Wetland Summary Report

Wheeler Ridge LLC
Chelan County



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SCJ ALLIANCE
CONSULTING SERVICES

Wheeler Ridge Wetland Summary Report

Project Information

Project:	**Wheeler Ridge Wetland Summary Report**
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TABLE OF CONTENTS

1. INTRODUCTION 5
1.1 Project Overview 5
1.2 Field Work 5

2. METHODS AND MATERIAL 6
2.1 Wetland Delineation Regulations (federal and state) 6
2.2 Wetland Rating, Classification, and Buffers (County) 6
2.3 Fish and Wildlife Habitat Conservation Areas and Buffers (County) 6
2.4 Background Materials 7

3. RESULTS AND DISCUSSION 8
3.1 Project and Site Description Overview 8
3.2 Soil and Geology Mapping 8
3.2.1 Soil Mapping (Chelan County NRCS Soil Survey) 8
3.2.2 Geology Mapping 10
3.3 Watershed and Stream Mapping 11
3.3.1 WDNR Stream Type Mapping 12
3.3.2 Wetland and Stream Hydrologic Functions 13
3.4 Wetland Systems Hydrologic Drivers 14
3.4.1 Wetland Vegetation Community (similar in all three systems) 17
3.4.2 Hydrology 18
3.4.3 Soil Conditions 18
3.5 Wetland Rating Results 19
3.6 Proposed Mitigation 19
3.7 Mitigation Goal 20

4. SUMMARY 21

5. REFERENCES 22

LIST OF FIGURES

Figure 1. Project Area (Sec. 17, 16 and 9) and area targeted for specific wetland and stream assessment. (red outline) 5
Figure 2. Soil map of area in and around Section 17. 8
Figure 3. Geology of the surrounding area. 10
Figure 4. Stemilt Creek and Squilchuck Creek Watersheds (12-digit HUC Units). 11
Figure 5. Stream and Wetland Overlay with respective standard buffers, relative to the orchard development boundary (shaded in white) in Section 17. 12

TABLE OF CONTENTS

Figure 6. Showing locations of named streams and wetlands in the southern portion of Section 17... 13
Figure 7. Showing severe erosion in the western Ns stream channels, where mitigation is proposed. 14
Figure 8. Showing location and extents of Wetlands A, B and C with approximate buffers in southern portions of Section 17. ... 15
Figure 9. Mud-bogging area at convergence of Ns streams and Wetlands. ... 16
Figure 10. Example of Facultative Wetland plant community and adjacent upslope Buffer vegetation community ... 17
Figure 11. Showing groundwater hydrology conditions in Wetland A, within 1 ft elevation of the adjacent stream channel ... 18
Figure 12. Example of Hydric Soil with Indicator F6 – Redox dark surface. ... 18
Figure 13. Showing the proposed orchard road realignment and crossings. ... 20
Figure 14. Example of disturbed area near Wetland B that will be restored during mitigation work. . 21
Figure A-15. Cowardin Plant Classes ... 23
Figure A-16. Areas within 150', 250' and 330' of the wetlands. ... 23
Figure A-17. Map of the Contributing Basin. ... 23
Figure A-18. Show habitat conditions within 1km of the wetland boundary edge. ... 23
Figure A-19. Showing project location in relation the TMDL studies. ... 23
Figure A-20. Showing project location relative to 303D Waters. ... 23

LIST OF TABLES

Table 1. Wetland buffer widths required per wetland category. ... 6
Table 2. Stream type buffer widths. ... 7
Table 3. Soil map units and descriptions ... 9

APPENDICES

Appendix A – Wetland Rating Figures and Forms
Appendix B – Field Data Forms

1. INTRODUCTION

1.1 PROJECT OVERVIEW

Wheeler Ridge, LLC is proposing a 260-acre orchard development within 640 forested acres. The Project site is located in Section 17, Chelan County, Washington State. The proposed Project Area and various project components are displayed in Figure 1. The purpose of this report is limited to a description of wetland and associated stream conditions in the southern portion of Section 17, as outlined in red in Figure 1, and to describe planned wetland and stream restoration efforts.

The detailed wetland delineation information was previously embedded in a large habitat assessment report prepared in October 2018, which was submitted to Chelan County for review. In response to comments and questions from that review process, a second habitat assessment report has been prepared, which describes all impacts and proposed mitigation measures across the Section 17. Some of the wetland assessment work is still embedded in that report. But to simplify that discussion, this wetland summary report has been prepared as a stand-alone document.

