Mercer Creek Floodplain and Riparian Enhancement Project

Critical Areas Report

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Chapter 1

Project Overview and Description

Project Overview

Mid-Columbia Fisheries Enhancement Group (MCF) is working with private landowners, Kittitas County and the City of Ellensburg to improve water quality, enhance fish and wildlife habitat, and reduce flooding along a 1,200-foot reach of Mercer Creek within the City of Ellensburg in Kittitas County, WA.

Goals for this restoration project are to enhance riparian and wetland habitat and function, to control and replace invasive crack willow with native riparian forest and shrubland habitat, and to improve flood management on Mercer Creek. Water quality goals are to reduce temperature, fecal coliform, and sediment in Mercer Creek. The restoration project will build on previous efforts in Mercer Creek to enhance habitat, improve water quality, and reduce flooding in a developed landscape

The project site is a 1,200-foot reach of Mercer Creek, immediately north of Helena Street, within Ellensburg city limits (Figure 1). The project area includes four participating private landowners and a floodplain parcel owned by Kittitas County. Funding for the project is provided by the Washington State Department of Ecology, which was awarded for the project's water quality benefits .

The restoration project offers a unique opportunity within an urban area to replace non-native crack willow, remove aggraded fine sediments, accommodate seasonal high flows through the contouring of an inset floodplain, and expand the forested riparian zone. Benefits associated with inset floodplains are well documented and include infiltration and retention of water during seasonal high flows and stormwater events, improved wetland function, increased residence time of water and subsequent retention of suspended sediments, and greater surface area availability.

Report Organization

Chapter 1 provides an overview of the project purpose, describes each project element, details the construction approach and general best management practices that will be utilized, and identifies the environmental permits that will be obtained before project implementation.

A review of existing data indicates that the following critical areas are within the project area. Each critical area type, along with potential impacts to the critical area, is discussed in detail in the identified chapter:

- **Chapter 2**: Wetlands (includes appendices within chapter)
- **Chapter 3**: Frequently Flooded Areas (includes technical memorandum within the chapter)
- **Chapter 4**: Fish and Wildlife Habitat

The following appendices are included for the entire document:

- **Appendix A**: List of Preparers
- **Appendix B**: Construction Plans
- **Appendix C**: Habitat Restoration Plan

Mercer Creek Floodplain and Riparian Restoration

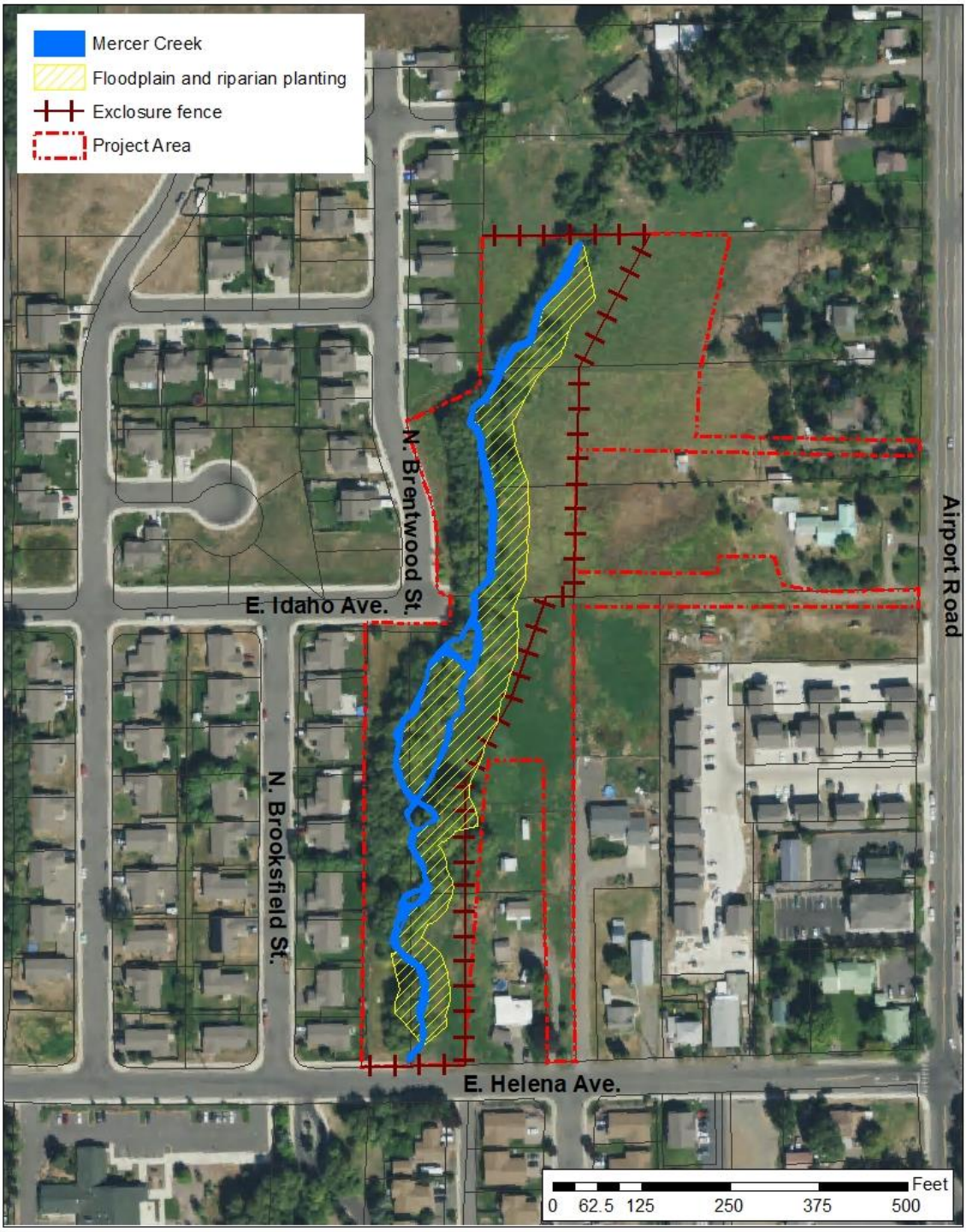

Figure 1: Project area.

Project Description

The project will create a 1.5 acre inset floodplain, construct habitat features using contouring, woody debris and post assisted log structures, and replace non-native crack willow with a native riparian buffer to enhance ecological function. Landowners in the project area currently own or plan to own livestock on their properties and have agreed to the installation of fencing 75 feet away from the ordinary high-water mark to prevent livestock use of the riparian area. The project will build on previous efforts in Mercer Creek to enhance habitat, improve water quality, and reduce flooding in a developed landscape.

Proposed Actions Include:

- Allow for creation of an inset floodplain that increases the frequency and duration of inundation during seasonal high flows, and expansion of native riparian vegetation, by removing non-native crack willow from the left bank and active channel of Mercer Creek; Avoid flushing sediments, which have aggraded in crack willow stems and rootwads, downstream during flood events by removing fine sediments from the channel and exposing channel bed cobbles for fish habitat;
- Increase the frequency of floodplain connection, and support conditions for expanded native riparian vegetation, by lowering the elevation of 1.5 acres of floodplain;
- Create a diversity of wetland and riparian habitat types within the 1.5 acre floodplain by creating depressions, backwatered channels, channels that increase floodplain connection, and installing wood structures;
- Increase roughness, filtration and shading by expanding native riparian and wetland vegetation in the 1.5 acre inset floodplain area;
- Reduce fecal coliform and sediment input by excluding livestock from the stream, wetland and riparian area by installing 1,700-ft of fencing on the north, east and south project boundaries;
- Maintain riparian plantings and exclusion fencing for 10 years following project installation; and
- Increase community engagement and investment in future, similar urban riparian and aquatic restoration projects through outreach and community involvement.

Project Location

The project site is a 1,200-foot reach of Mercer Creek, immediately north of Helena Street, within Ellensburg city limits, located within the SE1/4 of the SE1/4 of Section 26, Township 18 N, Range 18E, W.M. The project area includes four participating private landowners and a floodplain parcel owned by Kittitas County.

Construction Overview

Instream work will be authorized by the Washington Department of Fish & Wildlife and will likely occur between the dates of October 1 and February 28 during low flow conditions. Staging of equipment and materials may begin September 1 and site restoration and revegetation may continue for up to 10 years.

Access will be from Helena Street and Airport Road with permission from private property owners. Material and equipment will be staged be more than 150 feet from the water's edge of Mercer Creek. The equipment will operate from the bank and within the isolated section of the creek as much as possible. All equipment will be washed prior to entering the project area such that is clean of debris and petroleum products. Equipment will be in good working order and will be inspected daily for leaks. For phases of construction that require pumping, an adequately sized pump screen will be attached to ensure fish protection. The contractor will have a spill containment kit onsite at all times. Refueling and maintenance of equipment or vehicles will take place at a designated area outside of the stream channel.

A stream bypass will be installed and work will occur in isolation from flowing water to minimize impacts to aquatic life and water quality. Diversion around the construction site may be accomplished with a cofferdam and a by-pass culvert or pipe, or a lined, non-erodible diversion ditch. Dissipation of flow energy at the bypass outflow will be provided to prevent damage to riparian vegetation and/or stream channel. The bypass will be in place during construction of the inset floodplain and habitat features between the timeframe of October 1 – February 28. Construction is anticipated to take approximately 4 weeks.

Sediment and erosion control BMPs will be implemented during all phases of construction. A WDFW biologist will lead fish rescue efforts and block nets will be installed to isolate fish from the work area.

Crack Willow Removal

Trees on the left (east) bank will be killed using herbicide prior to physical removal of stems and roots. To reduce costs, above-ground material will be removed but not root systems where 1) inset floodplain installation does not require removal, or 2) where rootwads in the channel do not alter flow paths. An additional 53 trees occur on right (west) bank and will be killed in place over 2020-2022, to allow for continued stream shading as left bank planted material develops. As the right bank trees begin to die, hazard limbs will be removed. Herbicide treatments include injection with herbicide, or frill-cut followed with herbicide application, during winter months. Specific treatments methods will be described in a Department of Ecology Best Management Practices form.

Construction of Inset Floodplain and Habitat Features

In-channel work will likely be accomplished using an excavator equipped with a "thumb" or equivalent piece of equipment. The inset floodplain will likely be constructed with a dozer or similar piece of equipment.

The surface elevation of the floodplain will be lower than the existing soil surface. The inset floodplain extends approximately 50 ft to the east of Mercer Creek, following the alignment of the creek's eastern bank. The floodplain grades to less than 50 ft at the northern, upstream end of the project area at its initiation; it tapers to approximately 30 ft at the downstream 350 ft of the project area. The inset floodplain extends 30 ft beyond the western bank of the creek in the lower 150 ft of the property; it also includes the 40 ft wide surface of an existing 225 ft length island in the channel.

The collector channel is approximately 100 ft length and grades from the elevation of the inset floodplain in the north to the elevation of the creek channel at its outlet. The collector channel has 0.5' steps in its profile. For ~30' it would have similar dimensions to the main channel, then there will be a 0.5' step. The next 30' will be still be channelized but with a depth of 0.5-1, then another 0.5' step. The final 30' will not be channelized, instead it will be gradually graded to the floodplain elevation. At each of these steps, smaller post-assisted log structure (PALS) will be installed. The lower 30 ft of the channel is anticipated to be seasonally to perennially backwatered, with a narrow portion excavated to the elevation of the existing Mercer Creek thalweg and wetted at the same time as the creek.

The disappearing channels are connected to the main creek channel at the upstream end and graded to the elevation of the floodplain at the lower end, without reconnecting to the main channel. The channels are designed at 120 ft and 85 ft lengths. Disappearing channels widths are approximately 5 ft at their initiation, broadening to 20-30 ft at their terminus. The upper 20-30 feet of the channels are designed with a center channel graded approximately 0.5 ft higher than the stream thalweg; at their terminus, the channels lack a deeper center channel and grade to the elevation of the inset floodplain surface.

The approximately 70-ft long crescent-shaped swales will be excavated in the north-south direction of flow; at their broadest point, they will be approximately 7 ft width. The deepest elevation of the swales will be the same as the adjacent channel invert.

Six knolls are designed in the inset floodplain to increase habitat complexity. Knolls will be elevated 6-12" above the inset floodplain (elevation of the existing ground surface), approximately 3-7 ft width and 10-15 ft length.

The Post-assisted log structures (PALS) are designed to be 10-15 ft length and 2 ft width, positioned generally perpendicular to the north-south flowpath of Mercer Creek. PALS will include 6-10 six-foot posts per structure, and posts will be installed a minimum of half of their length to secure material. Posts will be cut to 12-18" height above the floodplain, and willow stakes or wattles will be installed after posts.

Livestock Exclusion Fencing

All landowners have agreed to the installation of protective fencing for the project area that is 75 feet from the existing east bank of the stream channel. A perimeter fence will be installed along the riparian buffer using 5-strand barbed wire, with the smooth wire on the top strand to accommodate wildlife movement. The total of 1,700 ft of fencing includes an eastern boundary of the riparian buffer along the 1,200 ft length of Mercer Creek, a cross fence on the northern project boundary to prevent trespass from neighboring horses, and a cross fence on the south end of the project area boundary to prevent pedestrian entry from Helena Street. The fence will be constructed to NRCS specifications.

Stormwater Management

This proposed project will not create any impervious surfaces. As discussed in more detail in Chapter 3, the proposed project maintains and the enhances natural drainage system on the project site by containing more flood flows within a floodplain with associated wetland habitat and

reducing overland flow onto local surface streets. Potential negative stormwater impacts are therefore associated with construction and site disturbance. Since grading and excavation will exceed 1 acre, a Construction Stormwater General Permit will be required, and a Stormwater Pollution Prevention Plan (SWPPP) will be developed and followed. The contractor conducting the work will develop the SWPPP and obtain the Construction Stormwater General Permit.

Site Restoration and Revegetation

Upon project completion, all disturbed areas will be cleaned up. Two types of revegetation are planned: 1) revegetation of the inset floodplain with 1,150 plants; and 2) seeding of the areas in the riparian buffer, access and stages areas, that are disturbed during construction. Please see the enclosed restoration (Appendix C). Erosion control fabric will be installed on the disturbed areas of the creek banks.

Project Monitoring

The design engineers will provide adequate construction oversight. Overtime, Mid-Columbia Fisheries and project partners will complete routine inspections to ensure the site is functioning as designed and to maintain riparian plantings for at least three years post implementation.

Project Permits

In addition to satisfying City of Ellensburg requirements for Critical Areas Protection, the following environmental permits and approvals will be secured before construction begins.

- State Environmental Protection Act Determination, City of Ellensburg
- Endangered Species Act Section 7 Consultation
- National Historic Preservation Act Section 106 Consultation
- Clean Water Act Section 404 Permit from US Corps of Engineers – Nationwide Permit 27, Aquatic Habitat Restoration, Establishment, and Enhancement Activities
- Clean Water Act Section 401 Water Quality Certificate from Washington Department of Ecology
- Construction Stormwater General Permit from Washington Department of Ecology
- Hydraulic Project Approval from Washington Department of Fish and Wildlife

Chapter 2

Wetlands

WETLAND DELINEATION AND RATING REPORT

Mercer Creek Floodplain and Riparian Restoration

Ellensburg, WA

December 9, 2019

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1. Overview

On four dates in July 2019 (between July 8-29, 2019), Katrina Strathmann conducted a wetland delineation and rating on Mercer Creek at river mile 2.5 in Ellensburg, WA. The area evaluated comprises 12 tax parcels in city limits between Airport Road at the upstream extent to Helena Street at the downstream extent. The 100 year floodplain intercepts all 12 parcels.

Two wetlands were delineated: Wetland 1 is a 3.32 acre riverine wetland composed of the narrow stream channel corridor upstream and a broad floodplain downstream. The downstream portion of the wetland is subject to seasonal flooding. Wetland 2 is a 0.06 acre slope wetland that drains a residential pond. Wetland 1 and 2 were aggregated for rating.

The 3.38 acre wetland area is a Category II wetland based on Functions and on Special Characteristics.

2. Introduction

2.1 Site Description. The project is located on Mercer Creek at river mile 2.5 in the City of Ellensburg (Lat 47.014379°, Long -120.542469°; Figure 1). The area evaluated includes 11 tax parcels in private ownership and 1 tax parcel in public ownership (Figure 2). The seven parcels included in the restoration project area were accessible by landowner permission and surveyed in July 2019. Five additional tax parcels to the north and east were not surveyed due to lack of access. MCF staff completed an evaluation of stream and riparian habitat conditions in the project reach in June 2018, which provided background for completing the wetland delineation and rating on parcels where access in July 2019 was not possible.

Vegetation along Mercer Creek is dominated by non-native crack willow (*Salix x fragilis*). All but four of the tax parcels in the evaluated area are grazed by livestock that have access to the floodplain, streambanks and channel.

