001).

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

The Integrated Water Resource Management Plan for the Yakima River basin proposes targeted acquisition of lands at the headwaters of Taneum Creek to protect ecologically important areas. These areas are important in protecting water quality, cool stream temperatures, water supply, and current or potential spawning grounds (Reclamation and Ecology 2011a).

4.2.2.2 Water Quality

Several segments of the Taneum Creek stream system are on Ecology's 303(d) list for high water temperatures. Extensive logging roads in the upper watershed deliver fine sediment to stream reaches in the upper watershed. Taneum Creek is

included in the 2002 TMDL for turbidity and suspended sediment in the upper Yakima River (Joy 2002).

4.2.2.3 Riparian Habitat Conditions (Land Cover)

The upper part of Taneum Creek and the North and South Forks flow through commercial forestland in various stages of succession. Roads and recreational campsites have impacted riparian vegetation in some areas (Haring 2001). Lower Taneum Creek is located within agricultural lands and shrub-steppe habitats where woody riparian cover is narrow and intermittent.

4.2.2.4 Wetlands

Freshwater forested and scrub-shrub wetlands are mapped along approximately one-quarter of the Taneum Creek mainstem. Very little wetland area is mapped along the North and South Forks.

4.2.2.5 Wildlife Habitats and Species

Northern spotted owls (federally listed threatened species) have been documented near upper Taneum Creek and the North and South Forks. This area is mapped as spotted owl critical habitat.

The upper Taneum Creek valley is mapped as a migration corridor for elk and deer, and as a wintering and calving area for these species. The area around lower Taneum Creek is a mapped mule deer and elk winter range.

4.2.3 Land Use

The lower approximately 5 miles of Taneum Creek is bordered by agriculture and range lands, along with some moderate-density residential subdivisions. Upstream, the creek flows through the Washington Department of Fish and Wildlife (WDFW) L.T. Murray Wildlife Area, which extends to the National Forest boundary. The upstream end of mainstem Taneum Creek and its South Fork flow through National Forest lands. The North Fork flows through a “checkerboard” of National Forest lands and private timber lands.

4.2.4 Public Access

Near its confluence with the Yakima River, Taneum Creek is crossed by the John Wayne Heritage Trail. On the National Forest and WDFW land, Taneum Creek and its forks can be accessed from Taneum Road and a network of snowmobile and hiking/horse trails.

4.2.5 Reach Sheets

TANEUM CREEK

SHORELINE LENGTH:
13.6 Miles

REACH INVENTORY AREA:
689.1 Acres

1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach is locally sinuous and flows from moderate (foothills) to low (valley) topographic relief west to east. No development is located in the upstream portion of the river, with limited development adjacent to the river in the valley. The channel is confined in several areas by the John Wayne HeritageTrail, I-90, and several other roads.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is dominated by conifer-dominated forest (50%), riparian vegetation (26%), and agricultural lands (20%). Developed lands (2%), shrubland (1%), and other (1%) are also present in this reach.

HAZARD AREAS (MAP FOLIO #2)

Less than half of the reach area (42%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach. The entire reach has potential for channel migration.

WATER QUALITY

The reach is listed on the State's Water Quality Assessment list of 303 (d) Category 5 waters for dissolved oxygen, fecal coliform, pH, and temperature.

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW maps show this reach provides spawning and rearing habitat for summer steelhead and spring Chinook. The presence of coho salmon, Dolly Varden/bull trout, mountain whitefish, rainbow trout, and westslope cutthroat is also mapped.

Wetland habitat is mapped along both banks of the river at multiple locations (20% of the reach). Priority elk winter range and mule deer winter range habitat is mapped of the reach.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1)

I-90 crosses the downstream end of the reach, and several other road crossings are mapped within the reach. A Forest Service road borders much of the creek.

PUBLIC ACCESS (MAP FOLIO #4)

The stream is crossed by the John Wayne Heritage Trail near its confluence with the Yakima River. Snowmobile trails, in addition to the North Fork Taneum Trail and Icewater Loops Trail, provide access to the upstream portion of the stream.

EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use along the reach is rural (34%) and agriculture (3%) at the downstream end, and forestry (63%) along the upstream portion. Land ownership is 36% private and 64% public (Forest Service and WDFW).

CONTAMINATED SITES

No identified contaminated sites are located within this reach.

ZONING (MAP #5)

Lands within the reach are zoned for forest & range (26%), agriculture (10%), and other (1%) [right-of-way] at the downstream end, and commercial forestry (63%) upstream.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are 4 recorded precontact and historic properties located within the reach. Historic properties include depression era (circa 1930s) camps and complexes associated with the CCC.

1

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 instream flows are a limiting factor for fish use.

TERRESTRIAL HABITAT QUALITY

Medium: The upper portion of the reach is well vegetated and is connected to large areas of relatively undisturbed habitat, but habitat along the lower reach has been disturbed.

VEGETATION FUNCTIONS

Medium: Vegetation along the lower creek has been altered by development and agriculture, but the upper creek is bordered by dense forest cover.

HYDROLOGIC FUNCTIONS

Medium: The hydrology of the upper creek is generally intact, but the lower portion experiences low flows because of water diversions. Much of the floodplain in the lower creek has been impacted by agriculture and development.

2

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

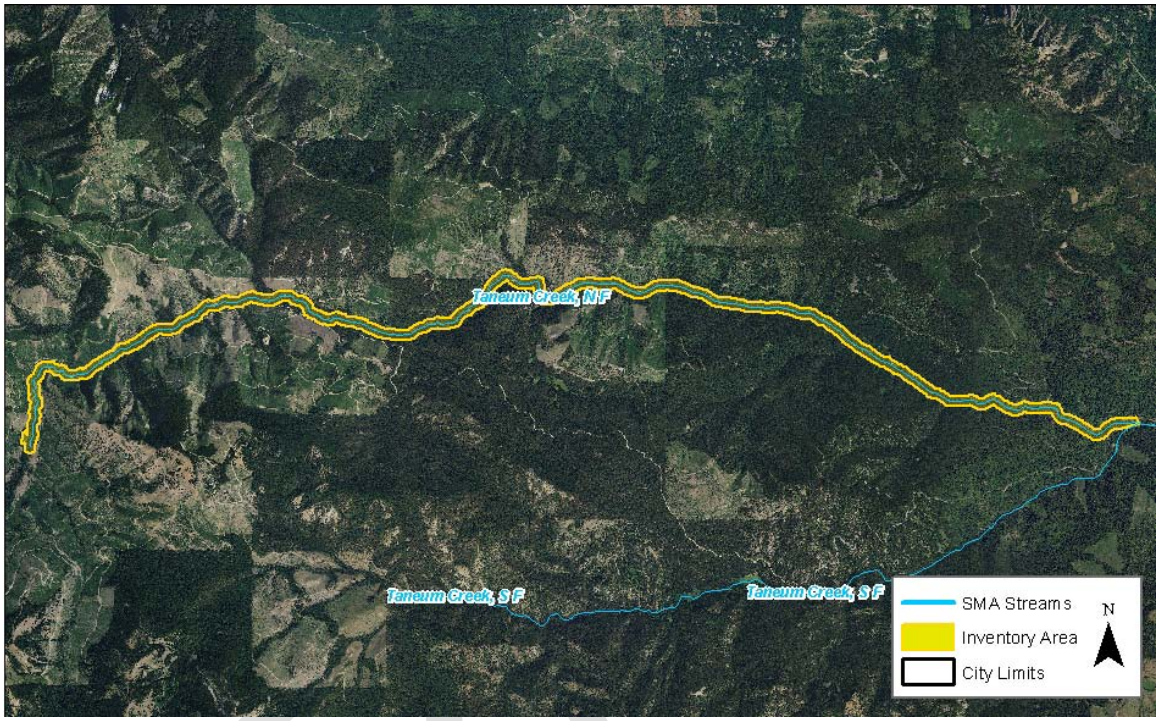
- New development should be set back an adequate distance from the shoreline to protect stream functions, and protect structures from flooding and channel migration.
- Low instream flows are a limiting factor for salmonids in the lower creek.
- Restoration opportunities include placing large woody debris in high priority areas in the Yakima Basin. Wood will be harvested from adjacent forests, decreasing fire potential and making riparian trees less susceptible to insect damage. Large wood replenishment on the river occurred in 2009 and environmental analysis is underway to treat additional acres (YBFWRB, 2011).
- Protect forested areas in the upper reaches.
- Educate shoreline property owners about measures to protect and restore riparian areas.

3

NORTH FORK TANEUM CREEK

SHORELINE LENGTH:
9.8 Miles

REACH INVENTORY AREA:
474.0 Acres



1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach flows west to east through a ravine with moderate topographic relief. A Forest Service road parallels the river near the confluence of the forks, but the remainder of the reach is undeveloped.

LAND COVER (MAP FOLIO #3)

The majority of the reach is covered by conifer-dominated forest (75%), harvested forest (13%), and riparian vegetation (11%).

HAZARD AREAS (MAP FOLIO #2)

The reach is not located within the FEMA 100-year floodplain. Limited amount of landslide hazard areas (4%) are mapped within the reach.

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW maps the presence of eastern brook trout, rainbow trout, summer steelhead, and westslope cutthroat in this reach.

Very limited wetland habitat is mapped along the river (2% of the reach). Priority rocky mountain elk migration corridor is mapped in the central portion of the reach.

WATER QUALITY

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

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1) A Forest Service roads parallels the downstream end of the reach.	**PUBLIC ACCESS (MAP FOLIO #4)** The North Fork Taneum Trail parallels much of the reach. Snowmobile and dog sled trails provide access at multiple locations, primarily at the upstream and downstream segments of the reach.
EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use in the reach is forestry (100%). Land ownership is 50% private and 50% public (Forest Service).	**CONTAMINATED SITES** No identified contaminated sites are located within this reach.
ZONING (MAP #5) Lands within the reach are zoned for commercial forestry (100%).	**CULTURAL AND ARCHAEOLOGICAL RESOURCES** A historic mine site and associated railroad that date from the late 1800s to early 1900s are recorded within the reach. Also, there is 1 recorded precontact site within the reach.

1

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY **Medium:** The reach provides habitat for priority fish species, but no spawning or rearing habitat is identified.	**TERRESTRIAL HABITAT QUALITY** **High:** Riparian areas are generally intact and connected to large areas of relatively undisturbed habitat.
VEGETATION FUNCTIONS **High:** The reach is dominated by dense forest cover, with limited areas of significant alteration.	**HYDROLOGIC FUNCTIONS** **Medium:** There are limited hydromodifications within the reach, but past timber harvest and road construction have somewhat altered the hydrology of the creek.

2

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Private resource 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 remaining forested areas in the upper reaches.

3

SOUTH FORK TANEUM CREEK

SHORELINE LENGTH:
6.0 Miles

REACH INVENTORY AREA:
289.5 Acres

1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach generally flows west to east through a ravine with moderate to low topographic relief. A forest service road parallels the river near the confluence of the forks and upstream for several miles. A parking lot and associated car camping is also located near the confluence of the forks.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is primarily conifer-dominated forest (90%), with patches of riparian vegetation (9%) and other (1%).