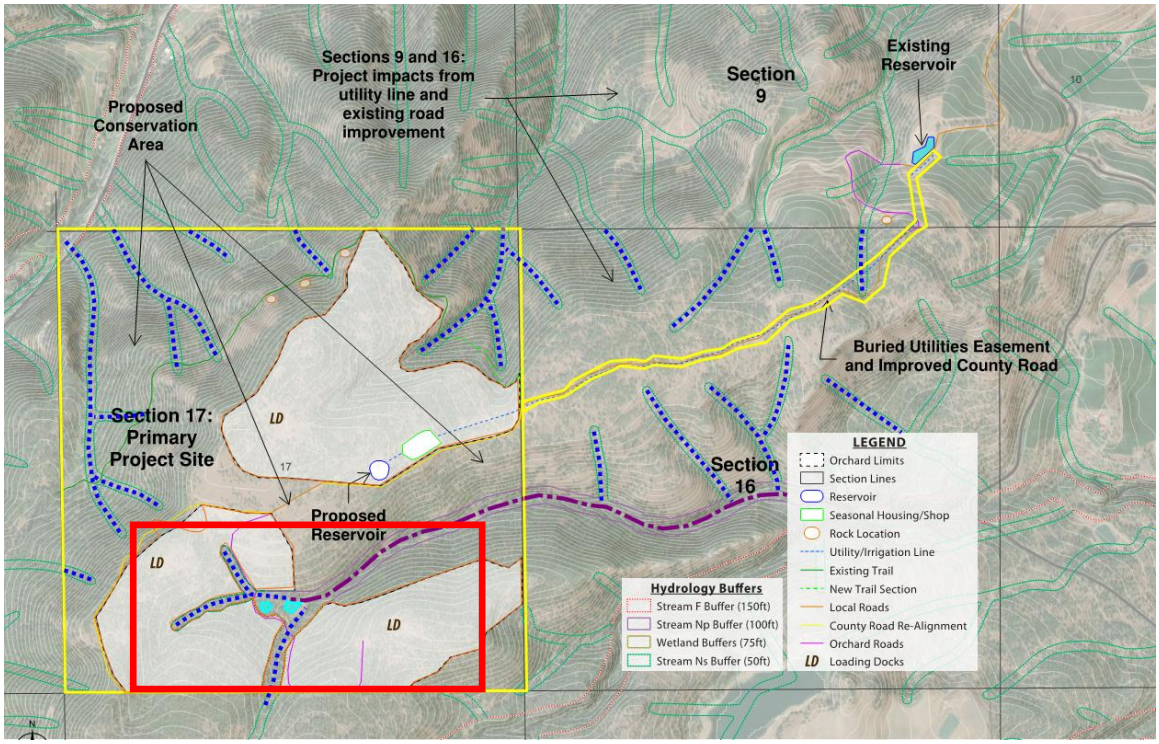

Figure 1. Project Area (Sec. 17, 16 and 9) and area targeted for specific wetland and stream assessment. (red outline)

1.2 FIELD WORK

On May 16, 2018 SCJ Alliance staff delineated wetland and stream complexes in the southern portion of Section 17. Weather on the day of the field visit was cool and sunny with occasional cloud cover. Hydrology was fully to partially expressed and conditions for effective wetland delineation were suitable.

The site was visited again in July and October of 2019 to collect additional data as needed to respond to reviewers' questions and comments from a previous report.

2. METHODS AND MATERIAL

2.1 WETLAND DELINEATION REGULATIONS (FEDERAL AND STATE)

Under the Washington Administrative Code (WAC) section 173-22-035, the Washington State Department of Ecology (Ecology) requires wetland identification and delineation be completed following the approved federal wetland delineation manual and applicable regional supplements, including but not limited to the 1987 Corps of Engineers Wetland Delineation Manual and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (U.S. Army Corps of Engineers 2010).

2.2 WETLAND RATING, CLASSIFICATION, AND BUFFERS (COUNTY)

Chelan County Code defines wetland protection standards in Chapter 11.80 Wetland Areas Overlay District (WOD), which includes requirements for rating the wetland and making buffer width determinations based on rating score results. Standard mitigation sequencing applies.

As required by Chelan County code, the Washington State Wetland Rating System for Eastern Washington (WRSEW) has been applied. The version of the WRSEW referenced in code was Hruby 2004a but code also indicates "as amended" therefore wetlands associated with the project site were rated according to the 2014 WRSEW (Ecology Publication #14-06-030).

Wetlands identified as part of this project were classified according to the USFWS Cowardin classification system (Cowardin et al. 1979) and the USACE Hydrogeomorphic (HGM) classification system (Brinson 1993). Wetland buffers width are assigned relative to Wetland Category rating results, as provided below in Table 1.

Table 1. Wetland buffer widths required per wetland category.

	Buffer Width (feet)	
Wetland Category	**High Intensity (feet)**	**Low Intensity (feet)**
Category 1	300	200
Category 2	200	100
Category 3	150	75
Category 4	50	50

2.3 FISH AND WILDLIFE HABITAT CONSERVATION AREAS AND BUFFERS (COUNTY)

FWHCAs include streams, riparian areas, mapped point locations of priority species wildlife habitat, and mule deer and/or elk winter range and migration corridors. Wetlands are included in the definition of Class II FWHCAs but are generally regulated primarily through Chapter 11.80. This report discussion is limited to stream impacts. Other FWHCAs are discussed in a separate, parallel report described above.

Stream buffers width are assigned based on Stream Type, as provided below (Table 2). Stream Type S is a Shoreline, a large, fish-bearing river system, which is also regulated under the County Shoreline Master

Plan. Stream Type F is a smaller fish-bearing stream, relative to a Type S. Stream Type Np is not fish bearing but flows year-round (is a perennial stream). Stream Type Ns is a seasonal stream, with no fish.

Table 2. Stream type buffer widths.

	Buffer Width (feet)	
Stream Type	**High Intensity (feet)**	**Low Intensity (feet)**
Type S	250	200
Type F	200	150
Type Np	150	100
Type Ns	50	50

2.4 BACKGROUND MATERIALS

To help determine the site conditions that might affect stream type assessment, wetland delineation and rating results SCJ Alliance staff reviewed the following information:

- Chelan County GIS mapping database
- US Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI)
- US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey Geographic database online Web Soil Service.
- Precipitation data (US Climate Data 2018)
- Washington State Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS). Database (WDFW PHS 2018)
- Washington State Department of Natural Resources (DNR) FPARS stream mapping system 2018
- Google Earth historic timeline aerial photos of the project area

3. RESULTS AND DISCUSSION

3.1 PROJECT AND SITE DESCRIPTION OVERVIEW

The proposed project site is in Section 17 (Parcel number 212017000000, 640 acres), Township 21N, Range 20E. Wheeler Ridge LLC is proposing to convert up to 260 acres of forestlands to orchard development. The purpose of this report is to describe wetland and stream conditions in Section 17, particularly in the southern portion where higher order water resources were located.