Soils are mapped as Opnish Ashy Loam, 0-2% slopes and Nack-Opnish complex, 0-2% slopes (NRCS 2019).

2.2 Project Description. Mid-Columbia Fisheries (MCF), Kittitas County Public Works, Washington Department of Fish and Wildlife and the City of Ellensburg are proposing restoration and enhancement of approximately 1250 feet of Mercer Creek within the City of Ellensburg. Project goals are to enhance riparian and wetland habitat and function, to control and replace invasive crack willow with native riparian shrubs and trees, and to improve flood management on Mercer Creek (Figure 25). Proposed actions include:

- remove crack willow from the left bank and active channel of Mercer Creek to allow for enhancement of floodplain function and restoration of native riparian and floodplain vegetation;

- remove fine sediments from the channel that have aggraded behind crack willow root wads to avoid sediments flushing downstream during flood events;
- lower the elevation of 1 acre of floodplain to increase the frequency of floodplain connection;
- create a diversity of habitat types within the 1 acre floodplain using large wood and topographic changes; and
- plant native wetland and riparian vegetation in the riparian and floodplain area.

2.3 Site Visits. Site visits were conducted on July 8, 9, 24 and 29, 2019.

2.4 Investigators. Site visits were conducted by Katrina Strathmann, plant ecologist for MCF. Ms. Strathmann is a certified wetland delineator, and is certified by the Department of Ecology in the Eastern Washington Wetland Rating System (version 2.0). Student interns for MCF Taelor Boldt, Linsdsay Schultz and Dana Whitmore assisted Ms. Strathmann during a portion of the field evaluation.

3. Survey Methodology

3.1 Wetland Determination. Wetland determination followed procedures outlined in the *US Army Corps of Engineers 1987 Wetland Delineation Manua*l (USACE 1987) and *Regional Supplement for the Arid West* (USACE 2008). Potential wetland areas were first identified visually according to topographic position and vegetation. Field work was aided by a review of digital topography contours and aerial photos. At each sampling location, a vegetation sampling plot was centered over a small soil pit. Data to make a wetland determination were collected within the plot.

Wetland Vegetation

Vegetation was evaluated using a nested plot method, with plot size varying according to growth form: tree species cover was collected in a 30 ft radius plot; shrub cover and woody vine cover were collected within 15 ft radius plots; and herbaceous species within a 5 ft radius plot. Species were recorded using scientific names, and wetland indicator status and origin status were identified (USACE 2019).

Hydric Soils

Soils were evaluated using a soil pit located in the center of each plot; pits were dug to 16-18" depth unless large cobble was encountered and it was not possible to reach additional depth using a shovel. The *Pocket Guide to Hydric Soil Field Indicators based on Field Indicators of Hydric Soils in the United States (2016)* was used to determine hydric soil indicators (NRCS 2017 and WTI 2017).

Hydrology

The ordinary high water mark (OHWM) was identified using field verification methods described in *Identification of the OHWM in the Arid West Region* (USACE 2008). Digital maps of the 100-year flood zone (Kittitas County 2019), LiDAR (DNR 2019), and April 2017 aerial photos were reviewed. Inundation was modelled in the project area for depth and velocity at estimated 2 yr, 10 yr, and 100 yr flow events (Watershed Sciences for Kittitas County Public Works, unpublished data; Figure 3). The model was based on a previous 100 yr flood model and additional site survey data taken in September 2019.

The wetland boundary was mapped using sample point data and visual evaluation of plants species, topography and indicators of hydrology. The field-mapped boundary was refined using LiDAR, aerial photo imagery from April 21, 2017, and the modelled 2 yr flow.

3.2 Wetland Rating. Wetland rating followed the methods described in the *Washington State Wetland Rating System for Eastern Washington* (Hruby 2014).

4. Results

Twelve sampling locations were established to determine the wetland boundary. Six sampling points were determined to be wetland areas.

Wetland 1 is a riverine wetland that encompasses both banks and the channel of Mercer Creek (channel width <17 ft) and frequently inundated areas. Wetland 1 is composed of both forested and emergent vegetation. Wetland 2 is slope wetland composed of shallow and narrow ditches that drain the residential pond of a landowner on parcel 702733 to the east of the project area. It is comprised entirely of heavily grazed emergent vegetation (0-12”). Due to the small size of Wetland 2 (0.06 acres), it is aggregated with Wetland 1.

The composite Wetland 1 (includes the areas of Wetland 1 and Wetland 2) totals 3.38 acres and was used for rating (Figure 5).

The riverine wetland is confined to the stream channel for approximately 830 ft below Airport Road, as observed on LIDAR imagery, modelled inundation in 2-yr events, and observation of the OHWM. The channel is moderately downcut in this upstream portion. In the restoration project area at parcel #572733, the wetland broadens and reaches 200 ft at its widest points upstream and downstream of Idaho Street. The channel is not significantly downcut from where it enters parcel #572733 to the culvert at Helena Street at the downstream extent.

4.1 Wetland Delineation.

Wetland Vegetation

Dominant plant species and status in sampling points classified as wetland:

Species	Wetland indicator status (USACE 2019)	Origin status (NRCS 2019)
Agrostis stolonifera	FACW	Non-native
Elymus repens	FAC	Noxious weed
Juncus balticus	FACW	Native
Myosotis scorpioides	FACW	Non-native
Poa pratensis	FAC	Non-native
Ranunculus repens	FAC	Non-native
Salix x fragilis	FAC	Non-native
Schedonorus arundianceae	FACU	Non-native
Trifolium repens	FACU	Non-native

Dominant plant species and status in sampling points classified as non-wetland:

Species	Wetland indicator status (USACE 2019)	Origin status (NRCS 2019)
Carex praegracilis	FACW	Native
Cirsium arvense	FACU	Noxious weed
Elymus repens	FAC	Noxious weed
Holcus lanatus	FAC	Non-native
Phleum pratensis	FACU	Non-native
Plantago major	FAC	Non-native
Poa pratensis	FAC	Non-native
Salix x fragilis	FAC	Non-native
Schedonorus arundianceae	FACU	Non-native
Trifolium repens	FACU	Non-native
Tripleurospermum maritiumum	FACU	Noxious weed

Salix x fragilis is the only plant species observed in the tree and shrub stratum.

Wetland Soils.

Soil characteristics of each soil pit were evaluated. All sample pits were textured as sandy clay loam, clay loam, silty clay and clays and sandy clay loam; non-wetland sample Point #12 textured as loamy sand.

Sampling Point #	Hydric Soil Indicator
1	Redox Dark Surface (F6)
4	Thick Dark Surface (A12)
5	Thick Dark Surface (A12)
8	Redox Dark Surface (F6)
10	Depleted Below Dark Surface (A11)

11	Other (saturation at 10”; water table at 12”)

Wetland Hydrology

The mapped wetland occurs almost entirely within the 100 yr floodplain (Figure 3).

On July 8 and July 9, 2019 site visits, shallow surface water was visible in the ditches of Wetland 2 (Figure 18); no water was present on July 24 and July 29, 2019. Sampling point #8 is representative of the slope wetland portion of the wetland.

Periodic flooding of >2 weeks duration, occurring at <10 yr intervals, in the wetland area on parcel #692733 was reported by a neighbor. Aerial imagery from April 21, 2017 shows dark green areas characteristic of high-productivity wetlands within the wetland boundary (Figure 5). A stream survey on June 12, 2018 (Figure 19) and a site visit on May 17, 2018 (Figure 20) provided guidance for the extent of inundation of >2 week duration above the OHWM.

Evidence of wetland hydrology was observed at the six sampling points classified as wetland:

Sampling Point #	Hydric Soil Indicators
1	High Water Table (A2), Saturation (A3), Dry Season Water Table (C2), FAC-Neutral Test (D5)
4	High Water Table (A2), Saturation (A3), Dry-Season Water Table (C2)
5	High Water Table (A2), Saturation (A3), Dry-Season Water Table (C2)
8	Saturation (A3), Inundation Visible on Aerial Imagery (B7)
10	High Water Table (A2), Saturation (A3), Inundation Visible on Aerial Imagery (B7), Dry-Season Water Table (C2)
11	High Water Table (A2), Saturation (A3), Inundation Visible on Aerial Imagery (B7), Dry-Season Water Table (C2), FAC-Neutral Test (D5)

3.2 Wetland Rating.

The hydrogeomorphic (HGM) class of Wetland 1 is Riverine and is 3.32 acres and is dominated by Forested and Emergent (0-12”) vegetation types. The HGM of Wetland 2 is Slope wetland, and is dominated by Emergent (0-12”) vegetation. Following Hruby (2014), the two wetland types were aggregated for rating as Wetland 1.

Cowardin classes (Figure 6) in the wetland and Plant Structure (Figure 7) providing roughness are:

Cowardin Class	Percentage
Forested	46.92%
Emergent 0-12"	29.65%
Emergent 12-40"	17.72%
Emergent >40"	5.71%

Plant Structure	Percentage
Forest/Shrub	60.15%
Ungrazed emergent	17.94%

The wetland is inundated during high flows (Figures 19 and 20), however ponded depressions are limited in extent.

The wetland is rated a Category II wetland based on functions.

The wetland is rated as a Category II based on Special Characteristics. It is classified as a Floodplain Forest due to the location of the forested component in the 100 year floodplain.