HAZARD AREAS (MAP FOLIO #2)

The reach is not located within the FEMA 100-year floodplain. Limited amount of landslide hazard areas (4%) are mapped within the reach.

WATER QUALITY

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

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW maps the presence of eastern brook trout, rainbow trout, summer steelhead, and westslope cutthroat in this reach.

Limited wetland habitat is mapped along the river, primarily in the central portion of the reach (8% of the reach). No priority habitats or species are identified in this reach by WDFW.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1)

A Forest Service road parallels the downstream end of the reach.

PUBLIC ACCESS (MAP FOLIO #4)

Taneum Ridge, Hoyt, Frost Creek, South Fork Taneum, and Frost Mountain trails provide reach access, in addition to a snowmobile trail near the confluence with the North Fork.

EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use in the reach is forestry (100%). Land ownership is 6% private and 94% public (Forest Service).

CONTAMINATED SITES

No identified contaminated sites are located within this reach.

ZONING (MAP #5)

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

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are 2 recorded historic properties that include a mining complex, the remains of a mill operation, and a historic trail. There is 1 recorded precontact site located within the reach.

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY

Medium: The reach provides habitat for priority fish species, but no spawning or rearing habitat is identified.

TERRESTRIAL HABITAT QUALITY

High: Riparian areas are generally intact and connected to large areas of relatively undisturbed habitat.

VEGETATION FUNCTIONS

High: The reach is dominated by dense forest cover, with limited areas of significant alteration.

HYDROLOGIC FUNCTIONS

Medium: There are limited hydromodifications within the reach, but past timber harvest and road construction have somewhat altered the hydrology of the creek.

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Private resource 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 remaining forested areas.

4.3 Manastash Creek

Manastash Creek flows from west to east and is a right-bank tributary to the Yakima River, entering at RM 154.5. At RM 8.5, Manastash Creek branches into the 12-mile North Fork and 20-mile South Fork (Haring 2001). There are two inventory reaches; one for the mainstem and one for the South Fork.

4.3.1 Physical Characterization

In the lower portion of Manastash Creek are six active irrigation diversions. Natural runoff in Manastash Creek is fully appropriated for irrigation. In most years, between mid-July and October, there is no surface flow between RM 4.2 and approximately RM 1.5. Lack of flow is attributed to irrigation withdrawals and the porous substrate of the channel bed. Surface flows return at about RM 1.4, due primarily to groundwater return seepage (Haring 2001). In addition to irrigation dams, there are several road crossings and five mapped bridge crossings.

Steeps slopes are nearly ubiquitous on both sides of Manastash Creek from RM 5 to the upstream extent of the stream's regulated shoreline, as the stream transitions from relatively flat agricultural land into forested canyons (Kittitas County, 2012). The FEMA 100-year floodplain is mapped the length of the mainstem, but does not occupy the full extent of the inventory area. Similarly, the floodplain is mapped in the lower one-third of the South Fork reach (FEMA 1996). Manastash Creek has a large and unpredictable floodplain and flood capacity suggesting development should be limited adjacent to the stream (Tetra Tech 2012). The entire mainstem is mapped as having potential for channel migration; the majority of the South Fork is mapped similarly (Ecology 2011).

The lower 5 miles of mainstem flows through land that has experienced significant suburban growth, with many short plats established since the mid-1990s (Haring 2001). Residential development is currently located on both banks of the stream, with agricultural fields dominating the landscape.

4.3.2 Habitats and Species

4.3.2.1 Fish Use

Manastash Creek provides spawning habitat for summer steelhead (federally listed threatened species) and spring Chinook salmon. Other species present in the Manastash Creek system include rainbow trout, eastern brook trout, and westslope cutthroat trout. Manastash Lake supports westslope cutthroat and eastern brook trout (StreamNet 2010).

The main factors limiting salmonid production in Manastash Creek are barriers to upstream fish passage, unscreened water diversions that entrain juvenile salmonids, and naturally low streamflows exacerbated by irrigation withdrawals. Miles of suitable spawning and rearing habitat are available upstream of the diversions. Efforts are underway to screen irrigation diversions in the watershed (Haring 2001; BPA 2002).

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

The Integrated Plan for the Yakima River basin also proposes targeted acquisition of lands at the headwaters of Manastash Creek to protect ecologically important areas. These areas are important in protecting water quality, cool stream temperatures, water supply, and current or potential spawning grounds (Reclamation and Ecology 2011a).

4.3.2.2 Water Quality

Parts of Manastash Creek and the South Fork are on Ecology's 303(d) list for high water temperatures and low dissolved oxygen. Manastash Creek is included in the 2002 TMDL for turbidity and suspended sediment in the upper Yakima River (Joy 2002).

4.3.2.3 Riparian Habitat Conditions (Land Cover)

Riparian vegetation along Manastash Creek is largely intact, with the exception of the downstream end of the reach which is impacted by development and agriculture. Riparian areas along the South Fork are a mixture of coniferous forest, shrub, and rocky bare areas within a steep-sided canyon.

4.3.2.4 Wetlands

A very small portion of the Manastash Creek shoreline inventory area is mapped as scattered wetlands. Most of this is scrub-shrub wetland mapped near the confluence with the Yakima River.

4.3.2.5 Wildlife Habitats and Species

Northern spotted owls (federally listed threatened species) have been documented near the upper part of the South Fork and Manastash Lake. The Manastash Creek corridor is mapped as mule deer winter range. Bighorn sheep summer range is mapped along the South Fork.

Approximately 20 percent of the Manastash Creek shoreline inventory area is mapped as shrub-steppe habitat (USGS 1993).

4.3.3 Land Use

Land use along the lower approximately 5 miles of Manastash Creek is primarily agriculture and low- to moderate-density residential development. Upstream, from the east end of Manastash Canyon to the point where the creek forks, the channel is bordered by agriculture lands and low- to moderate-density residential development.

The downstream approximately 5 miles of the South Fork of Manastash Creek is bordered by low- to moderate-density residential development and undeveloped land zoned as forest and range. The upstream two-thirds of the South Fork flows through National Forest land and private land zoned for commercial forestry.

4.3.4 Public Access

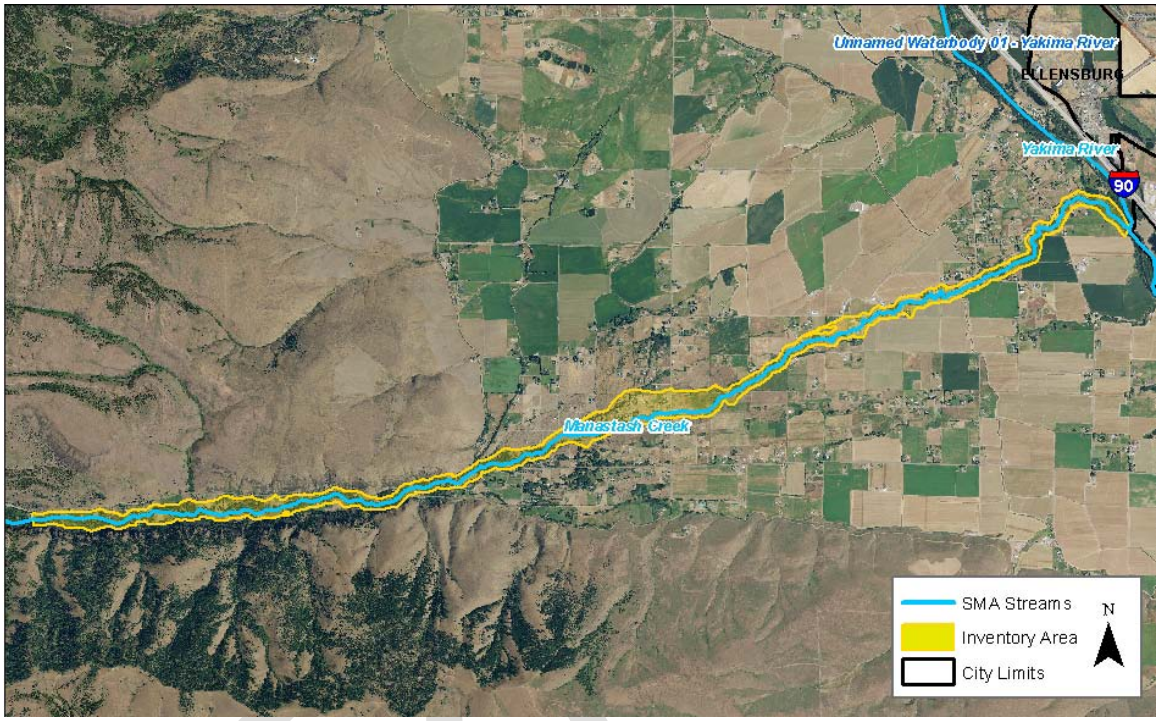
The mainstem of Manastash Creek and the lower portion of its South Fork flow through private land with no public access opportunities. However, the stream can be viewed in several locations from Manastash Road, which borders the stream. The upper portion of the South Fork of Manastash Creek can be accessed from a network of snowmobile and hiking/horse trails.

4.3.5 Reach Sheets

MANASTASH CREEK

SHORELINE LENGTH:
8.7 Miles

REACH INVENTORY AREA:
549.1 Acres



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PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The upstream portion of the reach flows through a relatively narrow valley that gives way to flat agricultural land. The reach generally flows west to east, with several roads crossing and paralleling the river. Residential development is adjacent to the river at many locations.

LAND COVER (MAP FOLIO #3)

This reach contains significant agricultural lands (61%), conifer-dominated forest (16%), and riparian vegetation (12%). A number of other land cover types are also present, including: developed lands (5%), shrubland (3%), and grassland (2%).

HAZARD AREAS (MAP FOLIO #2)

The majority of the reach area (70%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach. The entire reach has potential for channel migration.

WATER QUALITY

The reach is listed on the State's Water Quality Assessment list of 303 (d) Category 5 waters for dissolved oxygen, fecal coliform, pH, and temperature.

HABITATS AND SPECIES (MAP FOLIO #1)

The presence eastern brook trout and westslope cutthroat trout is mapped.

Very limited wetland habitat is mapped along, primarily near the confluence with the Yakima River (3% of the reach). Priority elk historic winter range and mule deer winter range are mapped along the majority of the reach. Priority cliffs/bluffs are also mapped within the reach.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1) Manastash Road parallels much of the reach, separating the creek from its natural floodplain. Several road crossings are also mapped, as well as several irrigation dams which are partial barriers for fish passage.	**PUBLIC ACCESS (MAP FOLIO #4)** There are no public access opportunities in the reach.
EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use in the reach is rural (100%). 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 primarily for agriculture (81%), with areas of forest & range (16%), and other (3%) [right-of-way] zoning.	**CULTURAL AND ARCHAEOLOGICAL RESOURCES** There are 3 recorded historic and precontact sites located within the reach. The 2 recorded historic properties include agricultural irrigation diversions and irrigation systems.