Wetlands and streams were delineated on May of 2018, and after rating the wetlands and defining the stream types, standard buffers (per Chelan County code) were applied to determine the boundaries of the orchard.

The site was revisited in July and October of 2019 to collect additional data as needed to respond to questions and comments from the first report review process.

3.2 SOIL AND GEOLOGY MAPPING

3.2.1 Soil Mapping (Chelan County NRCS Soil Survey)

The dominant soil type mapped on and near the site is the Stemilt silt loam (map units StD and StE), slope classes 0-25% and 25-45% (Figure 2; Table 3). According the the NRCS standard soil series description, the Stemilt soil series is typically "very deep and deep, well drained soils that formed in mixed ash and loess over material weathered mostly from basalt or andesite. Stemilt soils are on mountains. Slopes are 0 to 75 percent. The mean annual precipitation is about 25 inches and the mean annual temperature is about 44 degrees F."

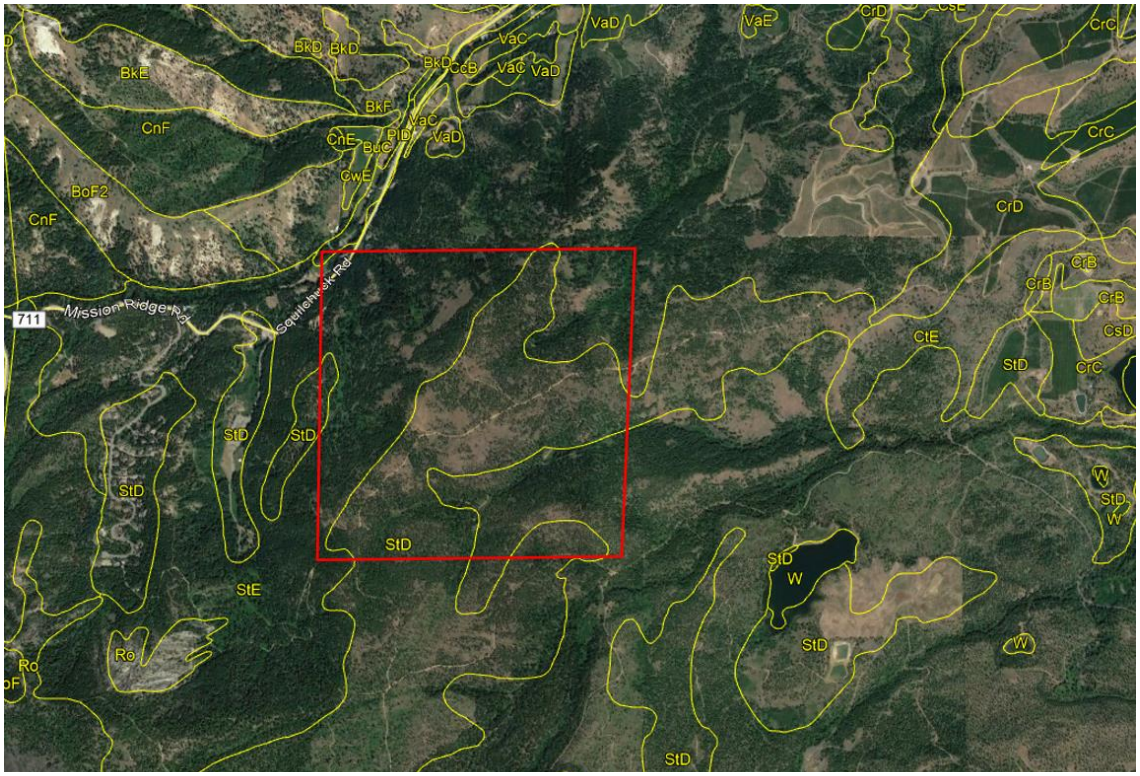

Figure 2. Soil map of area in and around Section 17.

Table 3. Soil map units and descriptions.

Soil Map Unit	Soil Name	Description
BoF2	Bjork-Rock outcrop complex, F=25% to 65% slopes, eroded	Rock outcrops – bedrock at surface
BkD, BkE, BkF	Bjork SiL, Aridic Argixeroll, D=15-25%, E=25-45%, F=45-65%	Moderately deep, well drained soils formed in loess and colluvium and residuum from schist, sandstone, or conglomerate on hillsides and mountainsides.
BuC	Burch FSL, Aridic Haploxeroll, C=8-15%	Deep, well drained soils that formed in valley fill material on terraces.
CnE	Cle Elum SiL, Ultic Haploxeralf, E=25-45%,	Moderately deep, well drained soils formed in loess and residuum and colluvium from sandstone. They are on foothills and mountain slopes.
CrB, CrC, CrD, CrE	Colockum SiL, Calcic Argixeroll, B=3-8%, C=8-15%, D=15-25%, E=25-45%,	Very deep, well drained soils that formed in loess over material weathered from basalt, sandstone, and glacial till on benches, foothills, hillslopes, canyon side slopes and lower mountain slopes.
CsD, CsE	Colockum Cobbly SiL, Calcic Argixeroll, D=15-25%, E=25-45%,	Very deep, well drained soils that formed in loess over material weathered from basalt, sandstone, and glacial till on benches, foothills, hillslopes, canyon side slopes and lower mountain slopes.
CtE	Colockum Bouldery SiL, Calcic Argixeroll, E=25-45%,	Very deep, well drained soils that formed in loess over material weathered from basalt, sandstone, and glacial till on benches, foothills, hillslopes, canyon side slopes and lower mountain slopes.
CwE	Cowiche SiL, Aridic Argixeroll, E=25-45%,	Deep, well drained soils formed in loess and residuum on uplands.
StD, StE	Stemilt SiL, Vitrandic Argixeroll, D=0-25%, E=25-45%	Very deep and deep, well drained soils that formed in mixed ash and loess over material weathered mostly from basalt or andesite on mountains.