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6. Figures

Figure 1. Project location

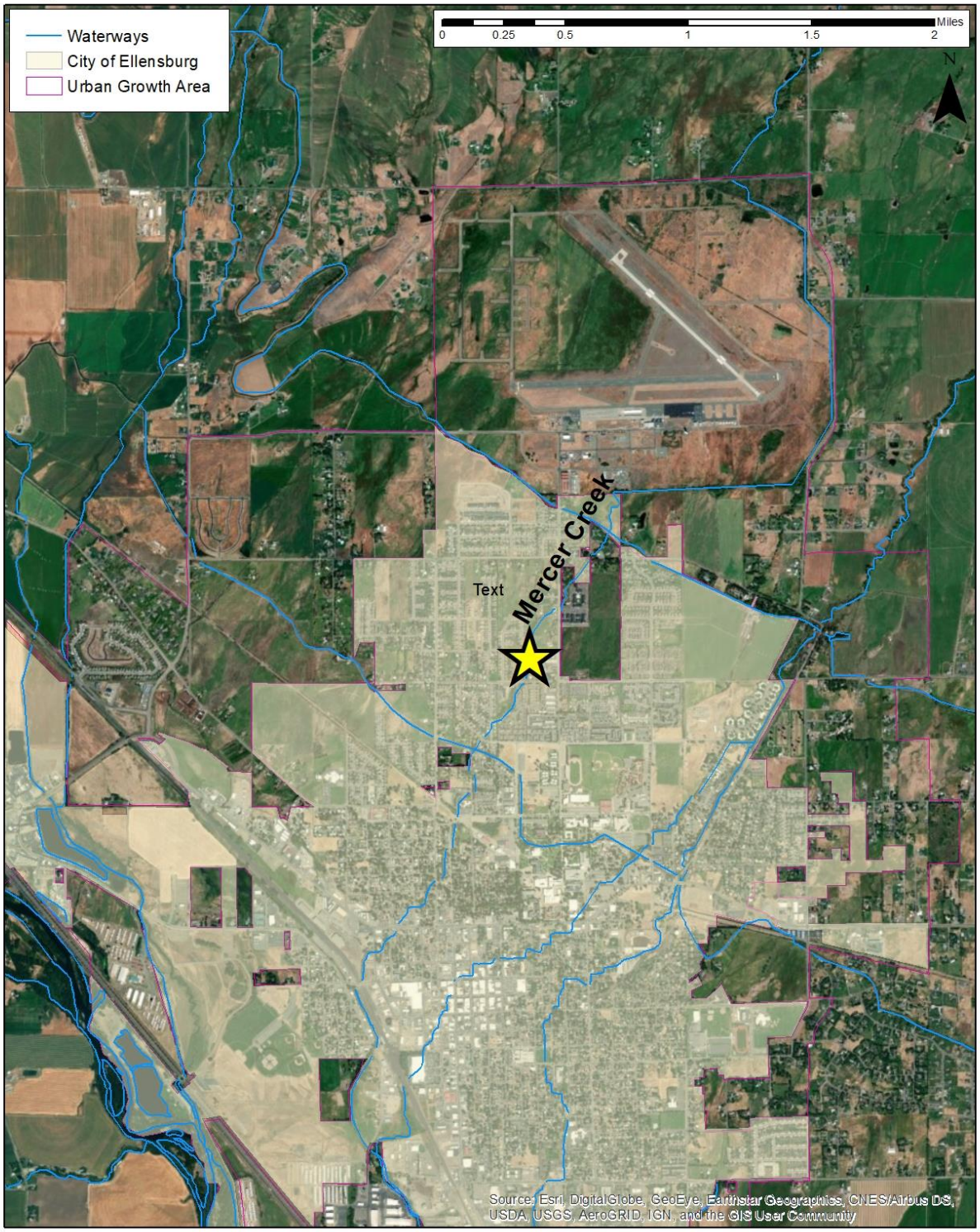


Figure 2. Project Area

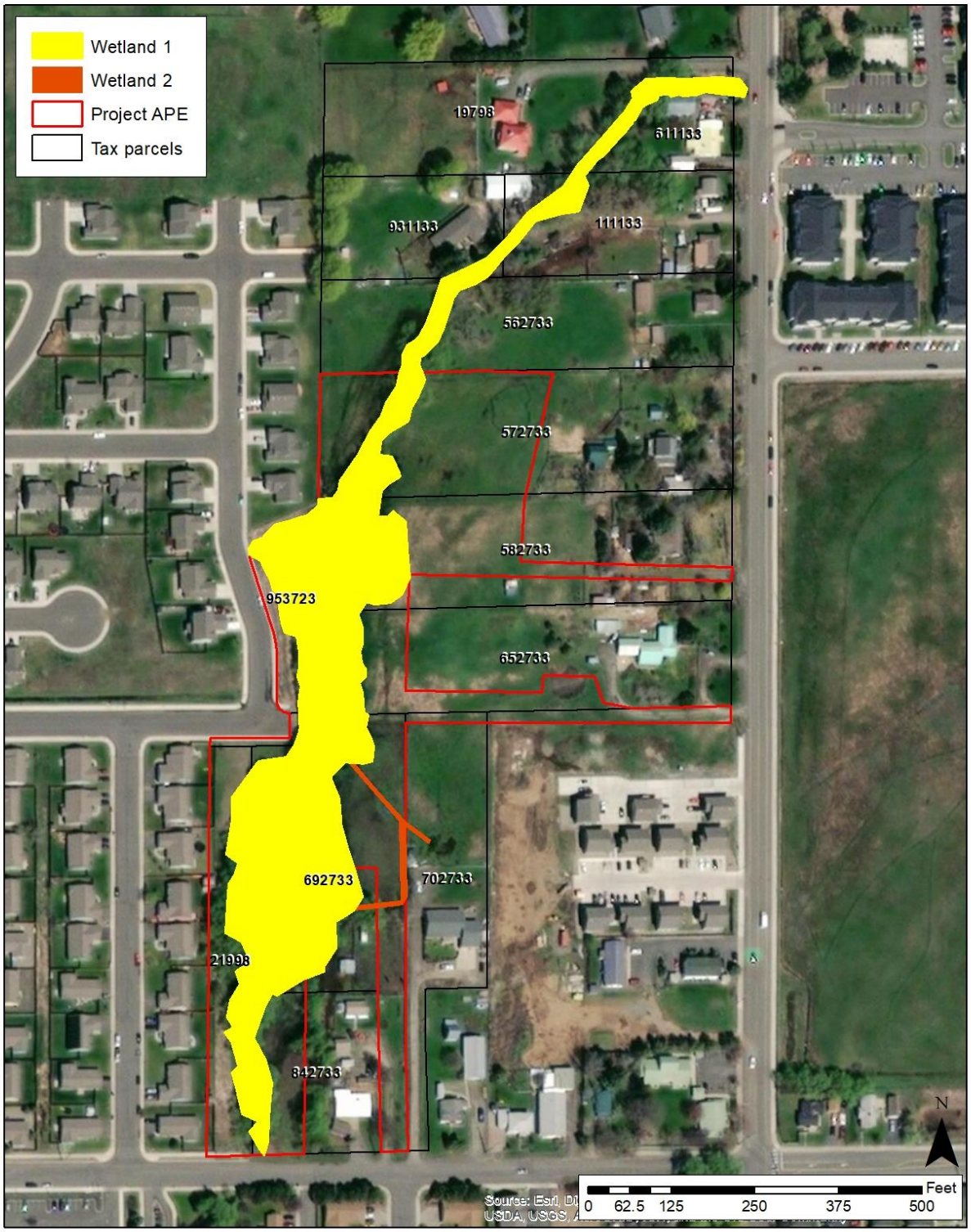


Figure 3. FIRM Floodplain and Modelled Inundation

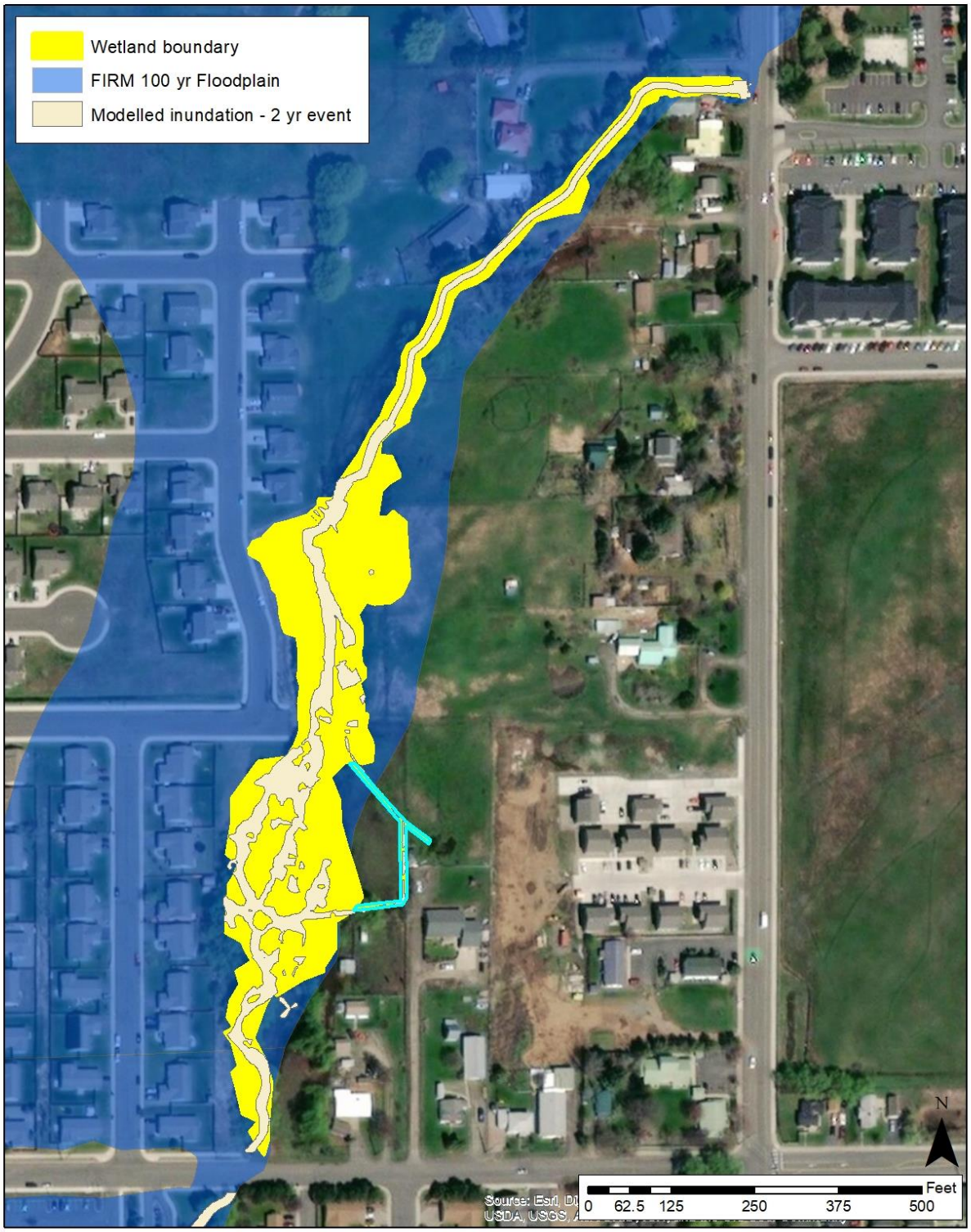


Figure 4. Stream flow of Wilson Creek at Sanders, April through September in 2015 and 2016. From *Naneum, Wilson, and Cherry Creek Watershed Assessment* by Jacobs Engineering Group Inc for Kittitas County Public Works. June 2017.