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 instream flows and partial migration barriers are a limiting factor for fish use.	**TERRESTRIAL HABITAT QUALITY** **Medium:** The reach has undergone significant vegetation removal and adjacent development, but habitat conditions improve somewhat upstream, where there is a connection to adjacent, high-quality habitat areas at the upstream end.
VEGETATION FUNCTIONS **Medium:** Vegetation along the creek has been significantly altered by roads, agriculture, and development, but a strip of riparian forest habitat and shrub remains in most areas.	**HYDROLOGIC FUNCTIONS** **Low:** Adjacent roads and development separate the creek from much of its natural floodplain, and the flow is significantly reduced by irrigation diversions throughout much of the year.

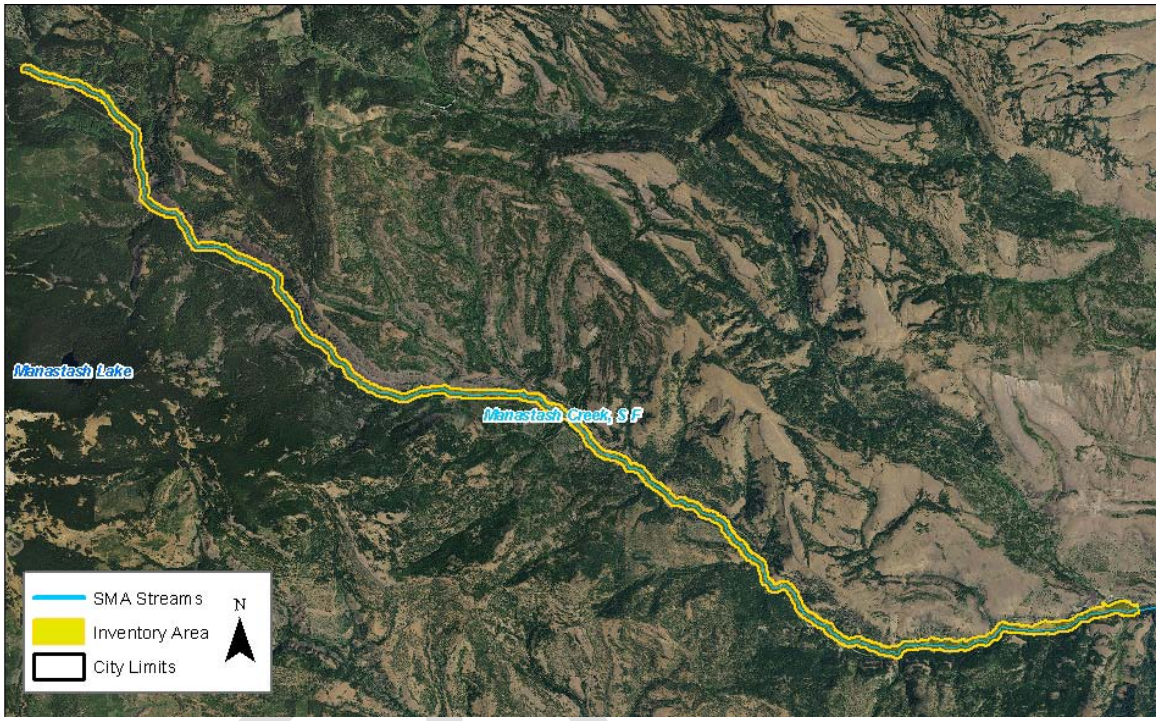
KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Agricultural and resource lands within the reach have the potential to be converted to more intensive uses (e.g., from agriculture to residential subdivisions). New development should be set back an adequate distance to protect stream functions and protect structures from flooding and channel migration.
- Low flows are a limiting factor for salmonids in the lower creek, as well as fish passage barriers (irrigation dams) and unscreened irrigation diversions.
- There is no public access to Manastash Creek.
- Limit development within the floodplain and implement bioengineered measures, where practical, to avoid and minimize flood damage to existing structures.
- Restoration opportunities include a proposed project will remove fish passage barriers in the lower 6 miles of the stream as part of the Manastash Creek Restoration Project; screening irrigation diversions is also a primary component of the project. Removal of barriers is considered essential to the recovery of the Mid Columbia summer steelhead (YBFWRB, 2011).

SOUTH FORK MANASTASH CREEK

SHORELINE LENGTH:
13.4 Miles

REACH INVENTORY AREA:
667.8 Acres



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PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach flows northwest to southeast through a narrow ravine and is paralleled by a county/forest service road for most of its extent. Limited residential development is associated with the downstream portion of the reach.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is mostly conifer-dominated forest (73%) and riparian vegetation (21%), with some developed lands (2%), shrublands (2%), agricultural lands (1%), unvegetated (1%), other (1%), and harvested forest (1%).

HAZARD AREAS (MAP FOLIO #2)

A limited reach area (22%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach. The majority of the reach has potential for channel migration.

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW maps the presence of eastern brook trout, rainbow trout, and westslope cutthroat in this reach.

Small patches of wetland habitat is mapped along the river (3% of the reach). Priority mule deer winter range, bighorn sheep summer range, elk winter range, and cliffs/bluffs are mapped along the reach.

WATER QUALITY

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

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1) Manastash Road parallels the downstream end of the reach, separating the creek from its natural floodplain	**PUBLIC ACCESS (MAP FOLIO #4)** The upstream half of the stream can be accessed by snowmobile trails, and the Bucky, Buck Meadows, and Keenan Meadow trails.
EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use along the reach is rural (28%) and agriculture (4%) at the downstream end, with forestry (67%) upstream. Land ownership is 66% private and 34% public (Forest Service and WDFW).	**CONTAMINATED SITES** No identified contaminated sites are located within this reach.
ZONING (MAP #5) Lands within the reach are zoned primarily for commercial forestry (67%), with areas of forest & range (27%), agriculture (5%), and other (1%) [right-of-way] at the downstream end.	**CULTURAL AND ARCHAEOLOGICAL RESOURCES** There are 6 recorded precontact sites and 1 recorded historic site located within the reach. A stock bridge built over the Manastash was constructed in the late 1800s or early 1900s and appears to meet the requirements for listing on the National Register.

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY **Medium:** The reach provides habitat for priority fish species, but no spawning or rearing habitat is identified.	**TERRESTRIAL HABITAT QUALITY** **Medium:** A road parallels the creek and portions of the downstream end have been altered by development, but much of the riparian corridor is forested and connections to high-quality habitat areas exist.
VEGETATION FUNCTIONS **High:** Some areas of alteration are present, but much of the riparian corridor (consisting of forest and shrub habitat) is largely intact.	**HYDROLOGIC FUNCTIONS** **Medium:** Adjacent roads and development separate the creek from much of its natural floodplain at the downstream end, but there are minimal hydromodifications at the upstream end.

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Limit development within the floodplain and implement bioengineered measures, where practical, to avoid and minimize flood damage to existing structures.
- Resource lands within the reach have the potential to be converted to more intensive uses (e.g., from forest/range lands to residential subdivisions). New development should be set back an adequate distance to protect stream functions and protect structures from flooding and channel migration.

4.4 Matoon Lake

Matoon Lake is located adjacent to the southwest boundary of the City of Ellensburg and north of I-90. The northeastern shoreline of lake is located within city limits; the shoreline area within the city is described below.

4.4.1 Physical Characterization

Matoon Lake is approximately 0.3 mile long and 0.15 mile wide, occupying roughly 26 acres, and oriented northwest-southeast. The lake is a former gravel pit that is relatively shallow, with a mean depth of 3 meters and a maximum depth of 4 meters (Kittitas County Noxious Weed Board 2007). I-90 travels along the lake's southern boundary, and Wilson Creek flows near the northern and eastern boundaries. The lake's shoreline is undeveloped, with one floating dock located in the northwest portion.

The FEMA 100-year floodplain, of the Yakima River and Wilson Creek, is mapped within a small portion of the waterbody's inventory area (FEMA 1996).

4.4.1.1 City of Ellensburg

The eastern regulated extent of Matoon Lake is located in the Ellensburg city limits. The eastern shoreline of the lake contains sparse vegetation and a gravel road. The land adjacent to the shoreline is undeveloped and contains a short stretch of Wilson Creek and an irrigation ditch; both have overwater structures located near their divergence.

The FEMA 100-year floodplain, of Wilson Creek, is mapped within a large portion of the waterbody's inventory area (FEMA 1996).

4.4.2 Habitats and Species

4.4.2.1 Fish Use

WDFW annually stocks Matoon Lake with rainbow and brown trout. Other warmwater fish in the lake include largemouth bass, pumpkinseed sunfish, and northern pikeminnow (KCNWCB 2007). Fish habitat in the lake has been degraded by non-native invasive vegetation (see below under Water Quality).

City of Ellensburg

See section 4.4.2.1

4.4.2.2 Water Quality

Mattoon Lake is considered a Category 4c waterbody on Ecology's 2008 303(d) list because of the presence of exotic invasive species (invasive plants as discussed above). Category 4c waterbodies are impaired by causes that cannot be remedied by a TMDL and must be addressed through more complex solutions.

Non-native, invasive aquatic vegetation has degraded the quality of habitats within the lake. Four noxious aquatic weeds known to be present in Mattoon Lake: Eurasian watermilfoil, purple loosestrife, yellow-flag iris, and curly-leaf pondweed (KCNWCB 2007).

Eurasian watermilfoil is of particular concern to aquatic habitat. In just a few growing seasons, this invasive species can crowd out native aquatic vegetation, change predator-prey relationships among fish and other aquatic animals, reduce dissolved oxygen, and release excess nutrients when it decomposes (potentially increasing algal growth). Dense mats of Eurasian watermilfoil can increase water temperature by absorbing sunlight and raise the pH. An Integrated Aquatic Vegetation Management Plan (IAVMP) has been created to address this species along with other invasive plants in the lake such as purple loosestrife and curly-leaf pondweed (KCNWCB 2007).

City of Ellensburg

See Section 4.4.2.2.

4.4.2.3 Riparian Habitat Conditions (Land Cover)

The riparian zone of Matoon Lake has very little woody riparian cover. An unpaved road runs around most of the lakeshore, and I-90 is located on the south side.

City of Ellensburg

Wilson Creek runs along the eastern side of the lake within city limits. Woody riparian vegetation is sparse along both the lake and the stream. An unpaved access road runs close to the lake shoreline.

4.4.2.4 Wetlands

A small scrub-shrub wetland is located within the Matoon Lake shoreline inventory area. This wetland is located between unpaved access roads near the southwest corner of the lake.

City of Ellensburg

No wetlands are mapped along the lakeshore within city limits. Limited unmapped wetlands may be associated with Wilson Creek, east of the lake.

4.4.2.5 Wildlife Habitats and Species

No priority habitats or species are mapped near Matoon Lake. The lake is located in a developed area that is unlikely to provide high-quality wildlife habitat.

4.4.3 Land Use

Matoon Lake is bordered by I-90 to the south, undeveloped land (zoned for urban residential) to the west and north, and the City of Ellensburg to the east.