The Stemilt soil series taxonomic classification -- loamy-skeletal, isotic, frigid Vitrandic Argixerolls – indicates that the native soils are Mollisols, which would typically have a dark, nutrient rich surface horizon and a clay-rich substrate (argillic horizon) from about 18 to 60+ inches depth. The typical Stemilt soil profile would include surface soils to about 22 inches depth that are influenced by volcanic ash (Vitrandic). Both clay content and volcanic ash contribute to soil quality, having a higher cation exchange capacity, and more micronutrients. These soils area also expecetd to have a later start of spring growing season due to the higher elevation (frigid). The coarse fraction soil texture is described as being as high as 60% in the subsoils below about 20 inches (loamy-skeletal), which means that despite the high clay content, water holding capacity in the deeper soils may be limited, and irrigation may be needed to sustain an orchard.

Other soil types mapped nearby area are mostly wind-blown loess deposits capping basalt, sandstone or glacial till substrates – the Bjork, Cle Elum, Colockum and Cowiche soil series.

3.2.2 Geology Mapping

The dominant geology mapping (Figure 3) on and near the site is defined as Quaternary Landslide (Qls), with block slide movement toward the relatively rare Tdyo map unit. The Tdyo map unit is rather vaguely described as "Older Diamictite". According to the SandAtlas online geologic dictionary (http://www.sandatlas.org/diamictite/),

> "Diamictite is a poorly sorted or non-sorted terrigenous non-calcareous sedimentary rock that contains variously sized clasts from clay to boulders in a muddy matrix."

This description is purely illustrative, and does not explain how this material formed. However, because it is composed of poorly sorted sediment (i.e., is not sorted by water or wind), it is thought to be more likely formed from an old mudflow, or landslide, or layers from intraglacial sediments. Its landscape position suggests it could have formed from a unique combination of river flow impacts from the north in concert with lava flow impacts from the southeast.