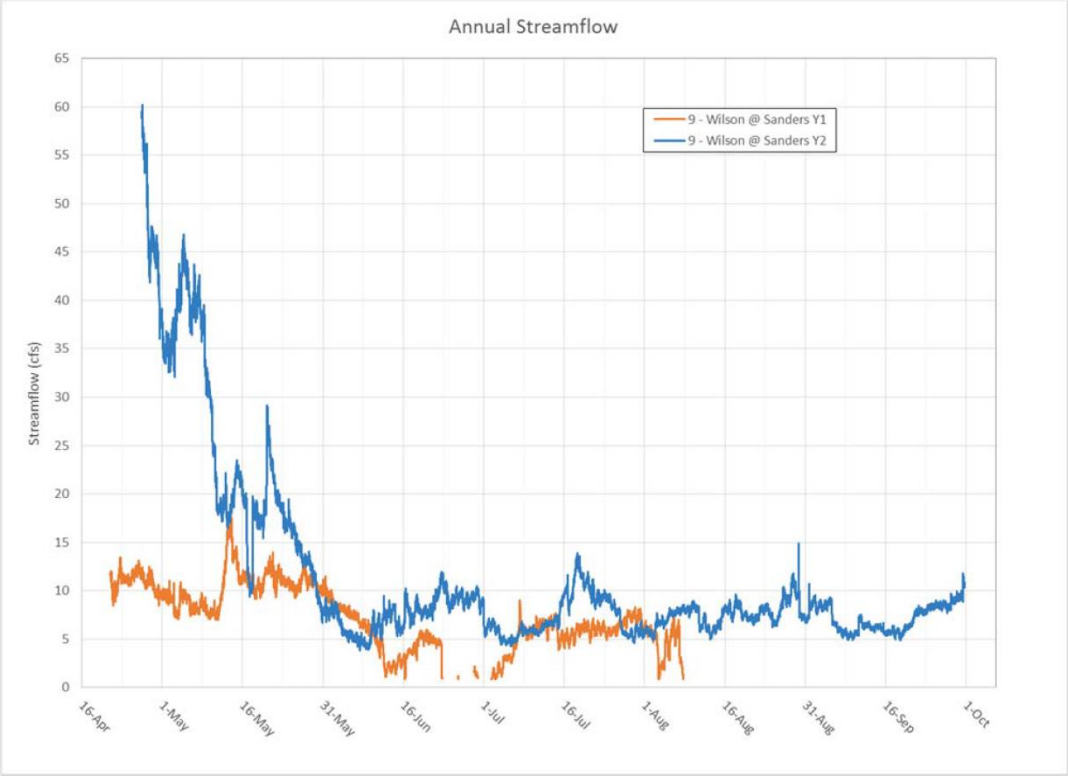


Figure 5. Wetland Delineation Sampling Locations

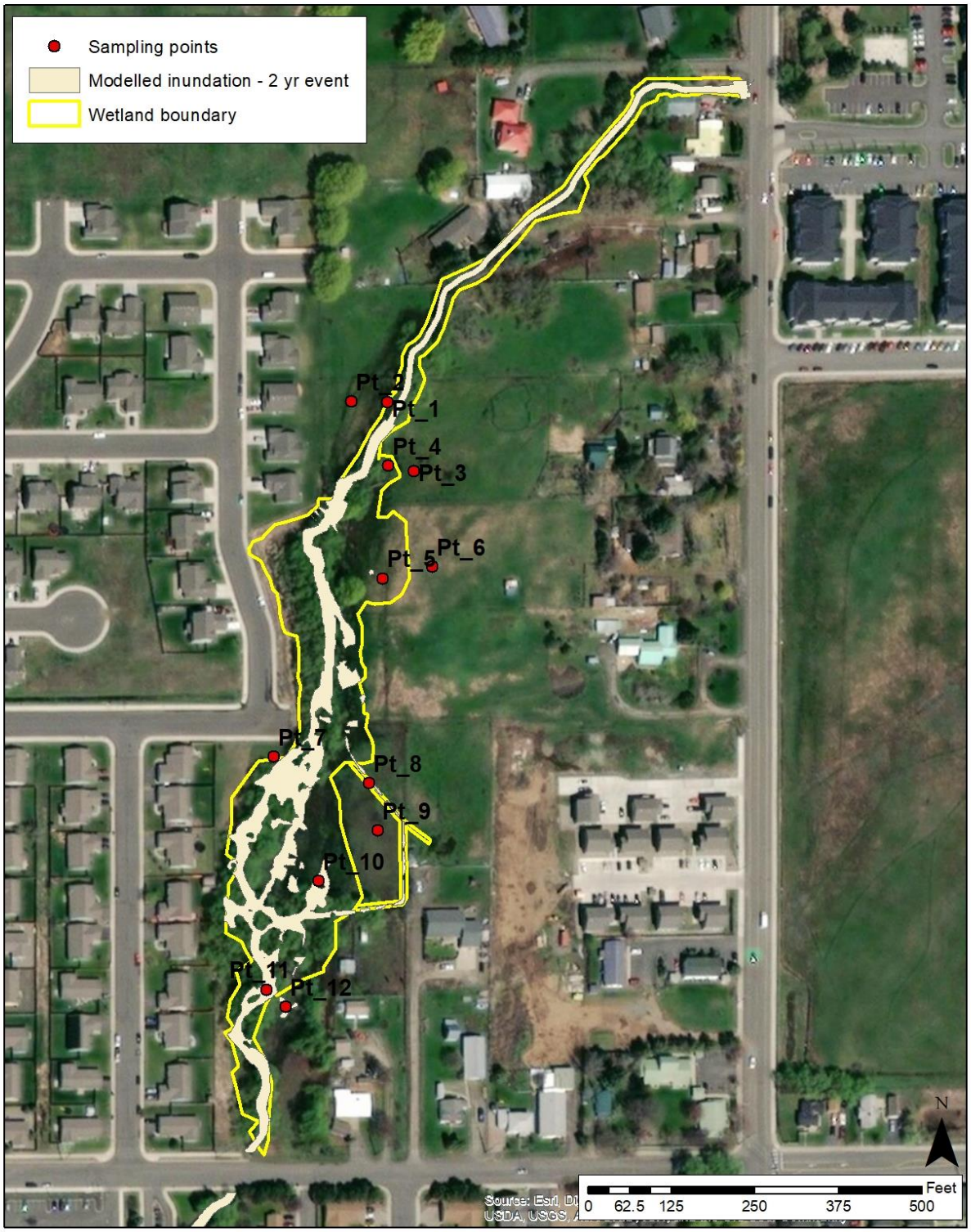


Figure 6. Cowardin Classes

Figure 7. Structure of Plant Cover

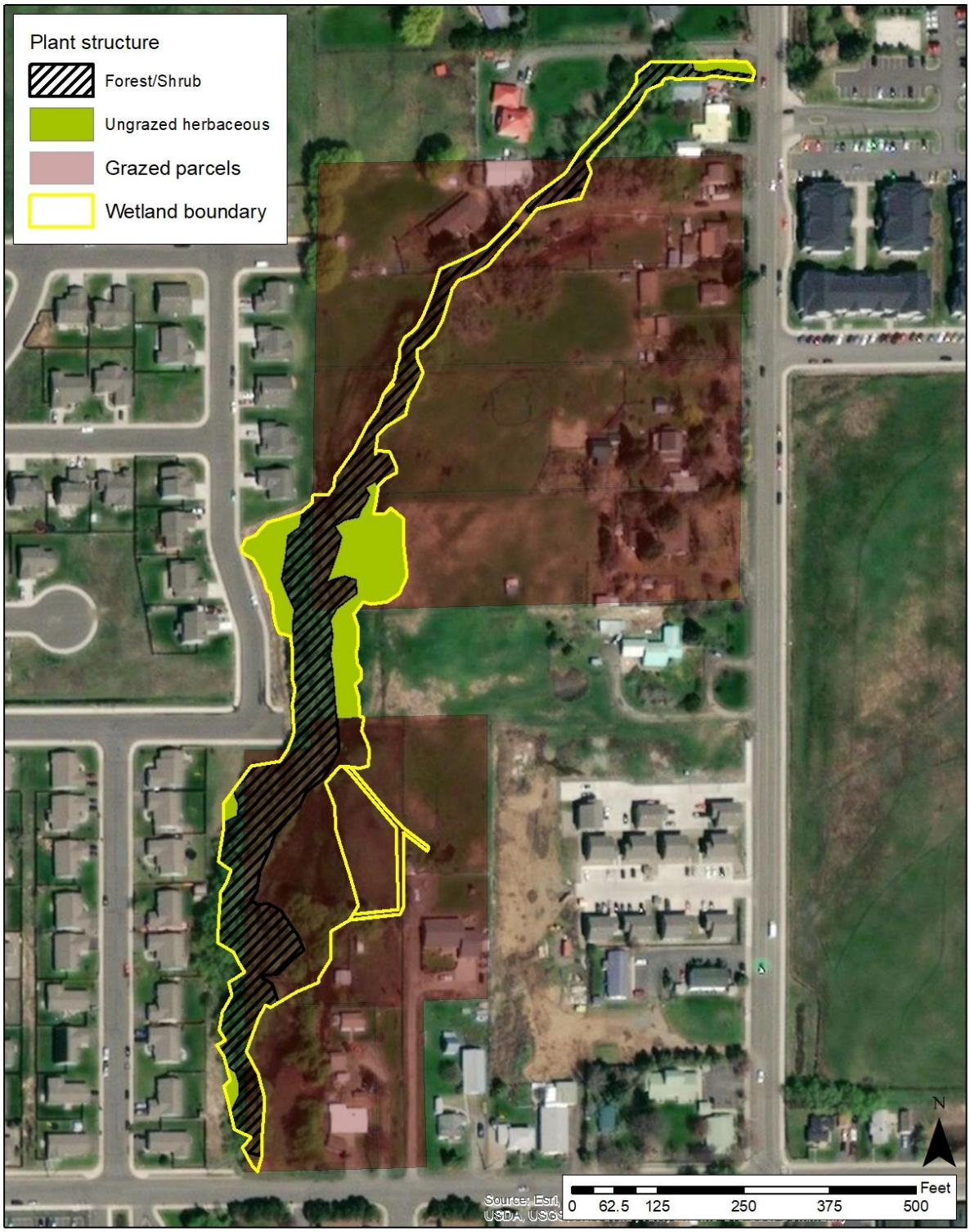


Figure 8. Contributing Basin: Naneum Creek-Wilson Creek

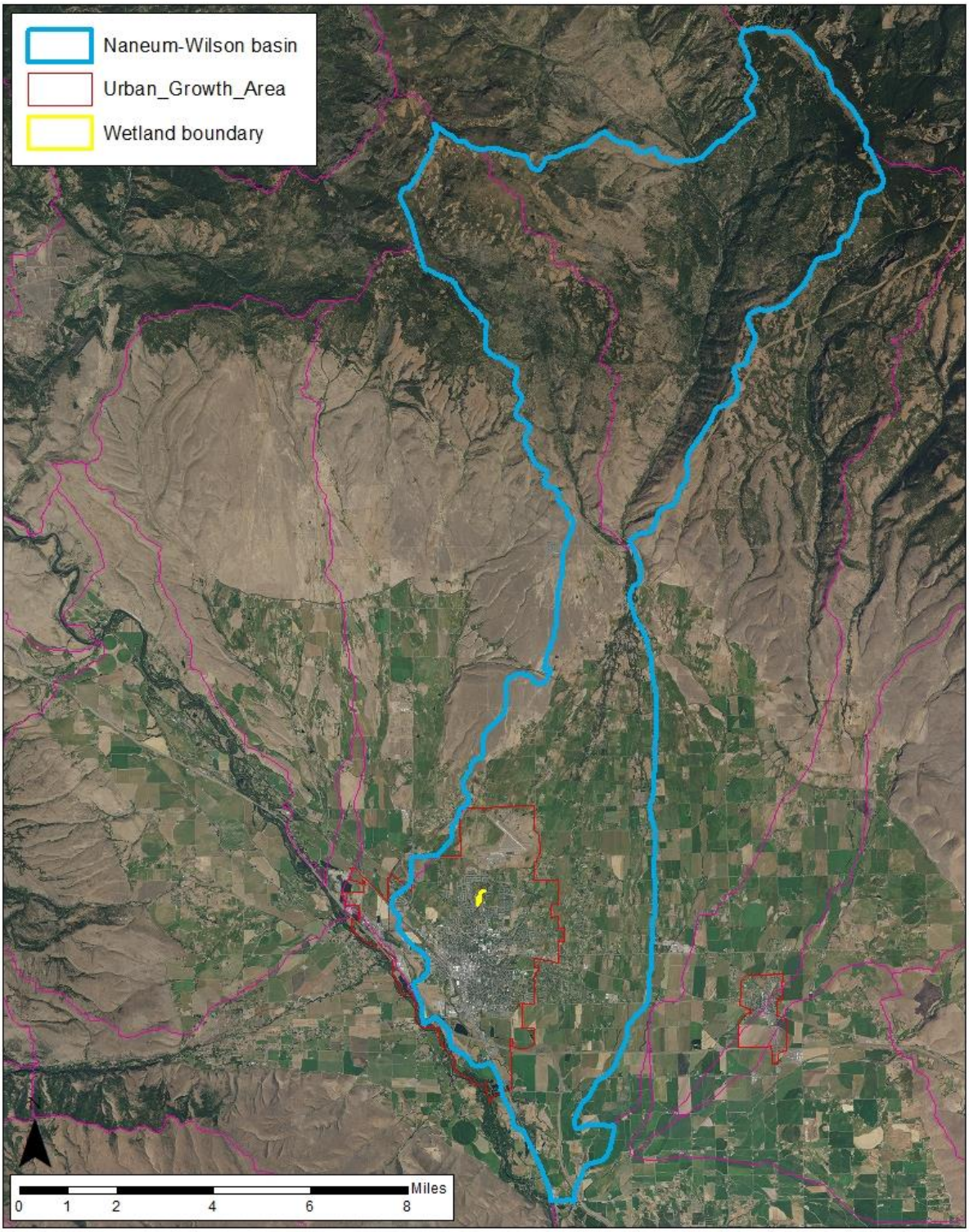


Figure 9. Surrounding Land Use

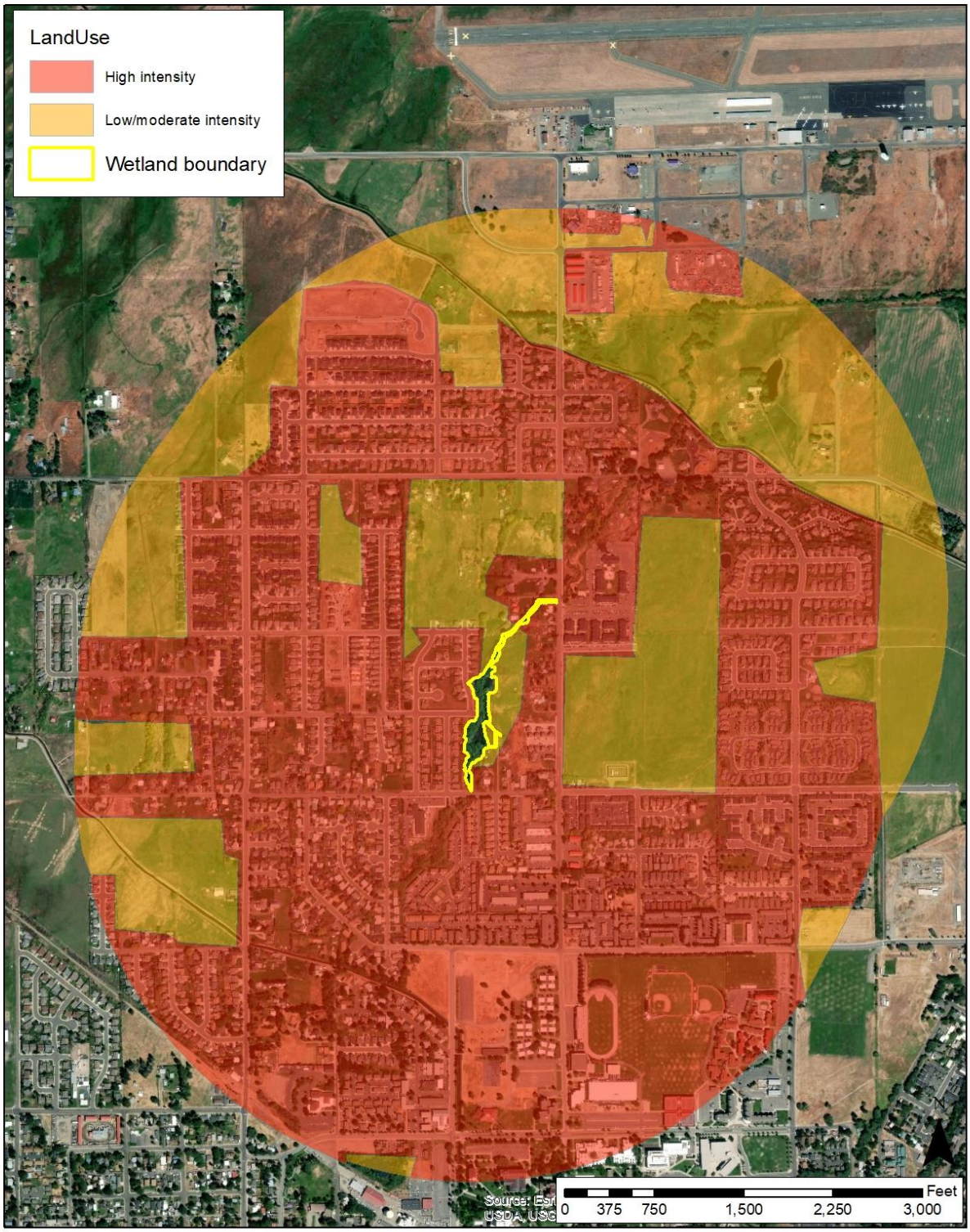
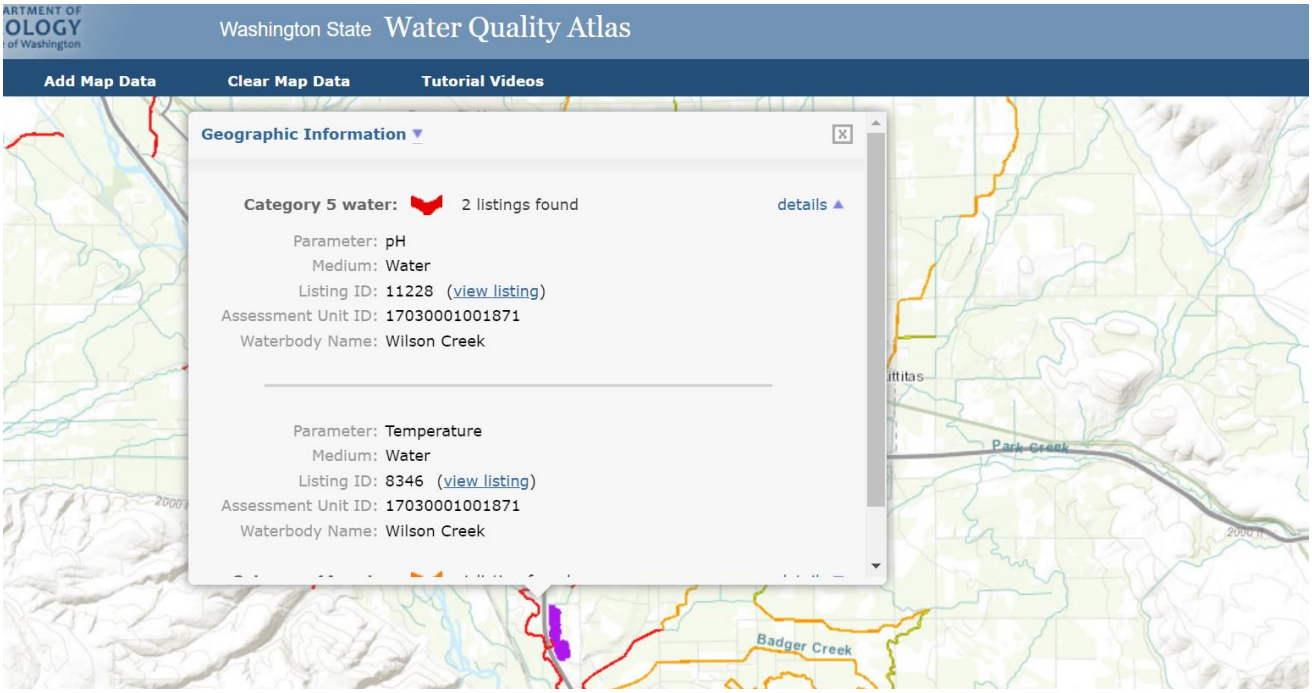


Figure 10. 303(d) Listed Waters. Mercer Creek is a tributary to Wilson Creek, which has its confluence with the Yakima River upstream of the Yakima Canyon. Wilson Creek has two 303(d) listings: temperature and pH.



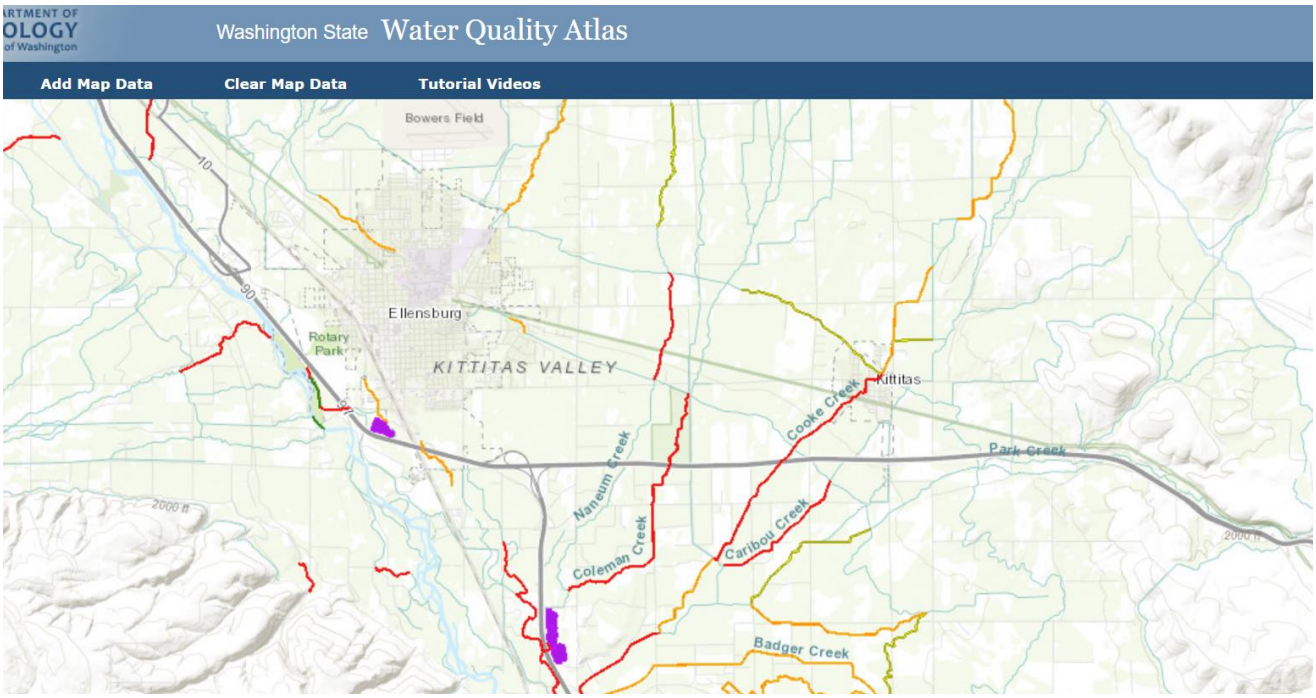


Figure 11. Water Quality Improvement Projects. Four water quality improvement projects exist for the basin: Upper Yakima River Watershed DDT and TSS TMDL, Wilson Creek Subbasin Bacteria TMDL, and Yakima River Basin Toxics TMDL (in development). The fourth TMPL, Upper Yakima Tributaries Temperature TMDL, is not applicable to the low elevation portions of Kittitas Valley's tributaries.

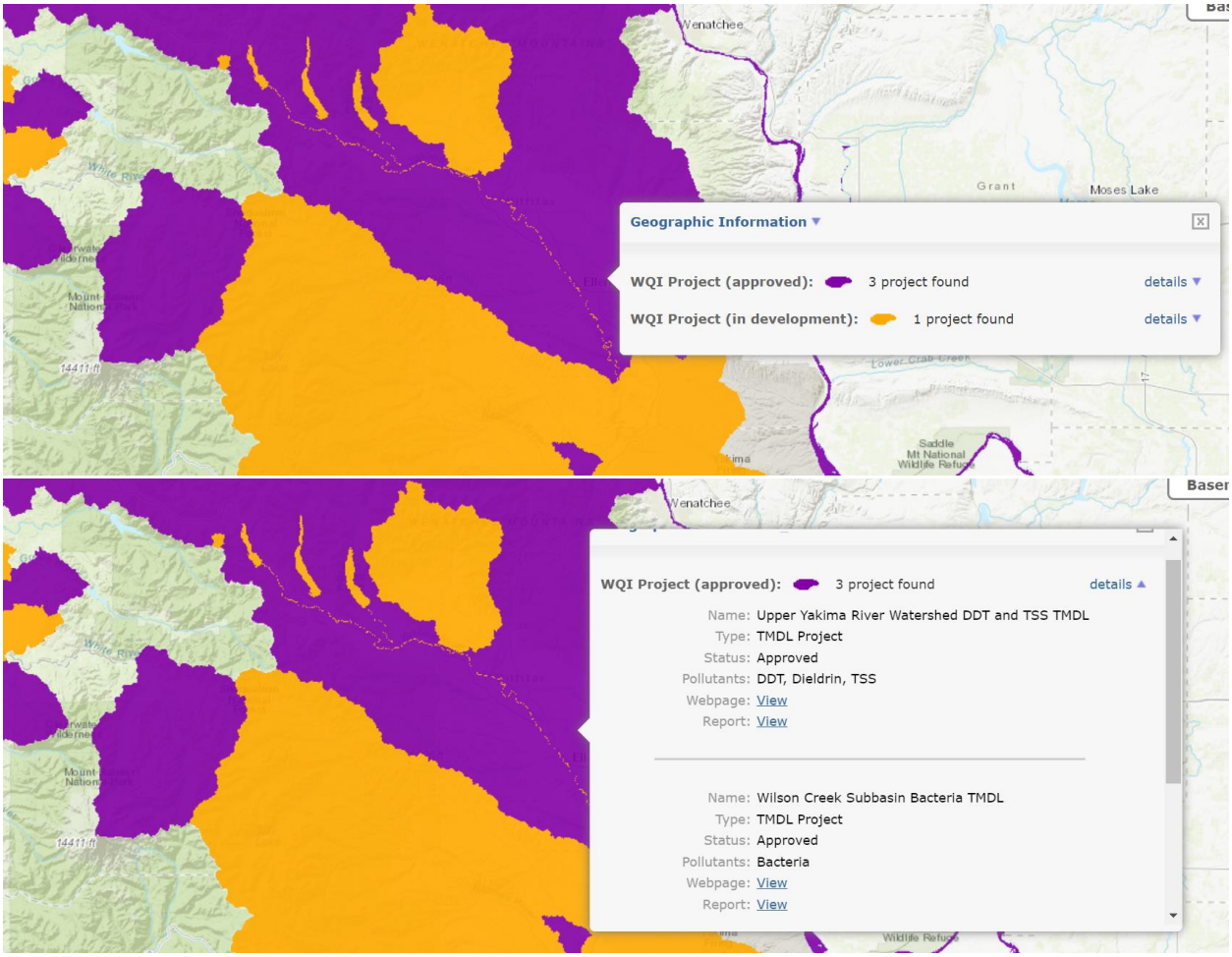


Figure 12. Saturated soil at sample Point #5.

Figure 13. Vegetation at sample Point #8, representing the slope feature of the wetland.

Figure 14. Vegetation and soils at sample Point #9. The area at the sample point is not within the wetland.

Figure 15. Vegetation at sample Point #10 on July 9, 2019.

Figure 16. Water table present and saturated soils at sample Point #10 on July 9, 2019.

Figure 17. Heavy grazing in the vicinity of sample Points #11 and #12.

Figure 18. Slope wetland feature on July 8, 2019 with surface water. On July 24, 2019, surface water was no longer present.

Figure 19. Mercer Creek on June 12, 2018 in downstream parcel #21998 owned by Kittitas County.

Figure 20. Flood flows in Mercer Creek on May 17, 2018, in downstream parcel #21998 owned by Kittitas County.