4.4.3.1 City of Ellensburg

To the northeast, within the City of Ellensburg, Matoon Lake is bordered by undeveloped land zoned for commercial development.

4.4.4 Public Access

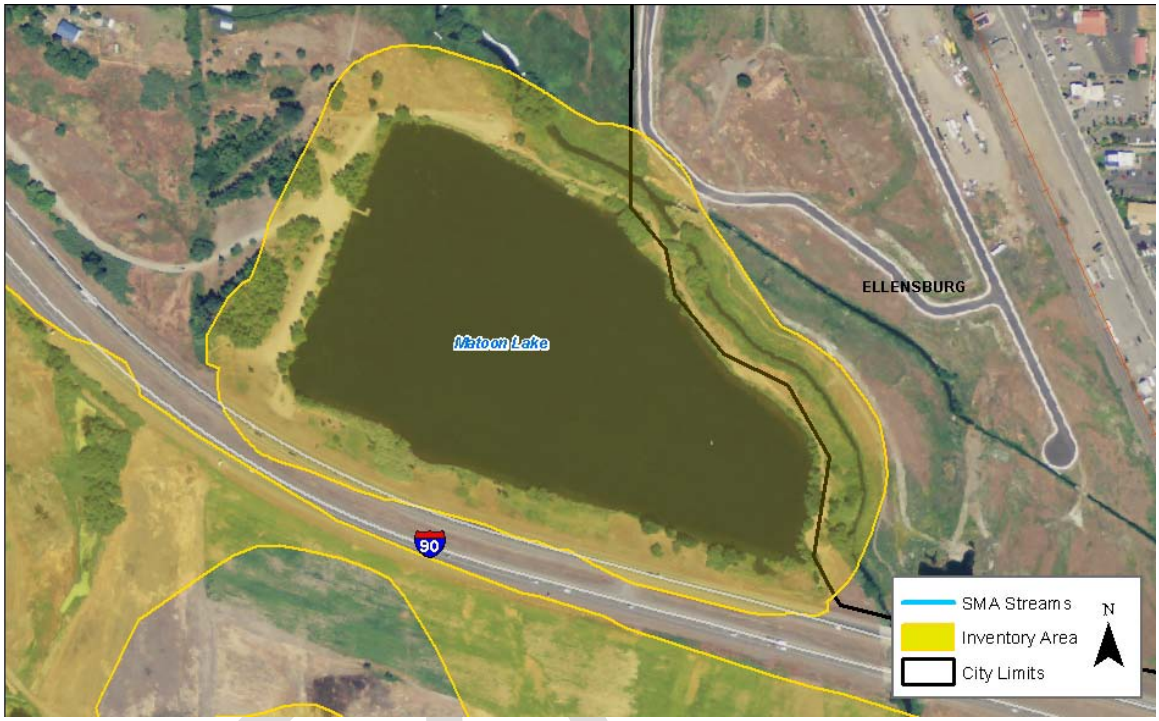
Access to Matoon Lake is available off of West Umtanum Road.

4.4.5 Reach Sheet

MATOON LAKE

SHORELINE LENGTH:
1.3 Miles

REACH INVENTORY AREA:
50.0 Acres



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PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The shoreline of the waterbody is oriented northwest to southeast and contains limited development, with the exception of I-90 that borders the waterbody to the south. The waterbody was created from gravel mining in the floodplain of the river.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is dominated open water (43%), agricultural lands (39%), and developed lands (17%), with limited grasslands (1%).

HAZARD AREAS (MAP FOLIO #2)

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

HABITATS AND SPECIES (MAP FOLIO #1)

There is no priority fish use mapped in the lake.

Wetland habitat is mapped along the southern shoreline of the waterbody (5% of the reach). No priority habitats or species are identified in this reach by WDFW.

WATER QUALITY

A TMDL has been implemented for fecal coliform in this waterbody.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1)

I-90 constrains the south end of the lake, and a gravel road is located along the western shore. An irrigation ditch is located along the eastern shore of the lake.

PUBLIC ACCESS (MAP FOLIO #4)

Access to Matoon Lake is available via West Umtanum Road.

EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use around the lake is primarily urban (75%), with parks & open space (7%) and commercial (18%) land to the east. Land ownership is 11% private, 59% public (WDFW), and 30% other [I-90]

CONTAMINATED SITES

No identified contaminated sites are located within this reach.

ZONING (MAP #5)

Lands within the reach are zoned primarily for urban/suburban residential uses (62%), with area of commercial zoning (25%) to the east and other (13%) [right-of-way] to the south.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no recorded sites within the reach.

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY

Low: No priority fish use is mapped; the pond does not have a surface water connection to the Yakima River.

TERRESTRIAL HABITAT QUALITY

Low: The shoreline is highly altered, and riparian vegetation is generally absent.

VEGETATION FUNCTIONS

Low: The shoreline is largely devoid of natural riparian vegetation.

HYDROLOGIC FUNCTIONS

Low: The pond is a manmade artifact of gravel mining.

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- There are several species of noxious aquatic weeds identified within the lake.

MATOON LAKE-CITY OF ELLENSBURG REACH

SHORELINE LENGTH:
0.02 Miles

REACH INVENTORY AREA:
6.0 Acres

1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The shoreline of Matoon Lake is generally undeveloped. The reach is located adjacent to Wilson Creek and a short stretch of irrigation ditch.

LAND COVER (MAP FOLIO #3)

This reach is entirely mapped as agricultural lands (100%).

HAZARD AREAS (MAP FOLIO #2)

A significant area of the reach (84%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach.

HABITATS AND SPECIES (MAP FOLIO #1)

There is no priority fish use mapped in the lake.

Wetland habitat is not mapped in this reach. No priority habitats or species are mapped in this reach.

WATER QUALITY

A TMDL has been implemented for fecal coliform in this waterbody.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1) An irrigation ditch is located along the eastern shore of the lake.	**PUBLIC ACCESS (MAP FOLIO #4)** Access to the reach is available via West Umtanum Road and then a gravel trail.
EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use along the reach is primarily commercial (72%), with areas of parks & open space (27%) and urban (1%) uses. Land ownership is 42% private and 58% public (WDFW).	**CONTAMINATED SITES** No identified contaminated sites are located within this reach; however, one hazardous waste generator is mapped near the center of the reach.
ZONING (MAP #5) Lands within the reach are zoned for commercial uses (100%).	**CULTURAL AND ARCHAEOLOGICAL RESOURCES** There are no recorded sites within the reach.

1

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY **Low:** No priority fish use is mapped; the lake does not have a surface water connection to the Yakima River.	**TERRESTRIAL HABITAT QUALITY** **Low:** The shoreline is highly altered, and riparian vegetation is generally absent.
VEGETATION FUNCTIONS **Low:** The shoreline is largely devoid of natural riparian vegetation.	**HYDROLOGIC FUNCTIONS** **Low:** The lake is a manmade artifact of gravel mining.

2

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- There are several species of noxious aquatic weeds identified within the lake.
- Continue to manage non-native invasive aquatic vegetation.

4.5 Wilson, Naneum, and Coleman Creeks

Wilson Creek flows generally north to south and is a left-bank tributary to the Yakima River at RM 147.0. Naneum and Coleman Creeks converge just east of I-82 and join Wilson Creek approximately 2 miles upstream of the Yakima River confluence.

4.5.1 Physical Characterization

Wilson Creek originates at Table Mountain north of Ellensburg. It flows southeast until it combines with Naneum Creek approximately 13 miles northeast of Ellensburg. The Wilson/Naneum Creek segment continues southward for another 1.5 miles where it separates into four streams (Whiskey, Mercer, Wilson, and Naneum Creeks) across a large alluvial fan. The channel structure of these streams is preserved through maintenance (John Marvin, personal communication, April 23, 2012). After the Wilson/Naneum split, Wilson Creek continues flowing southward, crossing several irrigation canals.

Near the northeastern Ellensburg city limits, Wilson Creek splits into two branches (west and east). The two branches flow south through the city and are composed of alternately exposed and piped sections. The west and east branches rejoin approximately 3 miles downstream of the city. Naneum Creek flows back into Wilson Creek approximately 2 miles upstream of Wilson Creek's confluence with the Yakima River. According to Ecology (1991), the only portion of Wilson Creek that is designated as a Shoreline of the State begins downstream (south) of Ellensburg city limits, in Sections 30 and 31, Township 17 North, Range 19 East.

Accurate mapping of the entire Wilson/Naneum system does not exist (Anna Lael, personal communication, May 24, 2012), and the hydrology of Wilson Creek is complex and not well understood. Most of the creek's naturally occurring flow results primarily from melting of the upgradient snowpack in the spring and summer months, as well as spring precipitation events (typically during the months of March through June) (Ecology 2005). To supply water for the annual agricultural growing season (April 15 through October 15), a substantial amount of supplemental water is diverted from the Yakima River and delivered to Wilson Creek via irrigation canals. Within the Wilson Creek subbasin, the amount of supplemental water is approximately 4.5 times the amount of water naturally supplied via local surface waters (Ecology 2002).

There are three road crossing and one railroad bridge over Wilson Creek, including I-82 (WDFW 2010). Multiple bridges are mapped over both Naneum and Coleman Creeks and both streams flow under I-90 (Kittitas County 2012, WDFW 2010).

Steep slopes are mapped on the left bank of Wilson Creek near its confluence with the Yakima River and along both banks of Naneum Creek higher in the watershed, near the northern extent of the regulated shoreline of the stream (Kittitas County 2012). The FEMA 100-year floodplain is mapped the length of the Wilson Creek and Colman Creek inventory areas, and the majority of the Naneum Creek inventory area (except for the upstream extent); however, the floodplain does not occupy the entire inventory area (FEMA 1996). The entire Wilson Creek reach has potential for channel migration, while the majority of the downstream half of the Naneum Creek reach also has potential. The majority of the Coleman Creek reach has potential for channel migration (Ecology 2011).

Streams in the Kittitas Valley have been extensively altered to provide irrigation for crop production, resulting in channels being rerouted, channelized, and diked. The entirety of Wilson and Coleman Creeks, and approximately the lower half of Naneum Creek, flow through actively farmed lands. Some residential and commercial development, associated with farming activities, is located along the streams.

4.5.2 Habitats and Species

4.5.2.1 Fish Use

Table 4-2 summarizes known fish use in Wilson, Naneum, and Coleman Creeks. Summer steelhead, a federally listed threatened species, uses these streams as juvenile rearing habitat (StreamNet 2010). Numerous spring Chinook juveniles rear downstream of fish passage barriers in the lower part of Wilson, Naneum, and Coleman Creeks. Some spring Chinook and steelhead spawning also occurs in these reaches (Haring 2001).

Exactly how much of the Wilson Creek stream system was historically suitable for salmonids is unknown. Salmonid use in drier areas of the lower Wilson Creek watershed likely varied substantially between dry and wet years (Haring 2001). Fish habitat in Wilson Creek and its tributaries has been heavily altered over the last century as the Kittitas Valley was developed for irrigation and agricultural uses. Naneum and Coleman Creeks have been channelized and diverted into lower Wilson Creek. Riparian vegetation has been largely converted to cropland and pastures. Logging and extirpation of beavers also changed the character of the watershed. Downed wood is actively removed from channels in the lower part of the watershed to allow for irrigation flows, reducing the presence of woody debris for fish habitat (Haring 2001, Conley et al. 2009).