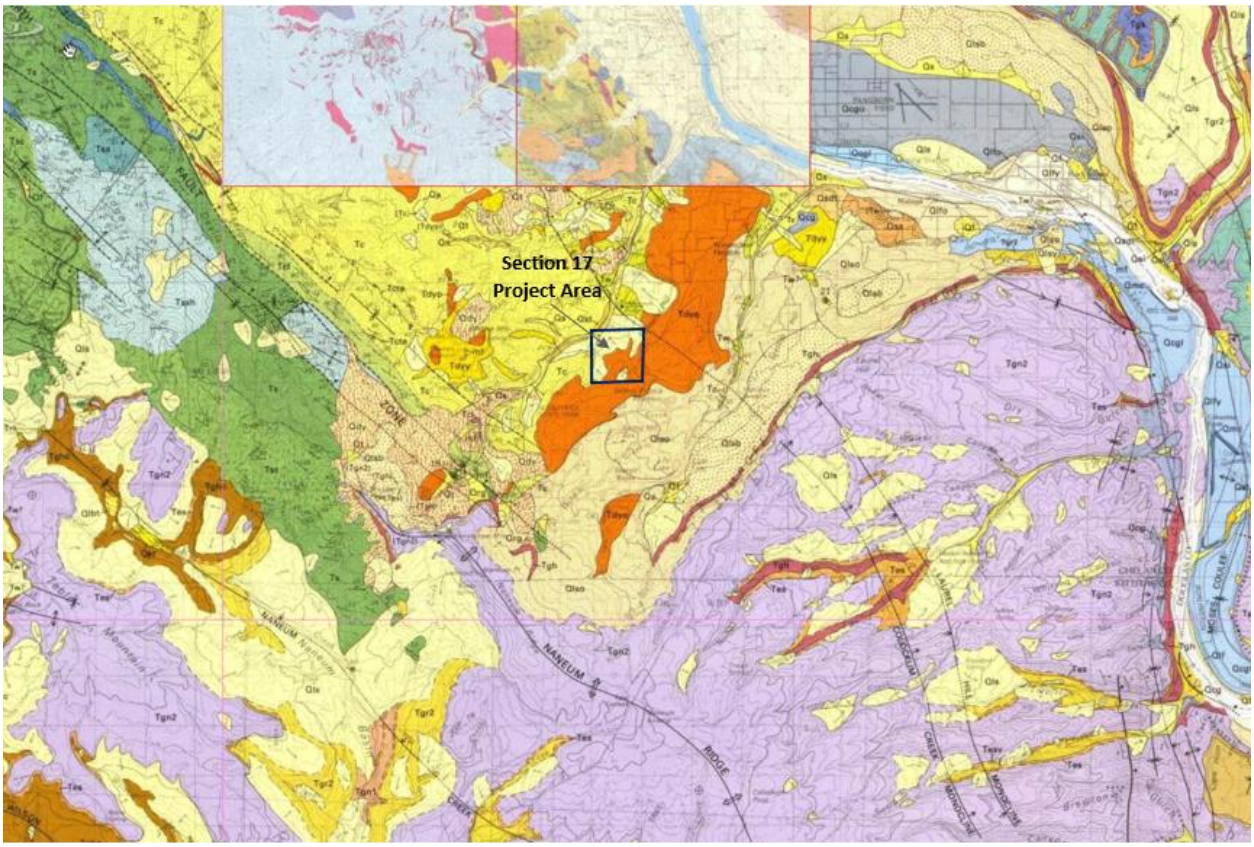

Figure 3. Geology of the surrounding area.

3.3 WATERSHED AND STREAM MAPPING

The Section 17 Project area spans a drainage divide between two watersheds, the Stemilt Creek watershed to the southeast and the Squilchuck Creek watershed to the northwest. Both watersheds drain to the Columbia River about 6.5 miles north of Section 17. Figure 4 shows the outline of each watershed and where Section 17 is in the greater landscape.

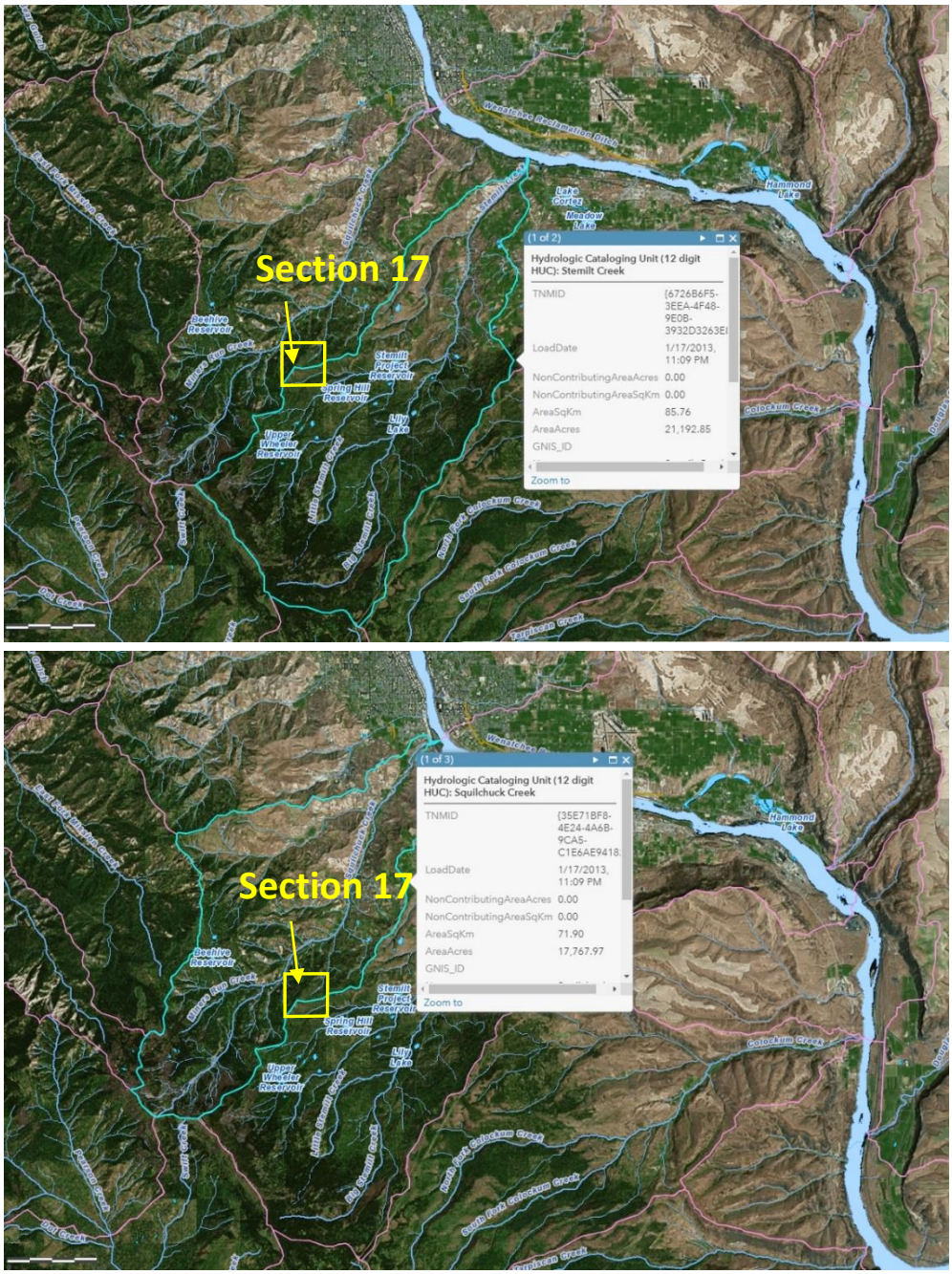

Figure 4. Stemilt Creek and Squilchuck Creek Watersheds (12-digit HUC Units).