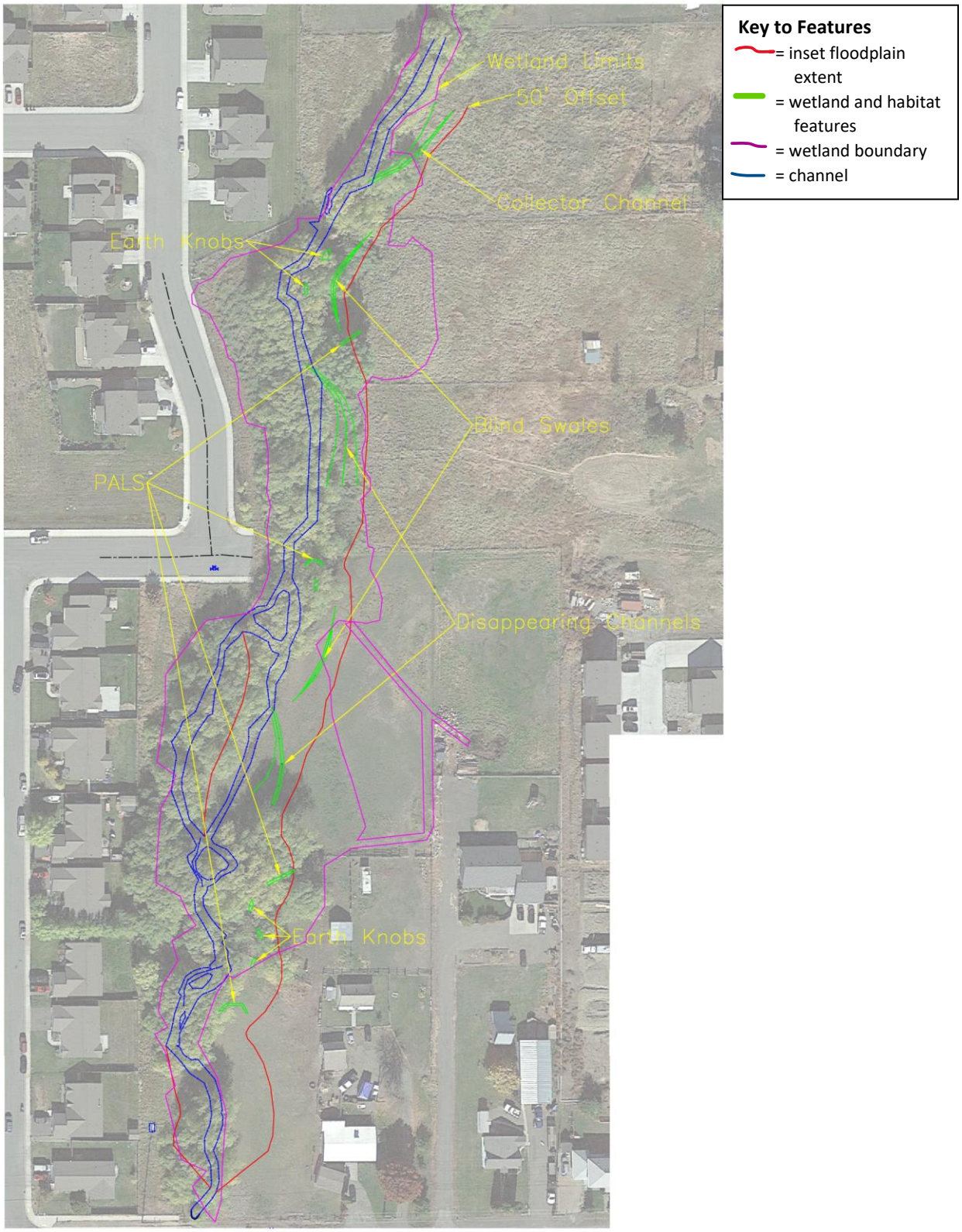
Figure 21. Parcel #562733 immediately upstream of project area. Creek evaluation by MCF on June 12, 2018.

Figure 22. A cattle crossing located in the creek upstream of project area on parcels #931133 and 111133. Creek evaluation by MCF on June 12, 2018.

Figure 23. Mercer Creek in a confined channel in the upstream portion of the wetland area on parcel #611133. Stream and habitat evaluation by MCF on June 12, 2018.

Figure 24. Flooding on Mercer Creek downstream of the project area on May 17, 2018, where floodwaters are leaving the channel and flowing down Regal Street road.

Figure 25. Preliminary design of the project area.



Chapter 2

APPENDIX A

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mercer Creek Restoration City/County: Kittitas Sampling Date: 7/29/2019

Applicant/Owner: Mid-Columbia Fisheries Enhancement Group State: WA Sampling Point: Pt 1

Investigator(s): Katrina Strathmann Section, Township, Range: T18N R18E S26SE1/4

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1%

Subregion (LRR): B-Columbia Snake River Plateau Lat: 47.015554 Long: -120.542112 Datum: NAD83

Soil Map Unit Name: Opnish Ashy Loam, 0-2% slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix x fragilis	95	Y	FAC
2.			
3.			
4.			
	95 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1. None			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. Agrostis stolonifera	80	Y	FACW
2. Iris missouriensis	10		FACW
3. Ranunculus repens	10		FAC
4. Schedonorus arundinaceae	3		FACU
5. Equisetum arvense	2		FAC
6. Trifolium repens	1		FACU
7. Juncus articulatus	1		OBL
8. Myosotis scorpioides	1		FACW
	108 = Total Cover		
Woody Vine Stratum (Plot size: 15 ft radius)			
1. None			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	1	x 1 =	2
FACW species	91	x 2 =	182
FAC species	107	x 3 =	214
FACU species	4	x 4 =	16
UPL species	0	x 5 =	0
Column Totals:	203 (A)		414 (B)

Prevalence Index = B/A = 2.04

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

The location is heavily grazed with vegetation very closely cropped (<6" ht).

SOIL

Sampling Point: Pt 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8"	5YR 3/3	100%	n/a				silty clay	Many coarse roots
8-13"	5YR 2.5/1	85%	5YR 4/4	15%	C	M	clay	Many fine roots
13-15"	10YR 3/1	100%	n/a				clay	Slightly mucky

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

Restrictive cobble at 15" depth. Saturation at 10". Redox at 8-13" but not visible below saturation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ✓ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 11.5"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 10"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Saturation at 10". Water table present at 11.5" and rising.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mercer Creek Restoration City/County: Kittitas Sampling Date: 7/29/2019

Applicant/Owner: Mid-Columbia Fisheries Enhancement Group State: WA Sampling Point: Pt 2

Investigator(s): Katrina Strathmann, Lindsay Schultz Section, Township, Range: T18N R18E S26SE1/4

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1%

Subregion (LRR): B-Columbia Snake River Plateau Lat: 47.015557 Long: -120.542223 Datum: NAD83

Soil Map Unit Name: Opnish Ashy Loam, 0-2% slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix x fragilis	2	N	FAC
2.			
3.			
4.			
	2 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1. None			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. Schedonorus arundinaceae	50	Y	FACU
2. Holcus lanatus	25	Y	FAC
3. Carex praegracilis	10		FACW
4. Juncus balticus	7		FACW
5. Taraxacum officinale	7		FACU
6. Trifolium pratense	5		FACU
7. Equisetum arvense	1		FAC
8. Carex pellita	1		OBL
	106 = Total Cover		
Woody Vine Stratum (Plot size: 15 ft radius)			
1. None			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	1	x 1 =	2
FACW species	17	x 2 =	34
FAC species	28	x 3 =	84
FACU species	62	x 4 =	248
UPL species	0	x 5 =	0
Column Totals:	108 (A)		368 (B)

Prevalence Index = B/A = 3.41

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

The location is moderately grazed.

SOIL

Sampling Point: Pt 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8"	7YR 3/1	98%	2.5YR 4/6	2%	C	M	silty clay	Soil dry, many roots
8-13"	10YR 3/2	98%	7.5YR 4/6	2%	C	M	silty clay	Fine roots, redox very faint
13-15"	10YR 4/2	93%	5YR 3/4	7%	C	M	silty clay	Moist

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

Restrictive cobble at 15" depth. Saturation at 10". No saturated soil present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No saturation present in soil pit.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mercer Creek Restoration City/County: Kittitas Sampling Date: 7/29/2019

Applicant/Owner: Mid-Columbia Fisheries Enhancement Group State: WA Sampling Point: Pt 3

Investigator(s): Katrina Strathmann Section, Township, Range: T18N R18E S26SE1/4

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1%

Subregion (LRR): B-Columbia Snake River Plateau Lat: 47.016833 Long: -120.541847 Datum: NAD83

Soil Map Unit Name: Opnish Ashy Loam, 0-2% slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1. None			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. Schedonorus arundinaceae	70	Y	FACU
2. Carex praegracilis	20	Y	FACW
3. Taraxacum officinale	7		FACU
4. Equisetum arvense	7		FAC
5. Juncus balticus	5		FACW
6. Agrostis stolonifera	5		FACW
7.			
8.			
	114 = Total Cover		
Woody Vine Stratum (Plot size: 15 ft radius)			
1. None			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	30	x 2 =	60
FAC species	7	x 3 =	51
FACU species	77	x 4 =	308
UPL species	0	x 5 =	0
Column Totals:	114 (A)		339 (B)

Prevalence Index = B/A = 3.68

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

The location is moderately grazed.

SOIL

Sampling Point: Pt 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6"	7YR 2.5/1	100					silty clay	Lots of fibrous roots; moist
6-12"	10YR 3/2	90	5YR 4/6	10	C	M	clay	Fine roots
12-16"	10YR 3/1	90	2.5YR 4/6	10	C	M	clay	Moist but not glistening

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
✓ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Thick layer of grass and roots on surface. Cobbles present in 12-16" layer. No saturation present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No saturation present in soil pit.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mercer Creek Restoration City/County: Kittitas Sampling Date: 7/8/2019

Applicant/Owner: Mid-Columbia Fisheries Enhancement Group State: WA Sampling Point: Pt 4

Investigator(s): Katrina Strathmann Section, Township, Range: T18N R18E S26SE1/4

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): <3%

Subregion (LRR): B-Columbia Snake River Plateau Lat: 47.016854 Long: -120.541999 Datum: NAD83

Soil Map Unit Name: Opnish Ashy Loam, 0-2% slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix x fragilis	85	Y	FAC
2.			
3.			
4.			
	85 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1. Salix x fragilis	10		FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. Ranunculus repens	35	Y	FAC
2. Elymus repens	25	Y	FAC
3. Myosotis scorpioides	10		FACW
4. Lycopus americanus	5		OBL
5. Schedonorus arundinaceae	2		FACU
6. Agrostis stolonifera	1		FACW
7. Rumex crispus	1		FAC
8. Alopecurus pratensis	1		FACW
	80 = Total Cover		
Woody Vine Stratum (Plot size: 15 ft radius)			
1. Solanum dulcamara	1		FAC
2.			
	1 = Total Cover		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	12	x 2 =	24
FAC species	157	x 3 =	471
FACU species	2	x 4 =	8
UPL species	0	x 5 =	0
Column Totals:	176 (A)		508 (B)

Prevalence Index = B/A = 2.88

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

Many Sapling/Shrub stratum Salix are grazed to <3 ft height. Persicaria lapathifolia (FACW) is also present in the Herb stratum at 1%. Location is very heavily grazed and trampled with exposed bare soil.

SOIL

Sampling Point: Pt 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5"	5YR 2.5/1	100					clay loam	
5-12"	10YR 3/1	100					SCL*	Small gravel present
12-16"	10YR 4/1	80	7.5YR 5/6	20	C	M	SCL*	Highly saturated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ✓ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

Saturation at 7". Redox features around gravel and cobble in 12-16" layer.
*SCL = silty clay loam

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ✓ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 9"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 7"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Water table rose from 12" to 9" during sampling.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mercer Creek Restoration City/County: Kittitas Sampling Date: 7/8/2019

Applicant/Owner: Mid-Columbia Fisheries Enhancement Group State: WA Sampling Point: Pt 5

Investigator(s): Katrina Strathmann Section, Township, Range: T18N R18E S26SE1/4

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1%

Subregion (LRR): B-Columbia Snake River Plateau Lat: 47.016393 Long: -120.542032 Datum: NAD83

Soil Map Unit Name: Opnish Ashy Loam, 0-2% slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1. None			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft radius)			
1. Juncus balticus	35	Y	FACW
2. Schedonorus arundinaceae	30	Y	FACU
3. Poa pratensis	20	Y	FAC
4. Carex pellita	11		OBL
5. Equisetum arvense	2		FAC
6.			
7.			
8.			
	98	= Total Cover	
Woody Vine Stratum (Plot size: 15 ft radius)			
1. None			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.6% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	11	x 1 =	11
FACW species	35	x 2 =	70
FAC species	22	x 3 =	66
FACU species	30	x 4 =	120
UPL species	0	x 5 =	0
Column Totals:	176 (A)		267 (B)

Prevalence Index = B/A = 1.52

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: Pt 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12"	10YR 2/1	100					clay	Roots, soil moist and dark
12-18"	10YR 4/1	60	5YR 4/4	40	C	PL/M	clay	Completely saturated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ✓ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Soil moist to 8"; saturated 8-18"; water table at 18".

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ✓ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 18"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 8"

Wetland Hydrology Present? **Yes** ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Saturated 8-18"; fully saturated and glistening/dripping 13-18". Water table present at 18".

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mercer Creek Restoration City/County: Kittitas Sampling Date: 7/8/2019

Applicant/Owner: Mid-Columbia Fisheries Enhancement Group State: WA Sampling Point: Pt 6

Investigator(s): Katrina Strathmann Section, Township, Range: T18N R18E S26SE1/4

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1%

Subregion (LRR): B-Columbia Snake River Plateau Lat: 47.01644 Long: -120.541737 Datum: NAD83

Soil Map Unit Name: Opnish Ashy Loam, 0-2% slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1. None			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. Poa pratensis	30	Y	FAC
2. Cirsium arvense	25	Y	FACU
3. Elymus repens	25	Y	FAC
4. Phleum pratensis	20	Y	FACU
5. Schedonorus arundinaceae	20	Y	FACU
6. Convulvulus arvensis	5		UPL
7. Tragopogon dubium	2		UPL
8. Equisetum arvense	2		FACU
	129 = Total Cover		
Woody Vine Stratum (Plot size: 15 ft radius)			
1. None			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	55	x 3 =	165
FACU species	67	x 4 =	268
UPL species	7	x 5 =	35
Column Totals:	129 (A)		468 (B)

Prevalence Index = B/A = 3.63

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: Pt 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10"	2.5YR 3/1	100					clay	Soil surface dry
10-18"	7.5YR 3/2	90	2.5YR 4/6	10	C	M	clay	Fine roots, soil moist but crumbly

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

Upper soil layer dry, with dense sod and lots of roots at surface. Bottom layer is moist but not saturated; lower soils are dry and crumbling. Fine roots present in lower soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mercer Creek Restoration City/County: Kittitas Sampling Date: 7/29/2019

Applicant/Owner: Mid-Columbia Fisheries Enhancement Group State: WA Sampling Point: Pt 7

Investigator(s): Katrina Strathmann, L. Schultz, D. Whitmore Section, Township, Range: T18N R18E S26SE1/4

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1%

Subregion (LRR): B-Columbia Snake River Plateau Lat: 47.01566 Long: -120.542686 Datum: NAD83

Soil Map Unit Name: Opnish Ashy Loam, 0-2% slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Adjacent to mapped NWI Forested/Shrub Wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix x fragilis	45	Y	FAC
2.			
3.			
4.			
	45 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1. None			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. Trifolium repens	85	Y	FACU
2. Taraxacum offinale	15		FACU
3. Iris missouriensis	10		FACW
4. Ranunculus repens	10		FAC
5. Agrostis stolonifera	10		FACW
6. Trifolium pratense	5		FACU
7. Symphyotrichum occentalis	5		FAC
8. Cichorium intybus	5		FACU
	145 = Total Cover		
Woody Vine Stratum (Plot size: 15 ft radius)			
1. None			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	60	x 3 =	180
FACU species	110	x 4 =	440
UPL species	0	x 5 =	0
Column Totals:	190 (A)		660 (B)

Prevalence Index = B/A = 3.47

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

Also present in Herb statrum: Plantago lanceolata (FAC) at 2%; Daucus carota (UPL) at 1%.

SOIL

Sampling Point: Pt 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4"	10YR 5/2	70	10YR 6/6	30	C	M	clay	Dry
4-12"	10YR 4/2	40%	5YR 4/6	60	C	M	sandy clay	Dry

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

Lots of medium cobbles throughout. Large cobbles restricted ability to sample more deeply. Soil is dry and appears compacted and blocky.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Dry to pit depth at 12.5".