Streams in the Wilson Creek system have been largely rerouted, channelized, and diked for use as irrigation delivery systems. Fish habitat features such as pools,

large wood, and riparian cover are lacking in many areas. Many stream channels have deeply incised or have been dredged to drain agricultural areas, increasing the draining of groundwater and irrigation return flows from surrounding lands. Because of irrigation return flows, streamflows within the lower stream channels are now much greater in the summer and fall than they would have been historically (Haring 2001).

The hydrology of tributaries to Wilson Creek is still suitable for salmonids, but many areas are blocked by fish passage barriers including irrigation diversions lacking screens or fish ladders, irrigation canals, and road culverts. Naneum Creek intersects three large irrigation ditches: KRD Canal, Cascade Irrigation District Canal, and Ellensburg Water Company Canal, while Coleman Creek intersects the latter two. Control structures associated with these intersections may entrain fish in the irrigation canals. Local, state, and federal agencies are working with water diverters to repair and remove these barriers where possible (Haring 2001). The Yakima Tributary Access and Habitat Project is a collaborative effort of the Yakama Nation, WDFW, and local conservation and irrigation districts to improve the connection between Wilson Creek and the Yakima River (Adolfson 2005).

Table 4-2. Fish Use in Wilson, Naneum, and Coleman Creeks (Source: StreamNet 2010)

Species	Wilson Creek	Naneum Creek	Coleman Creek
Dolly Varden/Bull Trout	P/M		
Rainbow Trout	P/M	P/M	P/M
Westslope Cutthroat		P/M	
Eastern Brook Trout		P/M	
Spring Chinook	R, S	R	R
Summer Steelhead	R	R	R
Coho salmon	P/M		

P/M = presence/migration; S = spawning; R= rearing

4.5.2.2 Water Quality

Water quality studies in the Wilson/Cherry Creek watershed over the past four decades have found elevated water temperature during summer months, elevated turbidity, suspended solids, and nutrients. Tributaries with agricultural irrigation return flows were found to have significantly higher nutrients, suspended sediment,

and fecal coliform bacteria than the mainstem Yakima River. The Wilson/Cherry Creek system contributes approximately 20 percent of the annual fine sediment load to the Yakima River. In addition, little stormwater detention or water quality treatment is present in Ellensburg, and most storm drains discharge to one of the branches of Wilson Creek or its tributaries (Haring 2001). Wilson Creek is included in the 2002 TMDL for turbidity and suspended sediment in the upper Yakima River (Joy 2002).

Wilson Creek is included on Ecology's 303(d) list for pH. A TMDL is being implemented to reduce fecal coliform contamination in this stream. Sources of bacterial contamination in the Wilson Creek drainage basin include failing septic systems, livestock, wildlife, and pets (Ecology 2005, Creech 2006).

As part of the Yakima River Watershed Toxics Study, Ecology found that levels of toxaphene in Wilson Creek exceed state standards (see Section 4.1.2 for more information about this study). Toxaphene is a chlorinated pesticide that was banned in 1990. It is not included on the current 303(d) list but has been identified as a contaminant of potential concern in Yakima River fish (Johnson et al. 2010).

High water temperatures are an issue in segments of Coleman and Naneum Creeks. The mainstem of Naneum Creek has been subject to excessive fine sediments resulting from forest practices and road construction (Haring 2001).

4.5.2.3 Riparian Habitat Conditions (Land Cover)

Prior to irrigation, the Wilson Creek stream system likely flowed through dense stands of willow, cottonwood, and aspen within a surrounding shrub-steppe community. Riparian conditions are still relatively intact within the forested canyons along the upper portions of Wilson, Naneum, and Coleman Creeks. The lower portions of the streams flow through agricultural areas with limited and patchy woody cover. The upstream part of Naneum Creek crosses sagebrush and coniferous forest areas. Grazing practices in the upper Naneum Creek drainage have recently been modified to reduce grazing impacts to riparian areas (Haring 2001).

4.5.2.4 Wetlands

A small fraction of the Wilson Creek shoreline inventory area is mapped as forested and scrub-shrub wetland. Numerous forested, scrub-shrub, and emergent wetlands are mapped along Naneum Creek. A large emergent wetland is mapped along upper Coleman Creek.

4.5.2.5 Wildlife Habitats and Species

Northern spotted owls (federally listed threatened species) are documented near upper Naneum Creek. This area is also mapped as mule deer winter range.

A small portion of the shoreline inventory area along these streams is mapped as shrub-steppe habitat (USGS 1993).

4.5.3 Land Use

Between its confluence with the Yakima River and the Naneum Creek confluence, Wilson Creek flows through agricultural lands and is paralleled by I-82 at the upstream end. The lower end of Naneum Creek is bordered by I-90 and Fiorito lake until just downstream of the Coleman Creek confluence. From this confluence upstream to near the Thomas Road crossing, Naneum Creek flows through agricultural and rural residential lands. Upstream of Thomas Road, the creek is bordered by undeveloped land zoned for agriculture and forest and range, with some areas of low-density residential development. The upper portion of Naneum Creek (within shoreline jurisdiction) flows through private, commercial forest-zoned land. Both the Town Canal and North Branch canal cross Naneum Creek.

Coleman Creek flows entirely through agricultural and low-density residential lands, with the exception of an industrial area located between Vantage Highway and Town Canal.

4.5.4 Public Access

The majority of Wilson, Naneum, and Coleman creeks flow through private property and are not accessible to the public. The John Wayne Heritage Trail crosses over the downstream portion of Naneum Creek and middle segment of Coleman Creek. Olmstead Place State Park is also located on the middle portion of Coleman Creek and can be accessed from North Ferguson Road. The downstream portion of Wilson Creek is accessible from Helen McCabe/Yakima Canyon State Park located off of Canyon Road.

4.5.5 Reach Sheets

WILSON CREEK

SHORELINE LENGTH:
2.0 Miles

REACH INVENTORY AREA:
122.5 Acres

1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach flows north to south, flows under and is bordered by I-82/SR 97 along the reaches upstream extent and is crossed by two road roads and railway, which constrain channel movement downstream. The reach contains limited development.

HAZARD AREAS (MAP FOLIO #2)

Over half of the reach area (64%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach. The entire reach has potential for channel migration.

WATER QUALITY

The reach is listed on the State's Water Quality Assessment list of 303 (d) Category 5 waters for pH and temperature. A TMDL has been implemented in this reach for fecal coliform.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is mainly agricultural lands (40%), developed lands (26%), riparian vegetation (14%), and conifer-dominated forest (12%), with limited shrubland (6%), grassland (1%), and unvegetated (1%).

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW maps show this reach provides spawning and known juvenile rearing habitat for spring Chinook and known juvenile rearing habitat for summer steelhead. The presence of coho salmon, Dolly Varden/bull trout, and rainbow trout is also mapped.

Limited wetland habitat is mapped along both banks of the upstream portion of the river (2% of the reach). Priority biodiversity area and corridor is mapped at the downstream extent of the reach.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1) The reach is constrained by I-97 at the upstream end and by Canyon Road at the downstream end, and the creek has been historically channelized. Most of the riparian corridor has been impact by development and agriculture.	**PUBLIC ACCESS (MAP FOLIO #4)** The downstream portion of Wilson Creek is accessible from Helen McCabe/Yakima Canyon State Park located off of Canyon Road.
EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use along the reach is primarily agriculture (70%), with rural land (30%) at the downstream end. Land ownership is 89% private and 11% public (State Parks).	**CONTAMINATED SITES** No identified contaminated sites are located within this reach.
ZONING (MAP #5) Lands within the reach are zoned primarily for agriculture (85%) with areas of other (15%) [right-of-way] zoning.	**CULTURAL AND ARCHAEOLOGICAL RESOURCES** There are no recorded sites within the reach.

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY **Low:** Priority fish use is mapped, but the creek has been historically channelized and the riparian corridor is largely devoid of riparian forest and shrub cover.	**TERRESTRIAL HABITAT QUALITY** **Low:** The reach and surrounding habitats have been highly altered by development and agricultural activities.
VEGETATION FUNCTIONS **Low:** There is very limited riparian cover within the reach.	**HYDROLOGIC FUNCTIONS** **Low:** The creek has been historically channelized and flows are highly altered by irrigation uses.

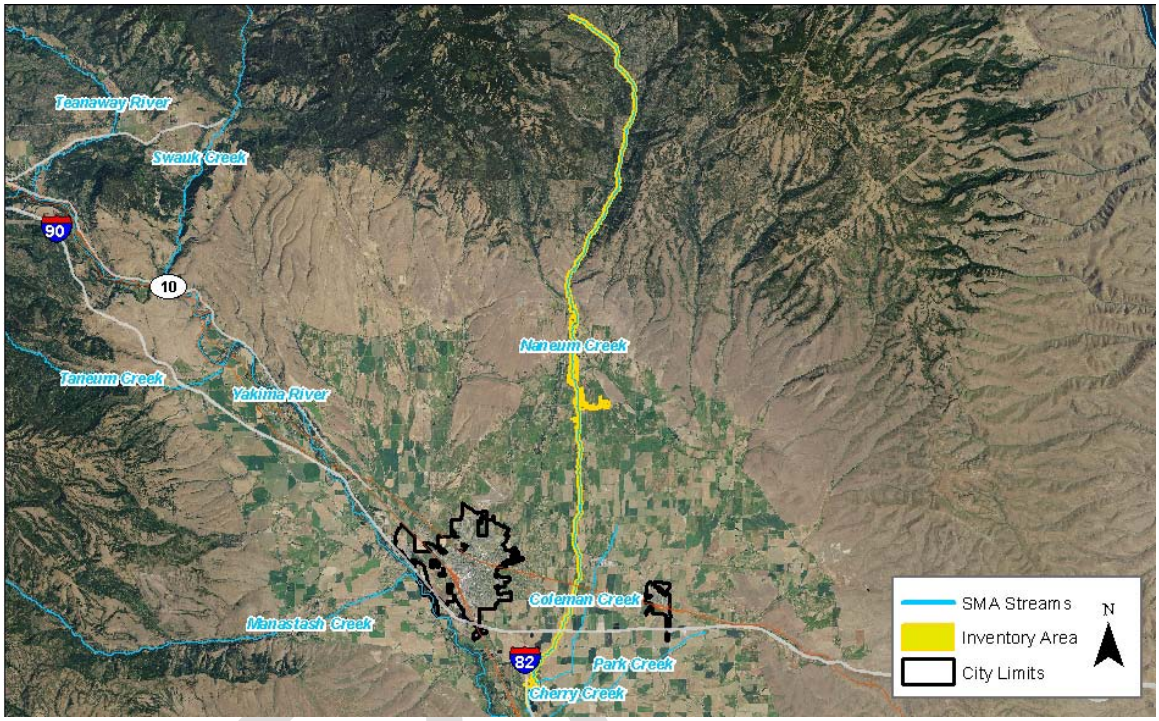
KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- New development should be set back an adequate distance from the shoreline to protect riparian functions and protect structures from flooding and channel migration hazards.
- The stream channel and adjacent riparian areas have been highly altered by adjacent development, (including I-90) and agricultural activities (including irrigation uses).
- Support the efforts of the Yakima Tributary Access and Habitat Project to improve the connection between Wilson Creek and the Yakima River.
- Encourage use of agricultural best management practices to reduce erosion and transport of legacy pesticides.