3.3.1 WDNR Stream Type Mapping

WDNR Stream Type maps were consulted to provide an initial assessment of potential stream types in the project area. The extents and locations of various stream types in Section 17 were formally revised and updated in 2018 through a standard DNR stream type assessment process following field work carried out with DNR and DFW staff assistance. The corrected and approved Stream Type classifications are displayed in Figure 5, which also shows the associated wetland locations and stream overlays.

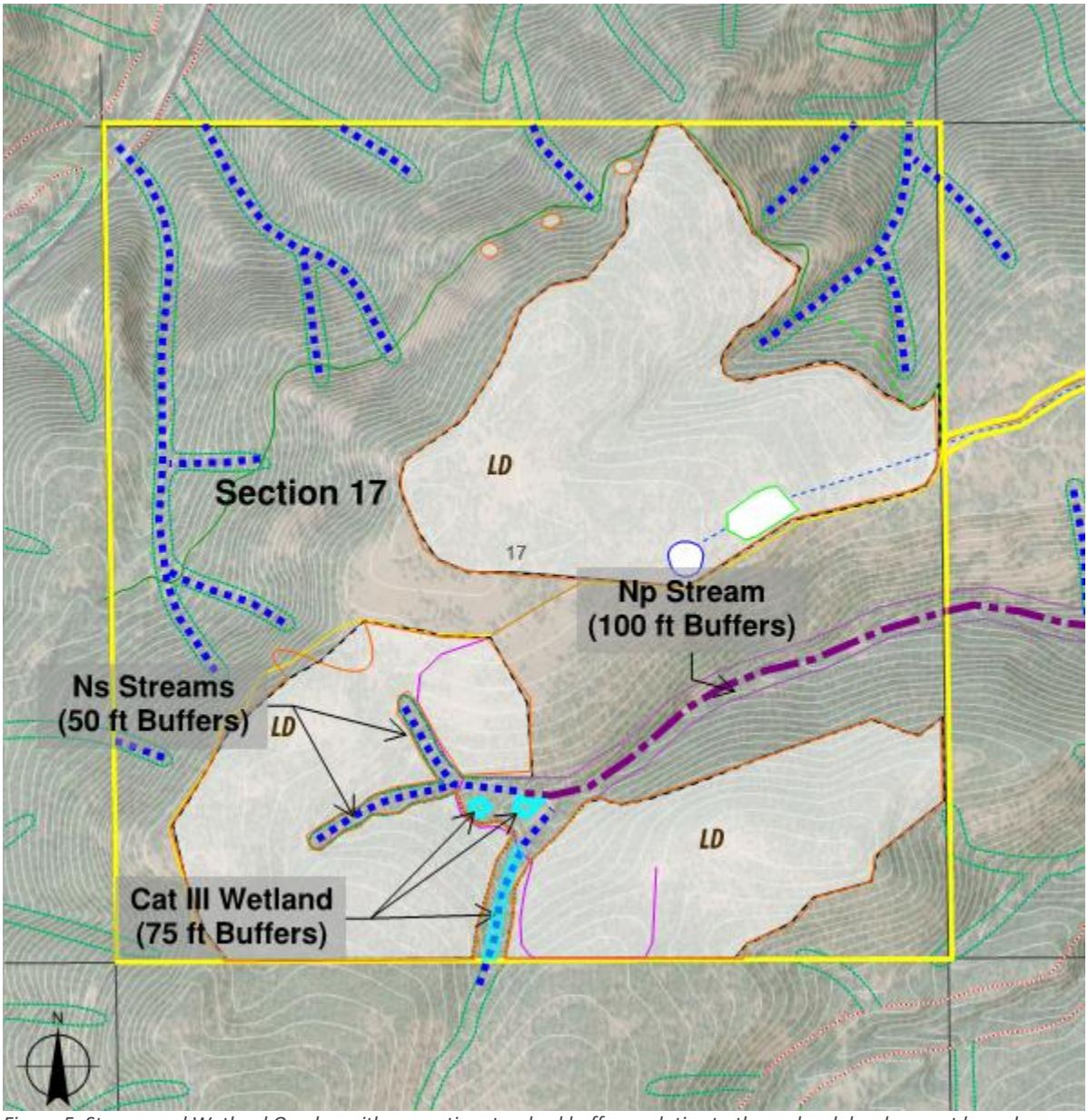

Figure 5. Stream and Wetland Overlay with respective standard buffers, relative to the orchard development boundary (shaded in white) in Section 17.

The result of this work shows that there are no Fish-bearing streams (Type F) within Section 17. However, one fish-bearing stream is located just offsite to the northwest, and another is located just offsite to the southeast. The two Type F streams have standard 150 ft buffers and are well outside of the proposed orchard development.

3.3.2 Wetland and Stream Hydrologic Functions

Section 17 overlays a drainage divide. The midsite ridge – called Wheeler Ridge – bisects the flow pathways. The northern portion of Section 17 flows north, and the southern portion flow south. Because this results in minimal upslope surface collection area, most of the onsite streams are small Non-Fish, Seasonal (Ns) systems, and have standard buffers of 50 feet. Only one section of onsite stream in the southeast quadrant of Section 17 is designated as Non-fish, Perennial (Np) by DNR and WDFW staff. The Np stream has a standard buffer of 100 feet. The Np stream has some associated Cat III riparian wetlands (75 ft buffers), but because the Np stream is in a ravine, these wetlands are very narrow – most being less than 10 feet wide. Therefore, the 100 ft Np stream buffer is wider and more protective, and thus is the controlling buffer along the Np stream.