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mercer Creek Restoration City/County: Kittitas Sampling Date: 7/24/2019

Applicant/Owner: Mid-Columbia Fisheries Enhancement Group State: WA Sampling Point: Pt 8

Investigator(s): Katrina Strathmann, L. Schultz Section, Township, Range: T18N R18E S26SE1/4

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): Concave Slope (%): 2-5%

Subregion (LRR): B-Columbia Snake River Plateau Lat: 47.015554 Long: -120.542112 Datum: NAD83

Soil Map Unit Name: Opnish Ashy Loam, 0-2% slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling location is along a ditch that drains an upslope, adjacent pond. The ditch connects to Mercer Creek in two places.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1. None			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. Ranunculus repens	30	Y	FAC
2. Trifolium repens	25	Y	FACU
3. Agrostis stolonifera	20	Y	FACW
4. Alopecurus pratensis	10		FACW
5. Convulvulus arvensis	5		UPL
6. Myosotis scorpioides	5		FACW
7. Plantago lanceolata	4		FAC
8. Juncus articulatus	4		OBL
	103 = Total Cover		
Woody Vine Stratum (Plot size: 15 ft radius)			
1. None			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 3 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.6% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	4	x 1 =	4
FACW species	35	x 2 =	70
FAC species	34	x 3 =	102
FACU species	25	x 4 =	100
UPL species	5	x 5 =	25
Column Totals:	103 (A)		301 (B)

Prevalence Index = B/A = 2.92

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

Also present in Herb statrum: Plantago major (FAC) at 3%; Iris missouriensis (FACW) at 2%; Matricaria perforata (FACU) at 2%; Taraxacum officinale (FACU) at 1%; Iris pseudacorus (OBL) at 1%.

SOIL

Sampling Point: Pt 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5"	10YR 3/3	98	2.5YR 4/6	2	C	M/PL	silty clay	Large and fine roots, dry
5-10"	10YR 2.5/1	75	2.5YR 4/6	25	C	M	silty clay	
10-16"	5YR 3/1	70	5YR 4/6	30	C	M	silty clay	Soil saturated, glistening

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
✓ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Medium cobble; saturation at 10".

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
✓ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
✓ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 10"

Wetland Hydrology Present? **Yes** ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Dark green area of surface water visible on aerial imagery dated April 21, 2017. Surface water was present in channel June 2019.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mercer Creek Restoration City/County: Kittitas Sampling Date: 7/24/2019

Applicant/Owner: Mid-Columbia Fisheries Enhancement Group State: WA Sampling Point: Pt 9

Investigator(s): Katrina Strathmann Section, Township, Range: T18N R18E S26SE1/4

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): None Slope (%): <3%

Subregion (LRR): B-Columbia Snake River Plateau Lat: 47.015359 Long: -120.542061 Datum: NAD83

Soil Map Unit Name: Opnish Ashy Loam, 0-2% slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Location does not meet requirement for vegetation (prevalence test), hydric soils and hydrology indicators. Weak indicators of vegetation and soils suggest potential influence from ditches draining residential pond.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1. None			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. Trifolium repens	75	Y	FACU
2. Elymus repens	20	Y	FAC
3. Taraxacum officinale	5		FACU
4. Plantago major	3		FAC
5. Carex pellita	1		OBL
6. Juncus bufonius	1		FACW
7. Descurainia sophia	<1		UPL
8.			
	106 = Total Cover		
Woody Vine Stratum (Plot size: 15 ft radius)			
1. None			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	1	x 1 =	1
FACW species	1	x 2 =	2
FAC species	23	x 3 =	69
FACU species	80	x 4 =	240
UPL species	1	x 5 =	5
Column Totals:	106 (A)		317 (B)

Prevalence Index = B/A = 2.99

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

Heavily grazed. Vegetation is <3 inches height.

SOIL

Sampling Point: Pt 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5"	10YR 5/3	100					silty clay	Dry, many roots
5-11"	7.5YR 3/1	95	5YR 4/6	5	C	M/PL	clay	Dry, crumbly to bottom.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
✓ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

At 11" hit medium cobbles.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mercer Creek Restoration City/County: Kittitas Sampling Date: 7/24/2019

Applicant/Owner: Mid-Columbia Fisheries Enhancement Group State: WA Sampling Point: Pt 10

Investigator(s): Katrina Strathmann, L. Schultz, D. Whitmore Section, Township, Range: T18N R18E S26SE1/4

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1%

Subregion (LRR): B-Columbia Snake River Plateau Lat: 47.014636 Long: -120.542613 Datum: NAD83

Soil Map Unit Name: Opnish Ashy Loam, 0-2% slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1. None			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft radius)			
1. Ranunculus repens	75	Y	FAC
2. Trifolium repens	20	Y	FACU
3. Agrostis stolonifera	20	Y	FACW
4. Juncus articulatus	15		OBL
5. Equisetum arvense	15		FAC
6. Juncus bufonius	12		FACW
7. Persicaria lapathifolia	5		FACW
8. Rumex crispus	3		FAC
	165	= Total Cover	
Woody Vine Stratum (Plot size: 15 ft radius)			
1. None			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.6% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	37	x 2 =	74
FAC species	93	x 3 =	279
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	165 (A)		448 (B)

Prevalence Index = B/A = 2.72

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

Heavily grazed and bare soil visible. Other species present in Herb strata: Plantago major (FAC) at 3%, Lycopus americanus (OBL) at 1%, Sisymbrium altissimum (FACU) at 1%.

SOIL

Sampling Point: Pt 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4"	7.5YR 2.5/2	100					SCL*	Many roots, soil dark red-brown
4-8"	2.5Y 2.5/1	90	5YR 4/8	10	C/CS	M	sandy loar	Many fine gravels, fine roots
8-16"	Gley 2.5/N	75	5YR 4/6	25	C	M	clay	Saturated soil, glistening

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

Saturation begins at 9". Water table rose to 12" from 16" during sampling.
*SCL=Silty clay loam

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ✓ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 12"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 9"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Dark green area of surface water in vicinity of sampling point is visible on aerial imagery dated April 21, 2017.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mercer Creek Restoration City/County: Kittitas Sampling Date: 7/29/2019

Applicant/Owner: Mid-Columbia Fisheries Enhancement Group State: WA Sampling Point: Pt 11

Investigator(s): Katrina Strathmann, L. Schultz, D. Whitmore Section, Township, Range: T18N R18E S26SE1/4

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1%

Subregion (LRR): B-Columbia Snake River Plateau Lat: 47.014706 Long: -120.542729 Datum: NAD83

Soil Map Unit Name: Nack-Opnish complex, 0-2% slopes NWI classification: Forested/Shrub Wetlanc

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Location has problematic hydric soils, however vegetation and hydrology indicators of wetland hydrology are strong.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix x fragilis	85	Y	FAC
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1. Salix x fragilis	15		FAC
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. Agrostis stolonifera	60	Y	FACW
2. Myosotis scorpioides	45	Y	FACW
3. Iris missouriensis	15		FACW
4. Ranunculus repens	8		FAC
5. Plantago major	2		FAC
6. Symphyotrichum occidentalis	1		FAC
7. Lactuca serriola	1		FACU
8. Taraxacum officinale	1		FACU
	133 = Total Cover		
Woody Vine Stratum (Plot size: 15 ft radius)			
1. None			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 15 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	120	x 2 =	240
FAC species	111	x 3 =	279
FACU species	2	x 4 =	8
UPL species	0	x 5 =	0
Column Totals:	233 (A)		448 (B)

Prevalence Index = B/A = 2.26

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

Heavily grazed and bare soil visible.

SOIL

Sampling Point: Pt 11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4"	7.5YR 3/1	100					silty clay	Many fine roots
4-7"	5YR 2.5/1	100					silty clay	
7-11	7.5YR 2.5/1	100					silty clay	Large roots
11-15	5Y 3/1	90	2.5YR 3/4	10	C	M	sandy loar	Saturated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

Problematic Hydric Soils Indicator: Ponded, Flooded or Saturated Soils. Adjacent landowner reports frequent (1-2 year return interval) spring to early summer flooding of >2 weeks duration that inundates the sampling location.
Large cobble truncated pit at 15" depth. Saturation begins at 10". Water table at 12". No redox features visible in upper layer. Lowest layer is very grey in color.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ✓ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ✓ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 12"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 10"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

April 21, 2017 aerial imagery from ESRI

Remarks:

Dark green area of surface water in vicinity of sampling point is visible on aerial imagery dated April 21, 2017. Adjacent neighbor reports observations of flooding/ponding of riverine wetland in vicinity of sampling location on frequent (1-2 year) intervals.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Mercer Creek Restoration City/County: Kittitas Sampling Date: 7/29/2019

Applicant/Owner: Mid-Columbia Fisheries Enhancement Group State: WA Sampling Point: Pt 12

Investigator(s): Katrina Strathmann, L. Schultz, D. Whitmore Section, Township, Range: T18N R18E S26SE1/4

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1%

Subregion (LRR): B-Columbia Snake River Plateau Lat: 47.014636 Long: -120.542613 Datum: NAD83

Soil Map Unit Name: Nack-Opnish complex, 0-2% slopes NWI classification: Forested/Shrub Wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix x fragilis	20	Y	FAC
2.			
3.			
4.			
	20 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1. None			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. Elymus repens	75	Y	FAC
2. Plantago major	20	Y	FAC
3. Tripleurospermum maritimum	20	Y	FACU
4. Cichorium intybus	10		FACU
5. Taraxacum officinale	3		FACU
6. Ranunculus repens	2		FAC
7. Trifolium repens	2		FACU
8. Symphyotrichum spathulatum	1		FAC
	133 = Total Cover		
Woody Vine Stratum (Plot size: 15 ft radius)			
1. None			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	240
FAC species	118	x 3 =	354
FACU species	35	x 4 =	140
UPL species	0	x 5 =	0
Column Totals:	233 (A)		734 (B)

Prevalence Index = B/A = 3.15

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks:

Heavily grazed and bare soil visible.

SOIL

Sampling Point: Pt 12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 3/2	100					loamy san	Dry; fine roots
2-7"	10YR 3/2	100					sandy clay	Dry; No roots present
7-12"	7.5YR 4/3	100					sandy clay	Dry

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

Soils extremely compacted. Dry soil in all layers. Medium cobbles encountered at 12" and pit could not be deeper. No redox features observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Chapter 2

APPENDIX B

Eastern Washington Wetland Rating Form

Wetland name or number Wetland 1

RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): Wetland 1 Date of site visit: 7/29/2019

Rated by Katrina Strathmann Trained by Ecology? ✓ Yes ___ No Date of training 11/12-13, 2019

HGM Class used for rating Riverine Wetland has multiple HGM classes? ✓ Y ____N

NOTE: **Form is not complete without the figures requested** (*figures can be combined*).
Source of base aerial photo/map ESRI April 21, 2017

OVERALL WETLAND CATEGORY II (based on functions ✓ or special characteristics ✓)

1. Category of wetland based on FUNCTIONS

_____**Category I** – Total score = 22-27

20 **Category II** – Total score = 19-21

_____**Category III** – Total score = 16-18

_____**Category IV** – Total score = 9-15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H ✓M L	✓H M L	H M ✓L	
Landscape Potential	✓H M L	H ✓M L	H M ✓L	
Value	✓H M L	✓H M L	H ✓M L	TOTAL
Score Based on Ratings	8	8	4	20

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY *Circle the appropriate category*
Vernal Pools	II III
Alkali	I
Wetland of High Conservation Value	I
Bog and Calcareous Fens	I
Old Growth or Mature Forest – slow growing	I
Aspen Forest	I
Old Growth or Mature Forest – fast growing	II
Floodplain forest	✓I
None of the above	

Wetland name or number Wetland 1

Maps and figures required to answer questions correctly for Eastern Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	D 1.3, H 1.1, H 1.5	
Hydroperiods (including area of open water for H 1.3)	D 1.4, H 1.2, H 1.3	
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	
Map of the contributing basin	D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	6
Hydroperiods	H 1.2, H 1.3	3,4
Ponded depressions	R 1.1	3
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	6
Map of the contributing basin	R 2.2, R 2.3, R 5.2	8
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	7
Width of wetland vs. width of stream *(can be added to another figure)*	R 4.1	3
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	9
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	10
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	11

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	L 1.1, L 4.1, H 1.1, H 1.5	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	S 3.3	

Wetland name or number Wetland 1

HGM Classification of Wetland in Eastern Washington

For questions 1-4, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-4 apply, and go to Question 5.

1. Does the entire unit **meet both** of the following criteria?
   ___The vegetated part of the wetland is on the water side of the Ordinary High Water Mark of a body of permanent open water (without any plants on the surface) that is at least 20 ac (8 ha) in size
   ___At least 30% of the open water area is deeper than 10 ft (3 m)

   ✓ NO – go to 2 **YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

2. Does the entire wetland unit **meet all** of the following criteria?
   ___The wetland is on a slope (*slope can be very gradual*),
   ___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks;
   ___The water leaves the wetland **without being impounded**.

   ✓ NO - go to 3 YES – The wetland class is **Slope**
   NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).

3. Does the entire wetland unit **meet all** of the following criteria?
   ✓ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river;
   ✓ The overbank flooding occurs at least once every 10 years.

   NO - go to 4 ✓ YES – The wetland class is **Riverine**
   NOTE: The Riverine wetland can contain depressions that are filled with water when the river is not flooding.

4. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

   NO – go to 5 YES – The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-4 APPLY TO DIFFERENT AREAS IN THE WETLAND UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

Wetland name or number Wetland 1

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the wetland unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM Class to use in rating
✓ Slope + Riverine	✓ Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine (the riverine portion is within the boundary of depression)	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number Wetland 1

RIVERINE WETLANDS **Water Quality Functions** - Indicators that the site functions to improve water quality	Points (only 1 score per box)
R 1.0. Does the site have the potential to improve water quality?	
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions cover >$^1/_3$ area of wetland points = 6 Depressions cover > $^1/_{10}$ area of wetland points = 3 ✓ Depressions present but cover < $^1/_{10}$ area of wetland points = 1 No depressions present points = 0	1
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height; **not** Cowardin classes): Forest or shrub > $^2/_3$ the area of the wetland points = 10 ✓ Forest or shrub $^1/_3$ – $^2/_3$ area of the wetland points = 5 Ungrazed, herbaceous plants > $^2/_3$ area of wetland points = 5 Ungrazed herbaceous plants $^1/_3$ – $^2/_3$ area of wetland points = 2 Forest, shrub, and ungrazed herbaceous < $^1/_3$ area of wetland points = 0	5
Total for R 1 Add the points in the boxes above	6

Rating of Site Potential If score is: ___**12-16 = H** ✓ **6-11 = M** ___**0-5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?	
R 2.1. Is the wetland within an incorporated city or within its UGA? ✓ Yes = 2 No = 0	2
R 2.2. Does the contributing basin include a UGA or incorporated area? Yes = 1 ✓ No = 0	0
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years? ✓ Yes = 1 No = 0	1
R 2.4. Is > 10% of the area within 150 ft of wetland in land uses that generate pollutants ✓ Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1-R 2.4? Source_____ ✓ Yes = 1 No = 0	1
Total for R 2 Add the points in the boxes above	5

Rating of Landscape Potential If score is: ✓ **3-6 = H** ___**1 or 2 = M** ___**0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?	
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi? ✓ Yes = 1 No = 0	1
R 3.2. Does the river or stream have TMDL limits for nutrients, toxics, or pathogens? ✓ Yes = 1 No = 0	1
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? *Answer YES if there is a TMDL for the drainage in which wetland is found.* ✓ Yes = 2 No = 0	2
Total for R 3 Add the points in the boxes above	4

Rating of Value If score is: ✓ **2-4 = H** ___**1 = M** ___**0 = L** *Record the rating on the first page*

Wetland name or number Wetland 1

RIVERINE WETLANDS **Hydrologic Functions** - Indicators that site functions to reduce flooding and stream erosion	Points (only 1 score per box)
R 4.0. Does the site have the potential to reduce flooding and erosion?	
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* If the ratio is more than 2 ✓ points = 10 If the ratio is 1-2 points = 8 If the ratio is ½-<1 points = 4 If the ratio is ¼-< ½ points = 2 If the ratio is < ¼ points = 1	10
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have > 90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for more than $^{2}/_{3}$ the area of the wetland points = 6 Forest or shrub for >$^{1}/_{3}$ area OR emergent plants > $^{2}/_{3}$ area ✓ points = 4 Forest or shrub for > $^{1}/_{10}$ area OR emergent plants > $^{1}/_{3}$ area points = 2 Plants do not meet above criteria points = 0	4
Total for R 5 Add the points in the boxes above	14

Rating of Site Potential If score is: ✓ **12-16 = H** ___ **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