NANEUM CREEK

SHORELINE LENGTH:
25.3 Miles

REACH INVENTORY AREA:
1,454.3 Acres



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PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The upstream half of the reach flows through a canyon with moderate topographic relief, while downstream, the reach flows through flat agricultural lands in the valley. Residential development is associated with the downstream half of the reach, which flows under many roads, including I-90 and I-82/SR 97, in addition to the John Wayne Trail and a railway.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is primarily agricultural lands (54%), conifer-dominated forest (27%), riparian vegetation (14%), with limited developed lands (4%) and shrublands (1%).

HAZARD AREAS (MAP FOLIO #2)

A limited area of the reach (28%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach. The majority of the downstream half of the reach has potential for channel migration.

WATER QUALITY

The reach is listed on the State's Water Quality Assessment list of 303 (d) Category 5 waters for pH and temperature. A TMDL has been implemented in this reach for fecal coliform.

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW maps show this reach provides rearing habitat for spring Chinook and summer steelhead. The presence of eastern brook trout, rainbow trout, and westslope cutthroat is also mapped. Wetland habitat is mapped along the river, primarily in the central and upstream portions of the reach (20% of the reach). Priority mule deer winter range and elk calving area are mapped along the central and upstream portions of the river, respectively. The Naneum Creek shoreline supports one rare plant species mapped by the Washington Natural Heritage Program.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1)

Several bridges, including I-90, cross the creek. In the lower half of the reach, most of the riparian corridor has been impact by development and agriculture and the creek has been historically channelized. The creek also intersects several irrigation canals.

PUBLIC ACCESS (MAP FOLIO #4)

The John Wayne Heritage Trail crosses over the downstream portion of Naneum Creek.

EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use along the reach is agriculture (15%) at the downstream end, with rural land (52%) mid-reach and forestry (33%) at the upstream end. Land ownership is 100% private.

CONTAMINATED SITES

No identified contaminated sites are located within this reach.

ZONING (MAP #5)

From downstream to upstream, lands within the reach are zoned for agriculture (58%), other (3%) [right-of-way], forest & range (5%), and commercial forestry (33%).

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are 2 recorded precontact sites located within the reach.

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY

Medium: The downstream portion of the creek has been historically channelized and cleared, but the upstream portion is more intact.

TERRESTRIAL HABITAT QUALITY

Medium: The downstream portion of the reach and surrounding habitats have been highly altered by development and agricultural activities, but habitat significantly improves upstream.

VEGETATION FUNCTIONS

Medium: There is very limited riparian cover in the downstream portion of the reach, but dense forest and shrub cover bordered the upstream portion.

HYDROLOGIC FUNCTIONS

Medium: The downstream portion of the creek has been historically channelized and flows are highly altered by irrigation uses. Hydrologic functions in the upper watershed are generally intact.

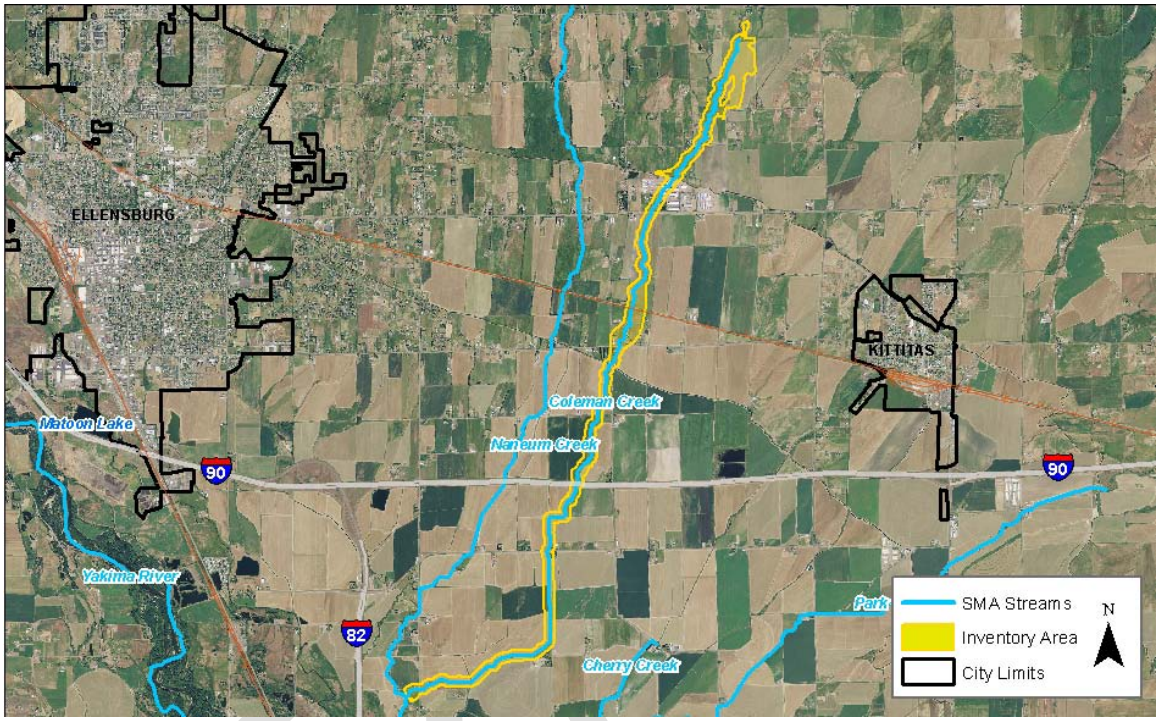
KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- New development should be set back an adequate distance from the shoreline to protect riparian functions and protect structures from flooding and channel migration hazards.
- The downstream portions of the stream channel and adjacent riparian areas have been highly altered by adjacent development and agricultural activities (including irrigation uses).
- Control structures associated with irrigation canal intersections may entrain fish within the canals.
- Decommission roads to reduce sedimentation in the stream.
- Protect intact habitat in the upper reaches.
- Encourage use of agricultural best management practices to reduce erosion and transport of legacy pesticides.

COLEMAN CREEK

SHORELINE LENGTH:
6.8 Miles

REACH INVENTORY AREA:
385.7 Acres



1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach generally flows north to south through flat agricultural lands. Residential and commercial development is located adjacent to the river in places. The reach flows under multiple roads, including I-90 and I-82/SR 97, in addition to the John Wayne Trail.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is agricultural lands (94%) with limited developed lands (6%).

HAZARD AREAS (MAP FOLIO #2)

Approximately 44 percent of the reach area is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach. The majority of the reach has potential for channel migration.

HABITATS AND SPECIES (MAP FOLIO #1)

WDFW maps show this reach provides known juvenile rearing habitat for spring Chinook and summer steelhead. The presence of rainbow trout is also mapped.

Wetland habitat is mapped along the river, mostly at the upstream extent of the reach (13% of the reach). No priority habitats or species are identified in this reach by WDFW.

WATER QUALITY

The reach is listed on the State's Water Quality Assessment list of 303 (d) Category 5 waters for temperature. A TMDL has been implemented in this reach for fecal coliform.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1)

Several bridges, including I-90, cross the creek. Within the reach, most of the riparian corridor has been impacted by development and agriculture and the creek has been historically channelized. The creek also intersects two irrigation canals.

PUBLIC ACCESS (MAP FOLIO #4)

The John Wayne Heritage Trail crosses over the middle segment of Coleman Creek. Olmstead Place State Park is also located on the middle portion of Coleman Creek and can be accessed from North Ferguson Road.

EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4)

Land use along the reach is primarily agriculture (99%), with a patch of rural land (1%) mid-reach. Land ownership is 86% private and 14% public (State Parks).

CONTAMINATED SITES

No identified contaminated sites are located within this reach.

ZONING (MAP #5)

Lands within the reach are zoned primarily for agriculture (95%), with a few areas of other (5%) [right-of-way] zoning.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

Olmstead Place State Park, a historic site located in the reach, features original structures constructed in the late 1800s and early 1900s from early settlers of this area.

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY

Low: Priority fish use is mapped, but the creek has been historically channelized and the riparian corridor is largely devoid of riparian forest and shrub cover.

TERRESTRIAL HABITAT QUALITY

Low: The reach and surrounding habitats have been highly altered by agricultural activities.

VEGETATION FUNCTIONS

Low: There is very limited riparian cover within the reach.

HYDROLOGIC FUNCTIONS

Low: The creek has been historically channelized and flows are highly altered by irrigation uses.

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- New development should be set back an adequate distance from the shoreline to protect riparian functions and protect structures from flooding and channel migration hazards.
- Control structures associated with irrigation canal intersections may entrain fish within the canals.
- The stream channel and adjacent riparian areas have been highly altered by adjacent development, (including I-90) and agricultural activities (including irrigation uses).
- Encourage use of agricultural best management practices to reduce erosion and transport of legacy pesticides.
- Educate shoreline property owners about measures to protect and restore riparian areas.

4.6 Fiorito Lake

Fiorito Lake is located upstream of the confluence of Wilson and Cherry Creeks, along the left bank of Naneum Creek and adjacent to I-82.

4.6.1 Physical Characterization

Fiorito Lake is oriented north-south and is approximately 0.7 mile long and about 0.1 mile in width, occupying roughly 54 acres. A berm separates the northern two-thirds of the lake from the southern part but allows flows to pass from north to south. The lake drains from its southeast corner back to Naneum Creek, passing under I-82, approximately 0.35 mile downstream of its southern extent.

The FEMA 100-year floodplain is mapped in much of the reach inventory area, particularly in the northern, western, and southern areas (FEMA 1996).

4.6.2 Habitats and Species

4.6.2.1 Fish Use

The lake is stocked with rainbow trout.

4.6.2.2 Water Quality

Fiorito Lake is considered a Category 4c waterbody on Ecology's 2008 303(d) list because of the presence of exotic invasive species (Eurasian watermilfoil). Category 4c waterbodies are impaired by causes that cannot be remedied by a TMDL and must be addressed through more complex solutions.

Eurasian watermilfoil can degrade water quality in just a few growing seasons by reducing dissolved oxygen, releasing excess nutrients when it decomposes (potentially increasing algal growth), increasing water temperature by absorbing sunlight, and raising the pH.

4.6.2.3 Riparian Habitat Conditions (Land Cover)

Fiorito Lake is located in an agricultural area and less than 200 feet east of I-82/U.S. 97. There is very little woody riparian cover along the lake's shoreline. An access road runs along the western side of the lake.