Three of the Ns stream sections in the south-central portion of Section 17 are associated with Category III wetlands, which are assigned a standard buffer of 75 feet in low intensity development areas[1]. For those combined Ns stream/wetland systems, the 75 ft wetland buffer is wider and more protective than the 50 ft Ns stream buffer, and therefore is the controlling buffer.

The three Ns stream systems mentioned above are called Ns North, Ns West and Ns South. The three wetlands are called Wetland A (associated with Ns South); and Wetlands B and C (associated with Ns West and Ns North) (Figure 6).

The proposed outline of the orchard development area is overlaid on the map in Figure 5. That map shows that in most areas, the proposed orchard area does not include streams. However, Ns North and Ns West are surrounded by proposed

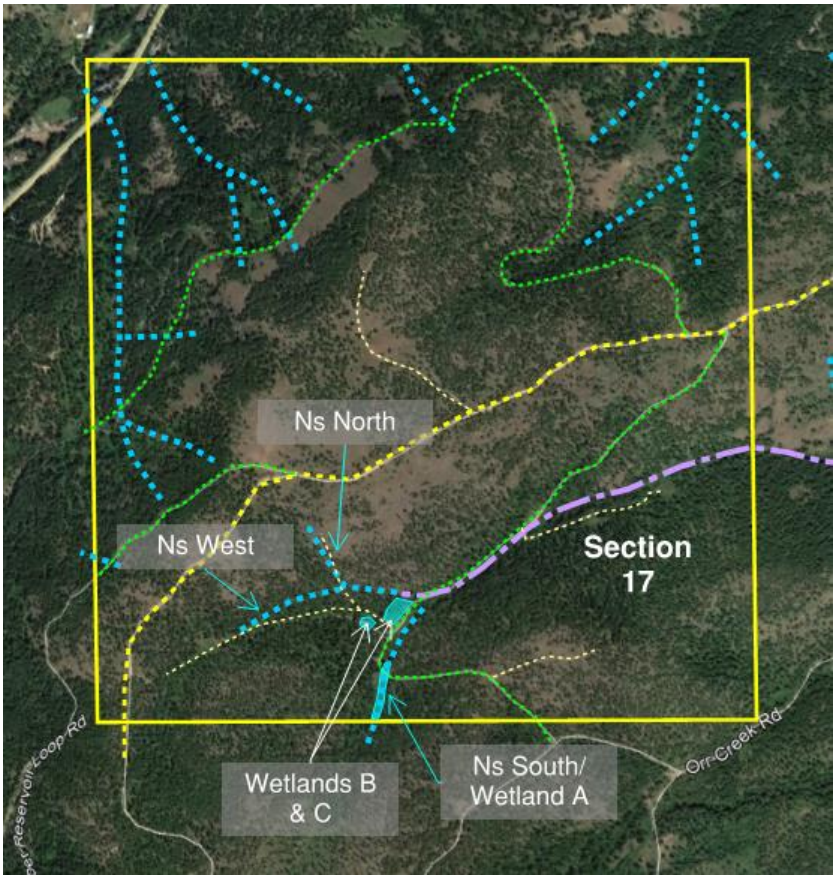

Figure 6. Showing locations of named streams and wetlands in the southern portion of Section 17.

[1] Agriculture is regulated as Low Intensity Development in Chelan County.

orchard area, due to terrain controlling the location of existing roads, some of which must be retained to support orchard operations. More about road impacts will be discussed below.

Figure 7. Showing severe erosion in the western Ns stream channels, where mitigation is proposed.

These two Ns stream channels are defined by flow that has eroded deeply into existing relic logging road system ruts (Figure 7), and as such, they provide minimal if any riparian habitat function under current conditions. Ns West has actually jumped from its original flow pathway, and is currently flowing down a logging road that parallels the original channel about 100 ft to the south.

For this reason, it was previously proposed to capture and pipe the seasonal flow in NS West and Ns North to stop the erosion and convey the flow to downstream wetland systems. The intent of that proposal was to eliminate sediment impacts to the downstream wetlands. However, Chelan County Code does not allow piping of regulated streams unless there is no alternative. Therefore, the proposal to pipe the two Ns streams has been withdrawn, and instead, the stream channels will be restored and revegetated, with erosion control measures added. More details about this work this will be discussed below.

3.4 WETLAND SYSTEMS HYDROLOGIC DRIVERS

Three wetland areas (Wetlands A, B and C, described below) were identified and flagged in the southern section of Section 17. These systems were associated to varying degrees with existing Ns and Np stream reaches in that area that have been described above. Per Chelan County Code, Ns streams are assigned a buffer of 50 feet; Np streams are assigned a buffer of 100 feet. In areas where both wetland and stream conditions occur, the most restrictive buffer applies. Figure 8 shows how these systems share seasonal hydrology, most of which is from snow melt moving through groundwater, but also from surface accumulation of rainfall.

Wetland A is a seasonally wet riparian Palustrine Scrub-Shrub (PSS) system that parallels Ns South, sometimes occurring on one side of the stream, and sometimes on both. However, because the 75 ft wetland buffer (measured from the wetland edge) is greater than the 50 ft Ns stream buffer (which is measured from the edge of the stream channel), the 75 ft buffer defines the regulated width of the Wetland A system.

Wetlands B and C (both are PSS/ PEM systems) are seasonal wetlands associated with flow from the diverted section of Ns West (described above). Wetland C's hydrology is fed primarily from upslope snowmelt from the south; therefore, it no longer has hydrology by early summer in most years.