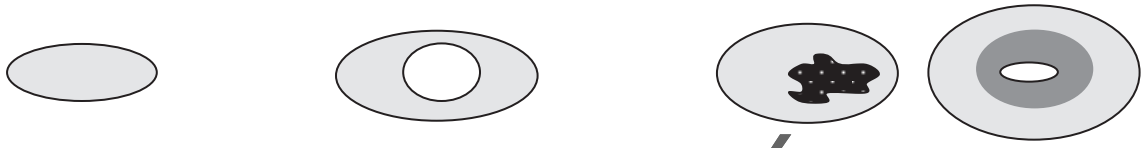
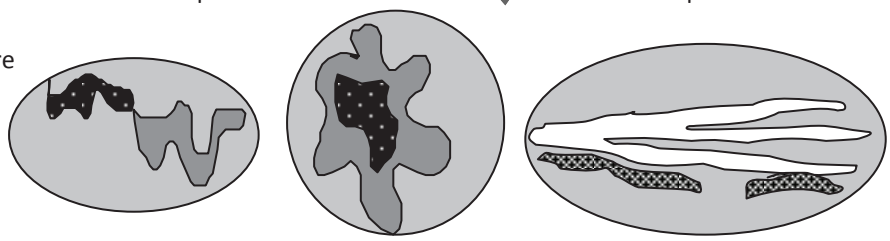
R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	Yes = 0 ✓ No = 1	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1 ✓ No = 0	0
R 5.3. Is the up-gradient stream or river controlled by dams?	Yes = 0 ✓ No = 1	1
Total for R 5	Add the points in the boxes above	2

Rating of Landscape Potential If score is: ___ **3 = H** ✓ **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?	
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* The sub-basin immediately down-gradient of site has surface flooding problems that result in damage to human or natural resources ✓ points = 2 Surface flooding problems are in a basin farther down-gradient points = 1 No flooding problems anywhere downstream points = 0	2
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 ✓ No = 0	0
Total for R 6 Add the points in the boxes above	2

Rating of Value If score is: ✓ **2-4 = H** ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number Wetland 1

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat	(only 1 score per box)
H 1.0. Does the wetland have the potential to provide habitat for many species?	
H 1.1. Structure of the plant community: *Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is >= ¼ ac or >= 10% of the wetland if wetland is < 2.5 ac.* ____Aquatic bed ✓ Emergent plants 0-12 in (0-30 cm) high are the highest layer and have > 30% cover ✓ Emergent plants >12-40 in (>30-100 cm) high are the highest layer with >30% cover ____Emergent plants > 40 in (> 100 cm) high are the highest layer with >30% cover ____Scrub-shrub (areas where shrubs have >30% cover) ✓ Forested (areas where trees have >30% cover) 4 or more checks: points = 3 ✓ 3 checks: points = 2 2 checks: points = 1 1 check: points = 0	2
H 1.2. Is one of the vegetation types Aquatic Bed? Yes = 1 ✓ No = 0	0
H 1.3. Surface water H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least ¼ ac **OR** 10% of its area during the March to early June **OR** in August to the end of September? ***A**nswer YES for Lake Fringe wetlands*. Yes = 3 points & go to H 1.4 ✓ No = go to H 1.3.2 H 1.3.2. Does the wetland have an intermittent or permanent, and unvegetated stream within its boundaries, or along one side, over at least ¼ ac or 10% of its area? *Answer yes only if H 1.3.1 is No*. Yes = 3 ✓ No = 0	0
H 1.4. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. D*ifferent patches of the same species can be combined to meet the size threshold. You do not have to name the species.* *Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Russian olive, Phragmites, Canadian thistle, yellow-flag iris, and saltcedar (Tamarisk)* # of species >9 Scoring: ✓ > 9 species: points = 2 4-9 species: points = 1 < 4 species: points = 0	2
H 1.5. Interspersion of habitats Decide from the diagrams below whether interspersion among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none. *Use map of Cowardin and emergent plant classes prepared for questions H 1.1 and map of open water from H 1.3. If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points **Low** = 1 point ✓ **Moderate** = 2 points All three diagrams in this row are **High** = 3 points  Riparian braided channels with 2 classes	Figure 6 2

Wetland name or number Wetland 1

H 1.6. Special habitat features *Check the habitat features that are present in the wetland. The number of checks is the number of points.* ____Loose rocks larger than 4 in OR large, downed, woody debris (> 4 in diameter) within the area of surface ponding or in stream. ____Cattails or bulrushes are present within the wetland. ____Standing snags (diameter at the bottom > 4 in) in the wetland or within 30 m (100 ft) of the edge. ____Emergent or shrub vegetation in areas that are permanently inundated/ponded. ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 45 degree slope) OR signs of recent beaver activity ____ Invasive species cover less than 20% in each stratum of vegetation *(canopy, sub-canopy, shrubs, herbaceous, moss/ground cover)*	0
Total for H 1 Add the points in the boxes above	6

Rating of Site Potential If score is:___**15-18 = H** ___**7-14 = M** ✓ **0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support habitat functions of the site?	
H 2.1. Accessible habitat (only area of habitat abutting wetland). If total accessible habitat is: *Calculate:* % undisturbed habitat 0 **+** [(% moderate and low intensity land uses)/2] 1.72 = 1.72 % > $^1/_3$ (33.3%) of 1 km Polygon points = 3 20-33% of 1km Polygon points = 2 10-19% of 1km Polygon points = 1 <10% of 1km Polygon ✓ points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around wetland. *Calculate:* % undisturbed habitat 0 **+** [(% moderate and low intensity land uses)/2] 15.45 = 15.45 % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches ✓ points = 1 Undisturbed habitat < 10% of Polygon points = 0	1
H 2.3. Land use intensity in 1 km Polygon: > 50% of Polygon is high intensity land use ✓ points = (- 2) Does not meet criterion above points = 0	-2
H 2.4. The wetland is in an area where annual rainfall is less than 12 in, and its water regime is not influenced by irrigation practices, dams, or water control structures. *Generally, this means outside boundaries of reclamation areas, irrigation districts, or reservoirs* Yes = 3 ✓ No = 0	0
Total for H 2 Add the points in the boxes above	-1

Rating of Landscape Potential If score is:___**4-9 = H** ___**1-3 = M** ✓ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose the highest score that applies to the wetland being rated* Site meets ANY of the following criteria: points = 2 — It has 3 or more priority habitats within 100 m (see Appendix B) — It provides habitat for Threatened or Endangered species (any plant or animal on state or federal lists) — It is mapped as a location for an individual WDFW species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (see Appendix B) ✓ points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If score is:___**2 = H** ✓ **1 = M** ___**0 = L** *Record the rating on the first page*

Wetland name or number Wetland 1

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate category. NOTE: A wetland may meet the criteria for more than one set of special characteristics. Record all those that apply. NOTE: All wetlands should also be characterized based on their functions.

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Vernal pools Is the wetland **less than 4000 ft^2**, and does it meet at least **two** of the following criteria? — Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input. — Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. *If you find perennial, obligate, wetland plants, the wetland is probably NOT a vernal pool*. — The soil in the wetland is shallow [< 1 ft (30 cm)deep] and is underlain by an impermeable layer such as basalt or clay. — Surface water is present for less than 120 days during the wet season. Yes **–** Go to **SC 1.1** ✓ No = **Not a vernal pool** SC 1.1. Is the vernal pool relatively undisturbed in February and March? Yes **–** Go to **SC 1.2** No = **Not a vernal pool with special characteristics**	
SC 1.2. Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 mi (other wetlands, rivers, lakes etc.)? Yes = **Category II** No = **Category III**	**Cat. II** **Cat. III**
SC 2.0. Alkali wetlands Does the wetland meet **one** of the following criteria? — The wetland has a conductivity > 3.0 mS/cm. — The wetland has a conductivity between 2.0 and 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as "alkali" species (see Table 4 for list of plants found in alkali systems). — If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. **OR** does the wetland unit meet two of the following three sub-criteria? — Salt encrustations around more than 75% of the edge of the wetland — More than ¾ of the plant cover consists of species listed on Table 4 — A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. Yes = **Category I** ✓ No= **Not an alkali wetland**	**Cat. I**
SC 3.0. Wetlands of High Conservation Value (WHCV) SC 3.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to **SC 3.2** No – Go to **SC 3.3** SC 3.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes = **Category I** ✓ No = **Not a WHCV** SC 3.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes **– Contact WNHP/WDNR and go to SC 3.4** ✓ No = **Not a WHCV** SC 3.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and it is listed on their website? Yes = **Category I** No =**Not a WHCV**	**Cat. I**

Wetland name or number Wetland 1

SC 4.0 Bogs and Calcareous Fens Does the wetland (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs or calcareous fens? *Use the key below to identify if the wetland is a bog or calcareous fen.* ***If you answer yes you will still need to rate the wetland based on its functions.*** SC 4.1. Does an area within the wetland have organic soil horizons (i.e., layers of organic soil), either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? *See Appendix C for a field key to identify organic soils*. Yes – Go to **SC 4.3** ✓ No – Go to **SC 4.2** SC 4.2. Does an area within the wetland have organic soils, either peats or mucks, that are less than 16 in deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 4.3** ✓ No = **Is not a bog for rating** SC 4.3. Does an area within the wetland have more than 70% cover of mosses at ground level AND at least 30% of the total plant cover consists of species in Table 5? Yes = **Category I bog** No – Go to **SC 4.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 5 are present, the wetland is a bog. SC 4.4. Is an area with peats or mucks forested (> 30% cover) with subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 5 provide more than 30% of the cover under the canopy? Yes = **Category I bog** No – Go to **SC 4.5** SC 4.5. Do the species listed in Table 6 comprise at least 20% of the total plant cover within an area of peats and mucks? Yes = **Is a Calcareous Fen for purpose of rating** No – Go to **SC 4.6** SC 4.6. Do the species listed in Table 6 comprise at least 10% of the total plant cover in an area of peats and mucks, AND one of the two following conditions is met: — Marl deposits [calcium carbonate ($CaCO_3$) precipitate] occur on the soil surface or plant stems — The pH of free water is ≥ 6.8 AND electrical conductivity is ≥ 200 uS/cm at multiple locations within the wetland Yes = **Is a Category I calcareous fen** No = **Is not a calcareous fen**	**Cat. I** **Cat. I**

SC 5.0. Forested Wetlands Does the wetland have an area of forest rooted within its boundary that meets **at least one** of the following three criteria? (*Continue only if you have identified that a forested class is present in question H 1.1*) ✓ The wetland is within the 100 year floodplain of a river or stream — Aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species — There is at least ¼ ac of trees (even in wetlands smaller than 2.5 ac) that are "mature" or "old-growth" according to the definitions for these priority habitats developed by WDFW *(see definitions in question H3.1)* Yes – Go to **SC 5.1** No = **Not a forested wetland with special characteristics**	
SC 5.1. Does the wetland have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees (*see Table 7*)? Yes = **Category I** ✓ No – Go to **SC 5.2** SC 5.2. Does the wetland have areas where aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species? Yes = **Category I** ✓ No – Go to **SC 5.3** SC 5.3. Does the wetland have at least ¼ acre with a forest canopy where more than 50% of the tree species (by cover) are fast growing species (*see Table 7*)? Yes = **Category II** ✓ No – Go to **SC 5.4** SC 5.4. Is the forested component of the wetland within the 100 year floodplain of a river or stream? ✓ Yes = **Category II** No = **Not a forested wetland with special characteristics**	**Cat. I** **Cat. I** **Cat. II** ✓ **Cat. II**
Category of wetland based on Special Characteristics *Choose the highest rating if wetland falls into several categories* If you answered No for all types, enter "Not Applicable" on Summary Form	II

Appendix B: WDFW Priority Habitats in Eastern Washington

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland: ***NOTE:*** *This question is independent of the land use between the wetland and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

— **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Old-growth/Mature forests:** Old-growth east of Cascade crest – Stands are highly variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. In general, stands will be >150 years of age, with 10 trees/ac (25 trees/ha) that are > 21 in (53 cm) dbh, and 1-3 snags/ac (2.5-7.5 snags/ha) that are > 12-14 in (30-35 cm) diameter. Downed logs may vary from abundant to absent. Canopies may be single or multi-layered. Evidence of human-caused alterations to the stand will be absent or so slight as to not affect the ecosystem's essential structures and functions. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west and 80-160 years old east of the Cascade crest.

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

✓ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

✓ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

— **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 12 in (30 cm)in eastern Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

— **Shrub-steppe:** A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).

— **Eastside Steppe:** Nonforested vegetation type dominated by broadleaf herbaceous flora (i.e., forbs), perennial bunchgrasses, or a combination of both. Bluebunch wheatgrass (*Pseudoroegneria spicata*) is often the prevailing cover component along with Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa secunda*), rough fescue (*F. campestris*), or needlegrasses (*Achnatherum* spp.).

— **Juniper Savannah:** All juniper woodlands.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Chapter 3

Frequently Flooded Area Assessment

Project Location and Identification of Frequently Flooded Areas

The project is located within the City of Ellensburg, along a 1,200-foot reach of Mercer Creek, immediately north of Helena Street, in the SE1/4 of the SE1/4 of Section 26, Township 18 N, Range 18E, W.M. Figure 1 shows the boundaries of the inset floodplain excavation, a 200 foot buffer around the area of excavation, the proposed project fencing, and the boundaries of the Special Flood Hazard Area as depicted on the Flood Insurance Rate Map (FIRM), panels 5300950 439B and 530234 0002C, effective date 5/5/1981. These FIRMs show that the Special Flood Hazard Area within the project area and the 200-foot buffer are Zone AO (depth 1), which indicates shallow flooding up to a foot in depth.

Additional Flood Information

Ellensburg City Code states that the director may use additional flood information that is more restrictive or detailed than that provided in the flood insurance study conducted by the Federal Emergency Management Agency (FEMA) to designate frequently flooded areas. The Kittitas County Flood Control Zone District has developed a 2-Dimension (2-D) hydraulic modeling to identify flood risk along Mercer and Currier Creeks. A 2-D model was utilized because this modeling technique is best suited for situations where water is spreading in multiple directions, like along alluvial fan systems with multiple flow distributary channels. For this effort, the existing model was further refined by incorporating site-specific ground survey. Additionally, by utilizing the new hydraulic model, we were able to model and evaluate potential flows in addition to the 1% probability event. Additional model detail is provided in the incorporated technical memo and the Whiskey and Mercer Creek Letter of Map Revision (LOMR) Report (WSE, 2018). The updated model is therefore more detailed than the flood information available in the Flood Insurance Rate Map: it utilizes more detailed topographic information, a 2-D flow model well suited for conditional along the Whiskey-Mercer Alluvial Fan, and existing and proposed conditions for the 2- (50% annual chance), 10- (10% annual chance), and 100-year (1% annual chance) flood events were modeled.

Additional Project Information

Mercer Creek's floodplain will be lowered to create the inset floodplain. Project design was directed by a Washington Department of Fish and Wildlife engineer with extensive experience designing river restoration projects. Project design was specifically conducted for the purpose grading, excavating and placing roughness features to create and maintain side channel and wetland features while simultaneously utilizing the inset floodplain feature to ensure that such features did not increase flood risk and instead reduced risk of flooding.

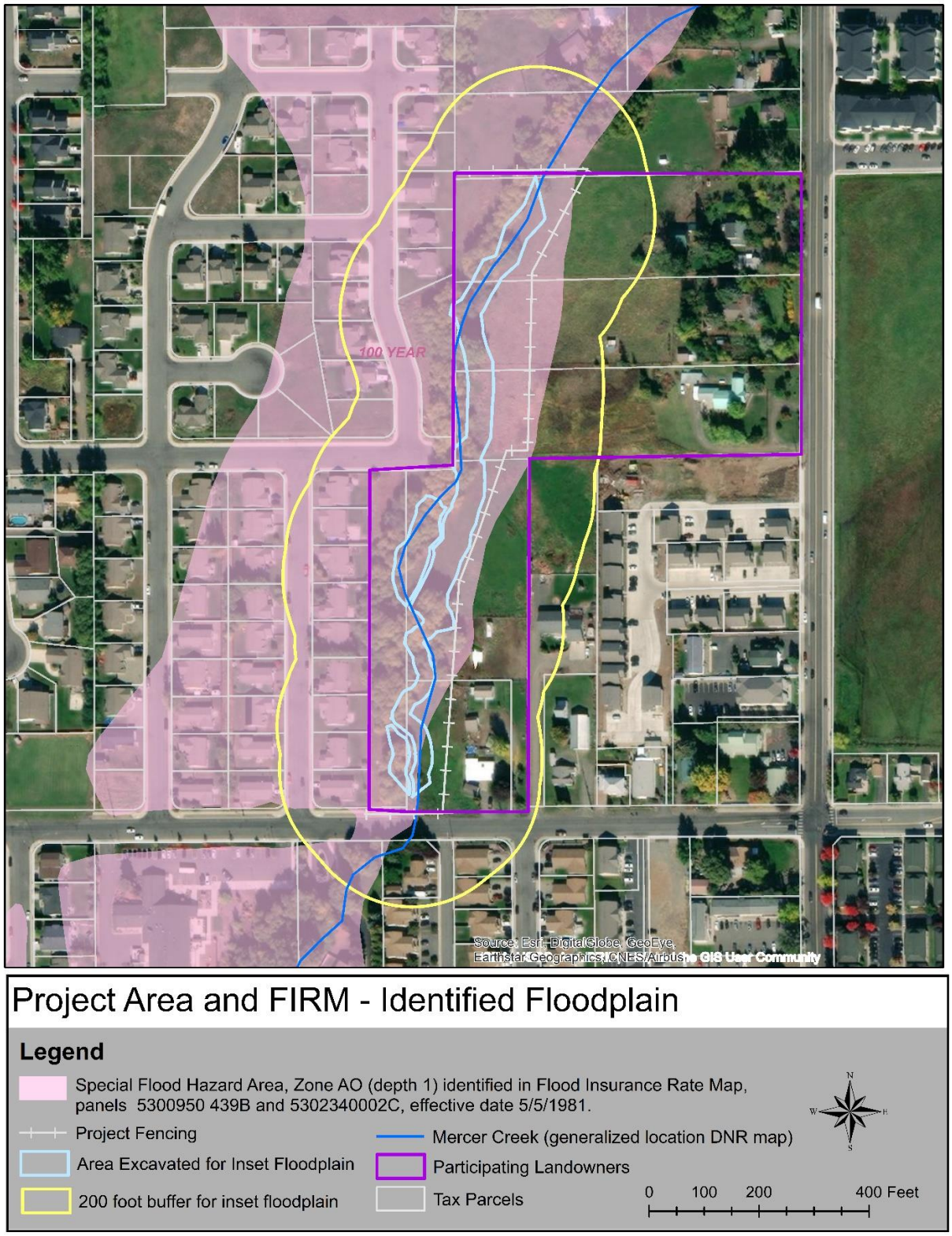


Figure 1. Project map showing special flood hazard area as depicted on Flood Insurance Rate Maps, the area of excavation for the inset floodplain, and a 200 foot buffer for the inset floodplain.