4.6.2.4 Wetlands

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

4.6.2.5 Wildlife Habitats and Species

No priority habitats or species are mapped along Fiorito Lake. The lake is located in an agricultural area near a major roadway and is unlikely to provide high-quality wildlife habitat.

Approximately 20 percent of the Fiorito Lake shoreline inventory area is mapped as shrub-steppe habitat (USGS 1993).

4.6.3 Land Use

Fiorito Lake is bordered by I-82 along its entire western shoreline. The lake is bordered by agricultural lands to the north, east, and south.

4.6.4 Public Access

The lake can be access from Number 6 Road.

4.6.5 Reach Sheet

FIORITO LAKE

SHORELINE LENGTH:
0.7 Mile

REACH INVENTORY AREA:
134.4 Acres

1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The waterbody shoreline is oriented north to south and is bordered by I-82/SR 97 to the west. Limited development is associated with the shoreline, aside from the highway. A constructed berm splits the waterbody into two sections, but also flow to pass from north to south before the waterbody drains to Wilson Creek from its southeastern border.

LAND COVER (MAP FOLIO #3)

This reach contains significant agricultural lands (43%) and open water (39%). A number of other land cover types are also present, including: developed lands (9%), grasslands (4%), riparian vegetation (3%), shrublands (1%).

HAZARD AREAS (MAP FOLIO #2)

A large extent of the reach (70%) is located within the FEMA 100-year floodplain. No landslide hazard areas are mapped within the reach.

WATER QUALITY

The reach is listed on the State's Water Quality Assessment list of 303 (d) Category 5 waters for pH. A TMDL has been implemented in this reach for fecal coliform.

HABITATS AND SPECIES (MAP FOLIO #1)

No priority fish use is mapped by WDFW.

Wetland habitat is mapped along the shoreline of the waterbody at several locations (16% of the reach). No priority habitats or species are identified in this reach by WDFW.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1) The shoreline is constrained by I-90 to the west.	**PUBLIC ACCESS (MAP FOLIO #4)** The lake can be access from Number 6 Road.
EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use around the lake is primarily agriculture (78%), with rural (19%) land at the downstream end and parks & recreation land (2%) at the upstream end. 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 agriculture (73%), with commercial zoning (19%) to the south and other (9%) [right-of-way] zoning to the west.	**CULTURAL AND ARCHAEOLOGICAL RESOURCES** There are no recorded sites within the reach.

1

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY **Low:** No priority fish use is mapped; the lake does not have a surface water connection to the Yakima River.	**TERRESTRIAL HABITAT QUALITY** **Low:** The shoreline is highly altered, and riparian vegetation is generally absent.
VEGETATION FUNCTIONS **Low:** The shoreline is largely devoid of natural riparian vegetation.	**HYDROLOGIC FUNCTIONS** **Low:** The lake is a manmade artifact of gravel mining.

2

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- Manage non-native invasive aquatic vegetation.

3

4.7 Cherry and Park Creeks

Cherry Creek is a left-bank tributary to Wilson Creek, emptying at RM 0.5, downstream from the I-82/Thrall Road overpass. Park Creek joins Cherry Creek near Moe Road. The streams generally flow from the northeast to the southwest.

4.7.1 Physical Characterization

Cherry and Park Creeks flow through agricultural lands and are crossed by several bridges. As discussed under Wilson Creek and Tributaries (Section 4.5.1), most of the streams in the area have been extensively altered to provide water for irrigation.

The FEMA 100-year floodplain is mapped the length of the Cherry Creek and Park Creek inventory areas; however, the floodplain does not occupy the entire inventory area (FEMA 1996).

4.7.2 Habitats and Species

4.7.2.1 Fish Use

Cherry Creek provides rearing and spawning habitat for summer steelhead (federally listed threatened species) and spring Chinook (StreamNet 2010, Haring 2001). Rainbow trout are also present in Cherry and Park Creeks (StreamNet 2010).

Fish habitat in Cherry Creek has been heavily altered over the last century as the Kittitas Valley was developed for irrigation and agricultural uses. The stream has been channelized and riparian vegetation has been largely converted to cropland and pastures. Logging and extirpation of beavers also changed the character of the watershed. Downed wood is actively removed from channels in the lower part of the watershed to allow for irrigation flows, reducing the presence of woody debris for fish habitat (Haring 2001).

As described in Section 4.5.2, use of the Wilson Creek stream system for delivery of irrigation flows has resulted in greater streamflows during the dry season than would have occurred naturally. Some of the Cherry Creek tributaries that now flow year-round may not have been perennial before irrigation began (Haring 2001).

The hydrology of tributaries to Wilson Creek is still suitable for salmonids, but many areas are blocked by fish passage barriers including irrigation diversions lacking screens or fish ladders, irrigation canals, and road culverts. Local, state, and federal agencies are working with water diverters to repair and remove these barriers where possible (Haring 2001).

4.7.2.2 Water Quality

Water quality studies in the Wilson/Cherry Creek watershed over the past four decades have found elevated water temperature during summer months, elevated turbidity, suspended solids, and nutrients. Tributaries with agricultural irrigation return flows were found to have significantly higher nutrients, suspended sediment, and fecal coliform bacteria than the mainstem Yakima River. The Wilson/Cherry Creek system contributes approximately 20 percent of the annual fine sediment load to the Yakima River (Haring 2001). Tributaries to upper Cherry Creek are on the 303(d) list for high water temperatures. Cherry Creek is included in the Upper Yakima River TMDL for organochlorine pesticides (Joy 2002).

4.7.2.3 Riparian Habitat Conditions (Land Cover)

Prior to irrigation, the Kittitas Valley likely supported a shrub-steppe community with dense woody vegetation along lower tributary streams (Haring 2001). Today, woody vegetation is limited to narrow bands and patches of trees and shrubs, particularly along the lower mile of Cherry Creek. The upper part of Cherry Creek and all of Park Creek flow through agricultural areas where woody riparian vegetation is lacking or sparse. Large wood is removed from streams used for irrigation deliveries in the lower watershed. Homogenous stands of reed canarygrass along tributaries to Cherry Creek suppress and compete with native woody vegetation (Haring 2001).

4.7.2.4 Wetlands

A very small portion of the Cherry Creek shoreline inventory area is mapped as freshwater emergent wetland. No wetlands are mapped along Park Creek.

4.7.2.5 Wildlife Habitats and Species

No priority habitats or species are documented along Park or Cherry Creek. These streams flow through agricultural areas and are unlikely to provide high-quality wildlife habitat.

Shrub-steppe habitat is mapped along the upper part of Cherry and Park Creeks.

4.7.3 Land Use

Cherry and Park Creeks flow through agricultural lands, and are bordered in several areas by low-density residential development.

4.7.4 Public Access

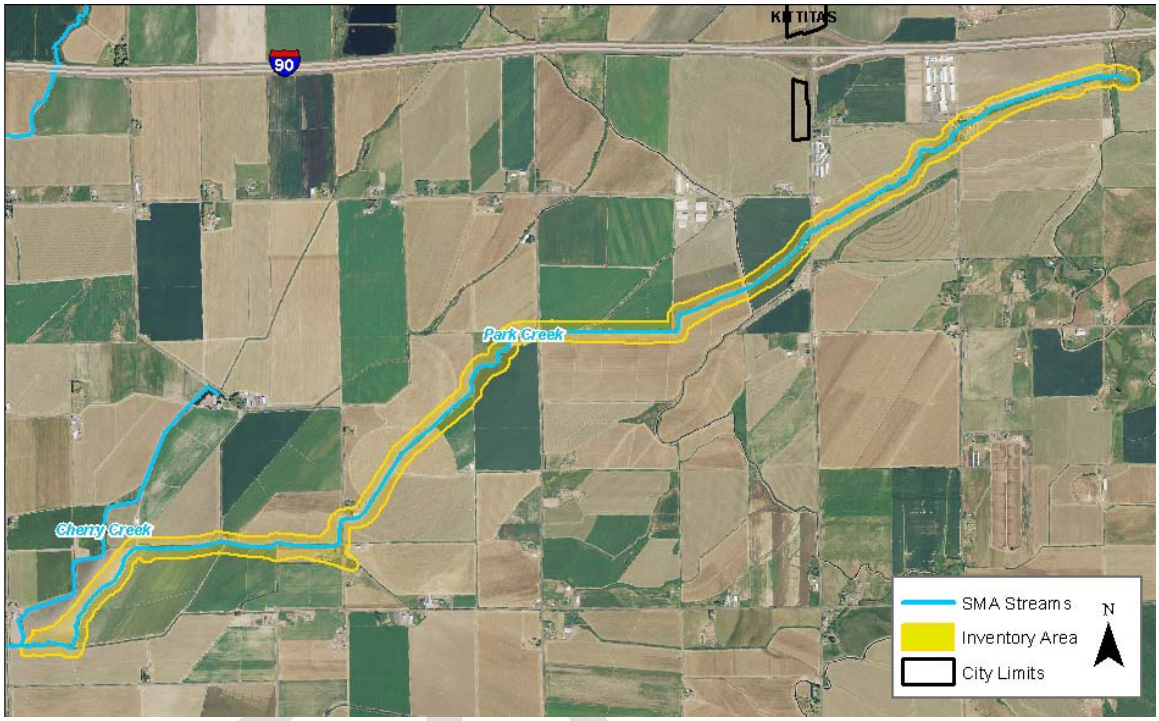
The entirety of Cherry and Park creeks flow through private property and are not accessible to the public, but can be viewed from several roads that cross over the streams, including: Moe Road, Thrall Road, and Canyon Road (Cherry Creek and Park Creek); Cleman Road, Denmark Road, and South Ferguson Road (Park Creek).

4.7.5 Reach Sheets

PARK CREEK

SHORELINE LENGTH:
5.2 Miles

REACH INVENTORY AREA:
268.5 Acres



1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach flows through flat agricultural lands from the northeast to southwest, crossing under several roads. A few residences and agricultural associated buildings are located next to the reach.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is mostly agricultural lands (94%) with patches of developed lands (5%).

HAZARD AREAS (MAP FOLIO #2)

About 59 percent 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 maps the presence of rainbow trout in this reach.

No wetland habitat is mapped along the river. No priority habitats or species are identified in this reach by WDFW.

WATER QUALITY

A TMDL has been implemented in this reach for fecal coliform.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1) Most of the riparian corridor has been impacted by development and agriculture and the creek has been historically channelized. There are several road crossings within the reach, and identified fish passage barriers.	**PUBLIC ACCESS (MAP FOLIO #4)** The reach is not accessible to the public, but viewable from Cleman Road, Denmark Road, South Ferguson Road, Moe Road, Thrall Road, and Canyon Road**.**
EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use along the reach is primarily agriculture (86%) with rural land (14%) at the upstream end. 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 primarily for agriculture (99%) with areas of other (1%) [right-of-way].	**CULTURAL AND ARCHAEOLOGICAL RESOURCES** There are no recorded sites within the reach.