The 1.5 acre floodplain will span the length of Mercer Creek in the 1,200 ft reach of the project area. Excavation will occur within the 1.5 acre inset floodplain, to a depth of 6-12 inches depending on existing ground surface elevations. The 1.5 acre inset floodplain will also include 18 habitat features including disappearing high flow channels, half-moon relic channels, raised knobs, and roughness features comprised of post assisted log structures and woody debris complexes. Accumulated fine sediment related to crack willow in the creek will be excavated in specific locations; excavation will also provide more capacity in the channel. Sediment to be excavated from the channel is estimated at 225 cubic yards. Soil to be excavated for creation of the inset floodplain is estimated at 2,045 cubic yards. A detailed description of construction techniques is provided in Chapter 1 and engineered drawing are in Appendix A.

Kittitas County Public Works crews will haul the excavated material to Kittitas County's Schnebly pit. This is an approved, legal location and is out of the 100-year floodplain of any natural streams or wetlands.

Technical Evaluation

The Watershed Science and Engineering Technical Memorandum, Mercer Creek Restoration Hydraulic Analysis, is incorporated into this chapter for the Flood Hazard Assessment. Note that while some excavation is proposed within Mercer Creek, this project will not change the location of the channel occupied by water within the banks of any portion of a riverine waterbody. Additionally, after project designs were submitted for hydraulic modeling, the decision was made remove an additional 70 cubic yards from the inset floodplain, from an existing island created where Mercer Creek splits. The design modeled by Watershed Science and Engineering included excavation of approximately half of this island for the purposes of providing additional floodplain storage and enhancing wetland diversity. The decision to enlarge the excavated area by this minor amount was made to further increase flood storage and wetland area. This change will modestly increase the flood depths within the area of additional floodplain excavation, relative to the information provided in the Technical Memorandum, but is not a significant enough change to alter the fundamental report conclusions.

Chapter 4

Fish and Wildlife Habitat Conservation Areas Assessment

Critical Areas

"Critical areas" include the following areas and ecosystems: wetlands; areas with a critical recharging effect on aquifers used for potable water; fish and wildlife habitat conservation areas; frequently flooded areas; and geologically hazardous areas (ECC 15.600).

Habitat Analysis

A review of existing data indicates that the following critical areas are within the project area: wetlands, frequently flooded areas, and fish and wildlife habitat conservation area. The assessment of wetlands is discussed in chapter 2 of the CAO report. An assessment of frequently flooded areas is discussed is chapter 3 of the CAO report.

Fish & Wildlife Habitat Conservation Area

The project area contains instream, riparian and wetland habitats that support an immense variety of microbes, plants, insects, amphibians, reptiles, birds, fish and mammals. Implementation of the proposed habitat restoration project will enhance these habitats in the project area.

Endangered Species Act

A species list for Kittitas County was obtained from the US Fish and Wildlife (USFWS) and the National Oceanic & Atmospheric Administration (NOAA). Review of agency databases indicated that 11 ESA-listed species were found to potentially be present in the project vicinity.

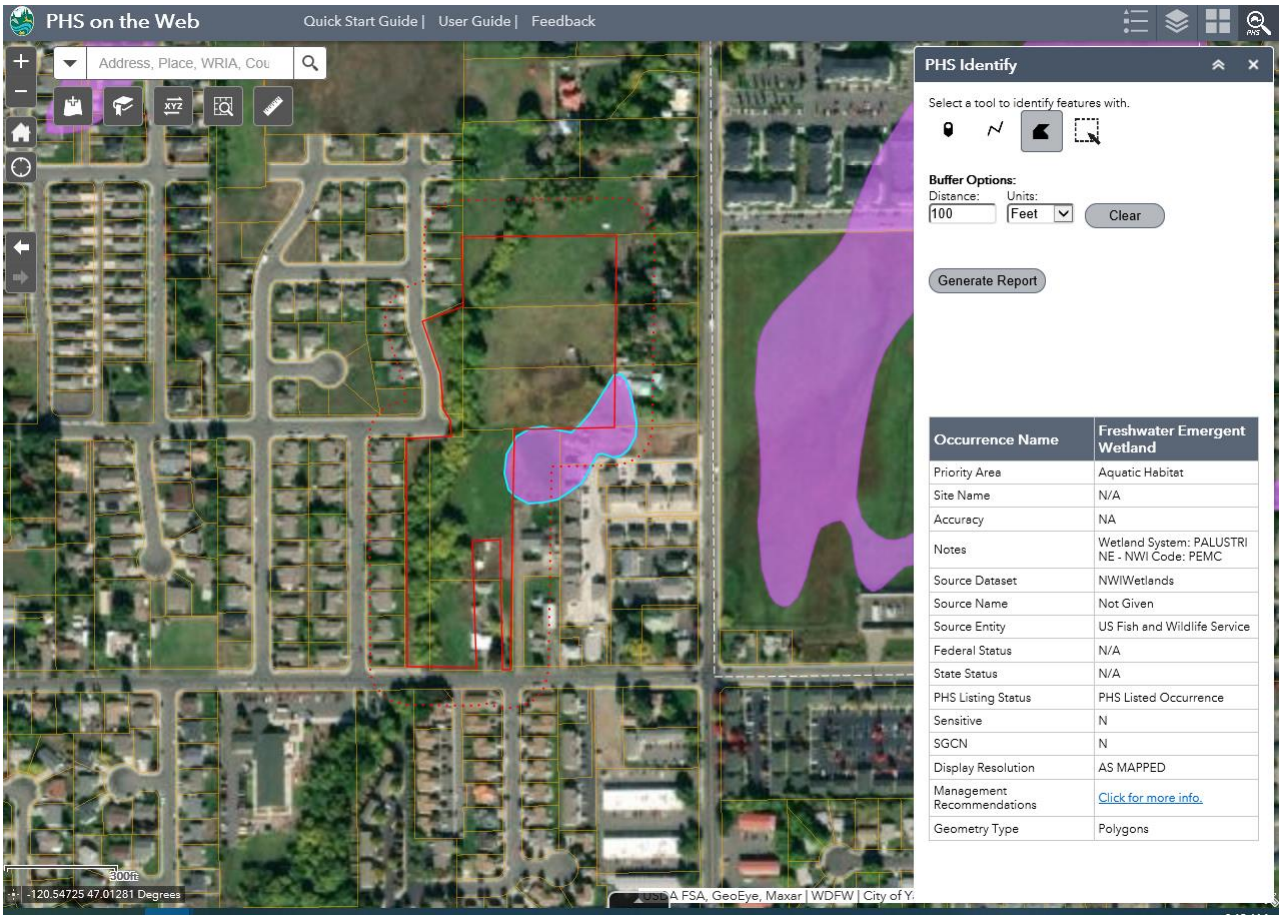
Table 1. ESA Species list for Kittitas County, Washington.

Species ***(Scientific Name)***	**ESA Status & Critical Habitat Designation**	**Effect of the Project**
Yellow-billed Cuckoo (*Coccyzus americanus*)	Threatened	No effect on the species or its habitat
Northern spotted owl (*Strix occidentalis caurina*)	Threatened, Critical Habitat	No effect on the species or its habitat
Marbled murrelet (*Brachyramphus marmoratus*)	Threatened	No effect on the species or its habitat
Whitebark pine (*Pinus albicaulis*)	Candidate	No effect on the species or its habitat
Bull Trout (*Salvelinus confluentus*)	Threatened	No effect on the species or its habitat

Wenatchee Mountains checkermallow (*Sidalcea oregana var. calva*)	Endangered	No effect on the species or its habitat
Grizzly Bear (*Ursusarctos horribilis*)	Threatened; Under Review in the North Cascades	No effect on the species or its habitat
Gray wolf (*Canis lupus*)	Endangered	No effect on the species or its habitat
Canada Lynx (*Lynx canadensis*)	Threatened	No effect on the species or its habitat
North American wolverine (*Gulo gulo luscus*)	Proposed Threatened	No effect on the species or its habitat
Middle Columbia River Steelhead (*Oncorhynchus mykiss*)	Threatened	No effect on the species, positive effect on its habitat

Furthermore, the Magnuson-Stevens Fishery Conservation and Management Act (MSA) Essential Fish Habitat (EFH) maps were reviewed. The Upper Yakima HUC is designated as EFH for Chinook Salmon and Coho Salmon.

The Washington Department of Fish & Wildlife (WDFW) State Listed Species list (https://wdfw.wa.gov/sites/default/files/2020-02/statelistedcandidatespecies_02272020.pdf, Feb. 2020) was reviewed and there will be no impacts to any of the state listed or candidate species. The project site was mapped in the WDFW Priority Habitats and Species (PHS) database. The PHS report identified freshwater emergent wetlands in the project area.



Middle Columbia River Steelhead, which are listed as Threatened under the Endangered Species Act, have been documented downstream in Wilson Creek, of which Mercer Creek is a tributary. Fish passage in Mercer Creek through the City of Ellensburg is questionable and it's unknown whether steelhead or other anadromous salmonids could migrate upstream into the project area at this time.

The intent of the proposed restoration project is to improve water quality and enhance fish and wildlife habitat in Mercer Creek. The project will create a 1.5 acre inset floodplain, construct habitat features using contouring, woody debris and post assisted log structures and replace non-native crack willow with a native riparian buffer to enhance ecological function. These elements will enhance aquatic and terrestrial habitat and improve water quality in Mercer Creek while helping to manage flood risks for nearby properties.

<u>Vegetation</u>

There are no endangered, threatened, or candidate plant species within the project area.

Vegetation along Mercer Creek is dominated by crack willow (*Salix x fragilis*), a non-native tree species that forms narrow, single-species stands along stream channels in developed areas. In the project area, crack willow is the single tree species present. Structure is limited to a forest canopy and an herbaceous layer that is heavily grazed is present throughout the project area. All but one of the tax parcels in the

project area are grazed by livestock that have access to the floodplain, streambanks and channel. In the delineated wetland area, most of the emergent vegetation is <12" height, and very little is >40" height; there is little to no shrub layer present. One parcel was not grazed in 2019 and herbaceous vegetation in the project area was primarily between 12-40" height.

Plant species in the project area are predominantly non-native. Plant species inventoried in the project area are described below:

Species	**Origin (NRCS 2019)**	**Location**
Agrostis stolonifera	Non-native	Wetland/riparian
Carex praegracilis	Native	Upland
Cirsium arvense	Noxious weed	Upland
Elymus repens	Noxious weed	Wetland/Upland
Holcus lanatus	Non-native	Upland
Juncus balticus	Native	Wetland/riparian
Myosotis scorpioides	Non-native	Wetland/riparian
Phleum pratensis	Non-native	Upland
Plantago major	Non-native	Upland
Poa pratensis	Non-native	Wetland/Upland
Ranunculus repens	Non-native	Wetland/riparian
Salix x fragilis	Non-native	Wetland/riparian
Schedonorus arundianceae	Non-native	Wetland/Upland
Trifolium repens	Non-native	Wetland/Upland
Tripleurospermum maritiumum	Noxious weed	Upland

A goal of the project is to enhance riparian and wetland habitat and function. In order to meet this goal, non-native crack willow will be controlled and replaced with native riparian forest and shrubland habitat. Crack willow trees on the left (east) bank will be killed using herbicide prior to physical removal of stems and roots. An additional 53 crack willow trees on the right (west) bank will be killed in place over 2020-2022.

Two types of revegetation are planned:

- Revegetation of the inset floodplain and related habitat features; and
- Seeding of areas in the riparian buffer, and access and staging areas, that are disturbed during construction.

Revegetation goals will be achieved using native plant species appropriate to site conditions. Approximately 1,155 plants will be installed on the inset floodplain surface at an average of 7 ft spacing. Spacings will range from 3-5 ft spacing near the stream channel to 9-11 ft centers near the eastern margin of the inset floodplain. Please see the Restoration Plan (Appendix C) for specific details on revegetation.

Implementation of the proposed project will result in a robust, native riparian buffer that is protected from livestock by exclusion fencing located a minimum of 75-feet from the eastern bank ordinary high water mark. Restoring a robust riparian buffer will benefit not only water quality and aquatic animals, but also terrestrial animals such as mammals, reptiles and amphibians that utilize the stream's riparian ecosystem for various life stages and as a migratory corridor. The cumulative long-term restoration benefits of this project result in improved ecological diversity and function over the existing baseline conditions.

Post-project maintenance is critical to the success of the new planting. Maintenance activities are funded and planned for the project area during the 2021 growing season. A crew will complete hand-irrigation of the new plants, manual weed removal and brush cutting, control new crack willow resprouts, and maintain the livestock exclusion fencing. This work will take place in six two-day visits over the growing season.

Appendix A
List of Preparers

This list presents the individuals who contributed to the technical content of the Critical Areas Report.

Name:	Colin Butler
Affiliation:	Watershed Science and Engineering, Inc.
Education / Certifications:	B.S., University of Washington, Civil and Environmental Engineering E.I.T, Washington
Technical Experience:	1D and 2D hydraulic modeling and mapping and application of these tools to flood hazard analysis, impact assessment, habitat restoration, and storm-water conveyance projects.
Report Responsibilities:	Mercer Creek Restoration Hydraulic Analysis

Name:	Chris Frei
Affiliation:	Watershed Science and Engineering, Inc.
Education / Certifications:	B.S., Washington State University, Civil and Environmental Engineering M.S., Washington State University, Civil and Environmental Engineering P.E., Washington Certified Floodplain Manager
Technical Experience:	Senior hydraulic engineer with 15 years of professional and academic experience working on complex hydraulic and water resource projects throughout the Pacific Northwest. Experience applying a variety and Hydrology and Hydraulic models to support hydraulic analyses and design and also experience in floodplain management and regulation, floodplain permitting, infrastructure protection, sediment management, scour analysis, stream restoration, bridge and culvert design, and flood and erosion hazard assessment and prioritization.
Report Responsibilities:	Mercer Creek Restoration Hydraulic Analysis

Name:	Katrina Strathmann, Project Manager/Plant Ecologist
Affiliation:	Mid-Columbia Fisheries Enhancement Group

Education / Certifications:	M.S. Biology, Ecology and Systematics Certification in Wetland Delineation Certification in Wetland Rating for Eastern Washington
Technical Experience:	23 years of experience in habitat restoration, including riparian and floodplain restoration
Report Responsibilities:	Wetland Delineation and Rating Report; Habitat Restoration Plan

Name:	Arden Thomas
Affiliation:	Kittitas County
Education / Certifications:	B.A., Earlham College, Biology M.S. University of Washington, College of Forest Resources Certified Floodplain Manager
Technical Experience:	15 years of experience managing environmental restoration projects and conducting environmental assessments, with an emphasis on addressing impacts associated with water management and altered flow regimes and advancing salmon recovery priorities.
Report Responsibilities:	Frequently Flooded Areas Chapter, compiled information for Chapter 1

Name:	Cassandra Weekes
Affiliation:	Washington Department of Fish and Wildlife
Education / Certifications:	B.S., Central Washington University, Environmental Science Minor in Energy Studies
Technical Experience:	Nine years of experience working in the Yakima Basin on aquatic habitat restoration and native salmonid recovery.
Report Responsibilities:	Fish and Wildlife Chapter