1

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY **Low:** Priority fish use is mapped, but the creek has been historically channelized and the riparian corridor is largely devoid of riparian forest and shrub cover.	**TERRESTRIAL HABITAT QUALITY** **Low:** The reach and surrounding habitats have been highly altered by development and agricultural activities.
VEGETATION FUNCTIONS **Low:** There is very limited riparian cover within the reach.	**HYDROLOGIC FUNCTIONS** **Low:** The creek has been historically channelized and flows are highly altered by irrigation uses.

2

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

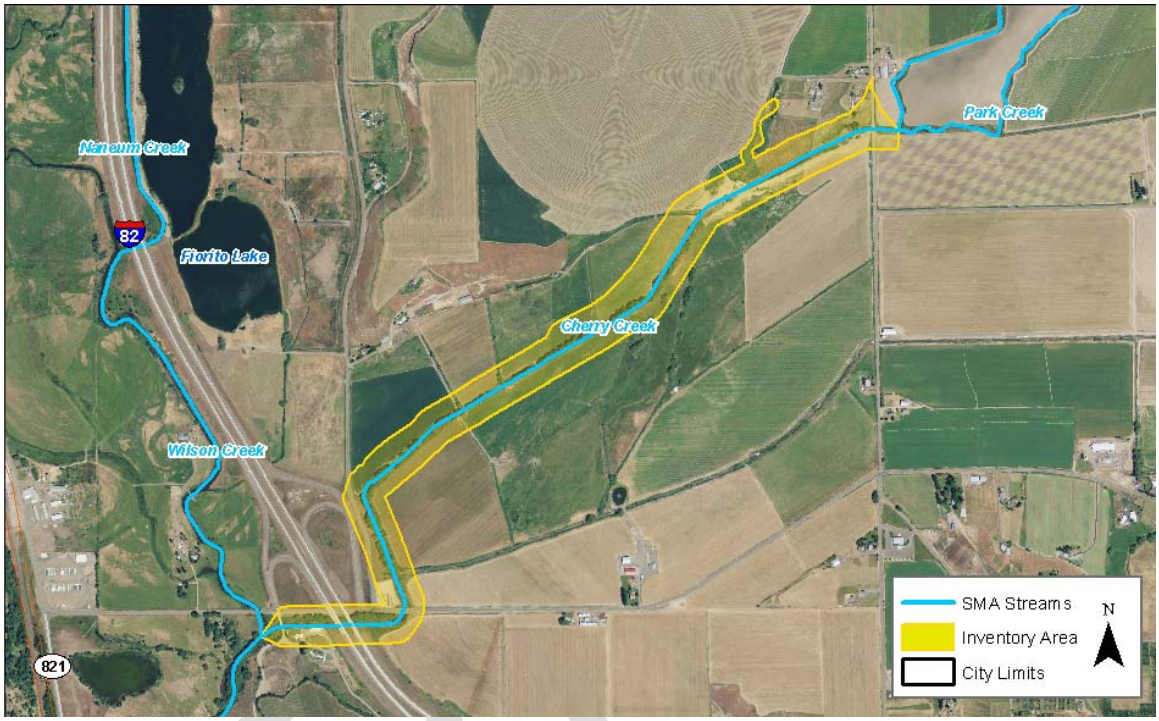
- New development should be set back an adequate distance from the shoreline to protect riparian functions and protect structures from flooding.
- The stream channel and adjacent riparian areas have been highly altered by adjacent development, (including I-90) and agricultural activities (including irrigation uses).
- One of approximately 10 identified fish screen/passage projects has been completed on the stream (Anna Lael, personal communication).
- Encourage use of agricultural best management practices to reduce erosion and transport of legacy pesticides.
- Educate shoreline property owners about measures to protect and restore riparian areas.

3

CHERRY CREEK-REACH 1

SHORELINE LENGTH:
1.8 Miles

REACH INVENTORY AREA:
93.5 Acres



1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach flows through flat agricultural lands from the northeast to southwest, crossing under several roads, including I-82/SR 97. Limited development is associated with the reach.

LAND COVER (MAP FOLIO #3)

Land cover within the reach is primarily agricultural lands (78%) and developed lands (21%), with limited shrublands (1%).

HAZARD AREAS (MAP FOLIO #2)

Over half of the reach (59%) 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 show this reach provides known juvenile rearing habitat for spring Chinook and summer steelhead. The presence of rainbow trout is also mapped.

WATER QUALITY

TMDLs have been implemented in this reach for 4,4'-DDE, DDT, dieldrin, and fecal coliform.

Limited wetland habitat is mapped along the river, primarily near the confluence with Wilson Creek (5% of the reach). No priority habitats or species are identified in this reach by WDFW.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1) Most of the riparian corridor has been impacted by development and agriculture and the creek has been historically channelized. I-82 crosses the downstream end of the reach.	**PUBLIC ACCESS (MAP FOLIO #4)** The reach is not accessible to the public, but viewable from Moe Road, Thrall Road, and Canyon Road**.**
EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use along the reach is agriculture (100%). 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 primarily for agriculture (86%) with areas of other (14%) [right-of-way].	**CULTURAL AND ARCHAEOLOGICAL RESOURCES** There are no recorded sites within the reach.

1

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY **Low:** Priority fish use is mapped, but the creek has been historically channelized and the riparian corridor is largely devoid of riparian forest and shrub cover.	**TERRESTRIAL HABITAT QUALITY** **Low:** The reach and surrounding habitats have been highly altered by development and agricultural activities.
VEGETATION FUNCTIONS **Low:** There is very limited riparian cover within the reach.	**HYDROLOGIC FUNCTIONS** **Low:** The creek has been historically channelized and flows are highly altered by irrigation uses.

2
3

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

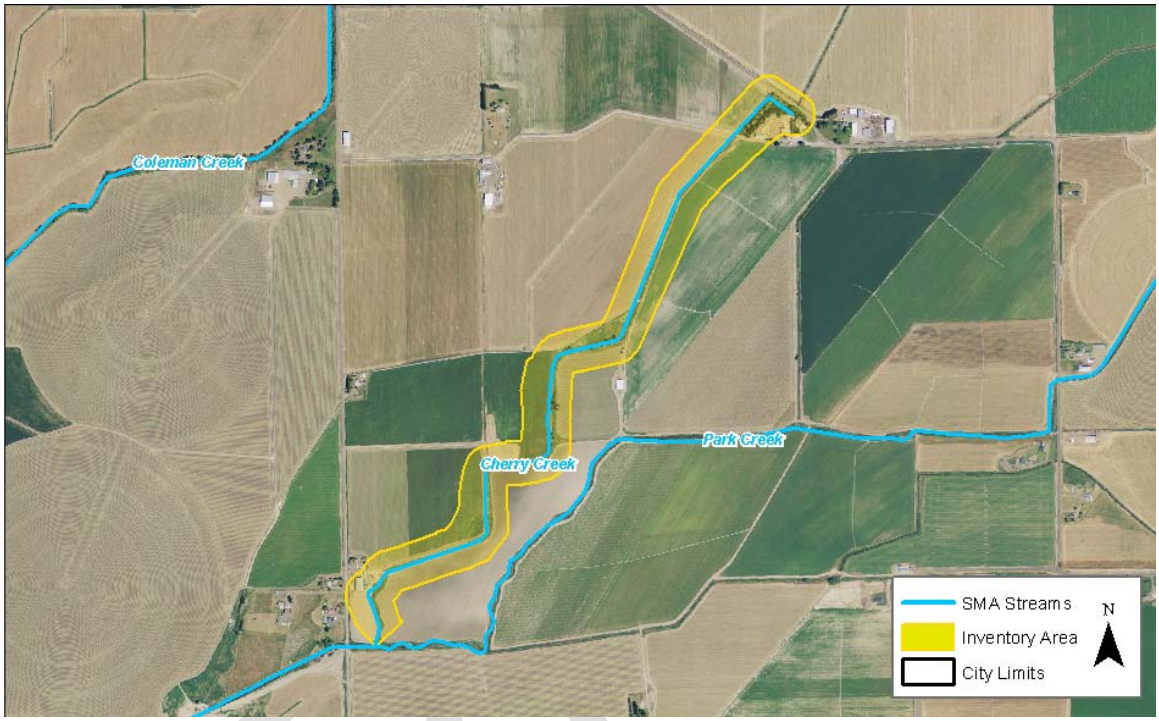
- New development should be set back an adequate distance from the shoreline to protect riparian functions and protect structures from flooding.
- The stream channel and adjacent riparian areas have been highly altered by adjacent development, (including I-90) and agricultural activities (including irrigation uses).
- Encourage use of agricultural best management practices to reduce erosion and transport of legacy pesticides.
- Educate shoreline property owners about measures to protect and restore riparian areas.

4

CHERRY CREEK-REACH 2

SHORELINE LENGTH:
1.4 Miles

REACH INVENTORY AREA:
71.6 Acres



1

PHYSICAL AND ECOLOGICAL FEATURES

CHANNEL CONFIGURATION

The reach flows through flat agricultural lands from the northeast to southwest; limited development is associated with the reach.

LAND COVER (MAP FOLIO #3)

This reach contains significant agricultural lands (93%) with patches of developed lands (7%).

HAZARD AREAS (MAP FOLIO #2)

Over half of the reach (56%) 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 show this reach provides known juvenile rearing habitat for spring Chinook.

No wetland habitat is mapped along the river. No priority habitats or species are identified in this reach by WDFW.

WATER QUALITY

The reach is listed on the State's Water Quality Assessment list of 303 (d) Category 5 waters for temperature. A TMDL has been implemented in this reach for fecal coliform.

BUILT ENVIRONMENT AND LAND USE

SHORELINE MODIFICATIONS (MAP FOLIO #1) Most of the riparian corridor has been impacted by development and agriculture and the creek has been historically channelized.	**PUBLIC ACCESS (MAP FOLIO #4)** The reach is not accessible to the public**.**
EXISTING LAND USES AND OWNERSHIP (MAP FOLIO #4) Land use along the reach is agriculture (100%). 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 primarily for agriculture (98%) with areas of other (2%) [right-of-way] zoning at the upstream and downstream ends.	**CULTURAL AND ARCHAEOLOGICAL RESOURCES** There are no recorded sites within the reach.

1

SHORELINE FUNCTION ANALYSIS

FISH HABITAT QUALITY **Low:** Priority fish use is mapped, but the creek has been historically channelized and the riparian corridor is largely devoid of riparian forest and shrub cover.	**TERRESTRIAL HABITAT QUALITY** **Low:** The reach and surrounding habitats have been highly altered by development and agricultural activities.
VEGETATION FUNCTIONS **Low:** There is very limited riparian cover within the reach.	**HYDROLOGIC FUNCTIONS** **Low:** The creek has been historically channelized and flows are highly altered by irrigation uses.

2

KEY MANAGEMENT ISSUES AND OPPORTUNITIES

- New development should be set back an adequate distance from the shoreline to protect riparian functions and protect structures from flooding.
- The stream channel and adjacent riparian areas have been highly altered by adjacent development, (including I-90) and agricultural activities (including irrigation uses).
- Encourage use of agricultural best management practices to reduce erosion and transport of legacy pesticides.

3