Hydrology from Wetland C overflows north into the logging road (which also contains seasonal flow from Ns West).

During the May 2018 field visit, there was no current flow (Ns West) in the logging road upslope of Wetland C; but over flow from Wetland C was actively flowing down the road to the east. The ruts in the road conduct seasonal Ns West flow as well as overflow from Wetland C to the east, until a slight rise in surface elevation forces the water in the road to spill to the north into Wetland B, a sloped wetland system that seeps north into an Ns stream channel. That channel contains seasonal flow from Ns North, but was dry upslope of Wetland B in May of 2018. However, there was flow in the stream bed east of Wetland B, indicating that Wetlands C and B contribute hydrology to the local stream systems longer in the spring than the upslope Ns stream systems.

Before Ns West jumped out of its native channel to the logging road, this section of the stream channel downslope from Wetland B would also have contained flow from Ns West. Ns West and NS North channels originally converged about 400 feet upstream from Wetland B. The combined seasonal flows from Ns West, Ns North, Wetlands B and C merge with flows from the Wetland A/ Ns South system about 300 feet to the east, forming the headwaters for the Np stream which continues downstream to the east (Figure 6).

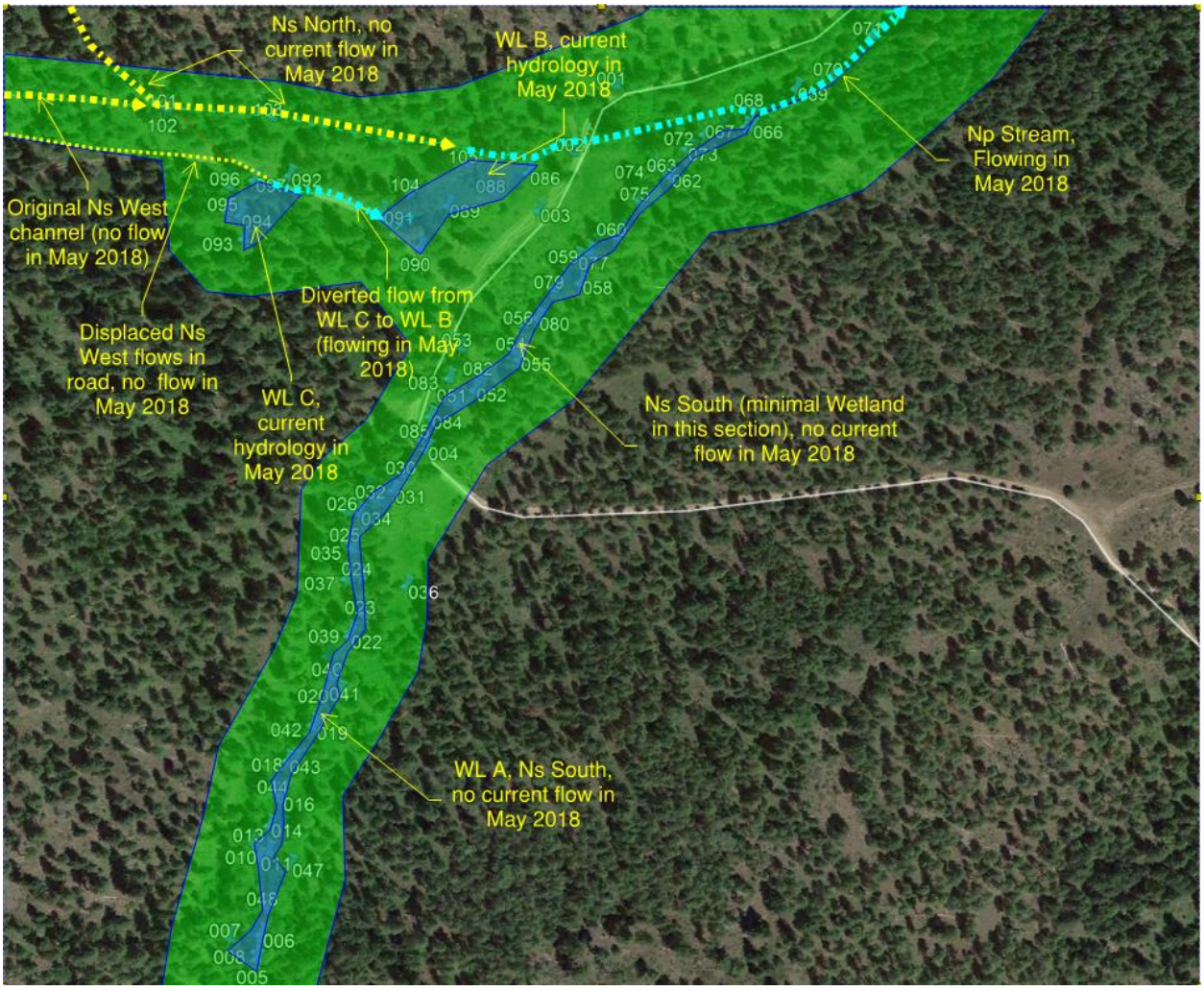

Figure 8. Showing location and extents of Wetlands A, B and C with approximate buffers in southern portions of Section 17.

The convergence area is severely damaged from past mud-bogging activities (Figure 9). This area will be targeted for restoration, described in more detail below.

Figure 9. Mud-bogging area at convergence of Ns streams and Wetlands.

There was a small meadow area east of Wetland A at the downslope end of an old logging road scar, which had some wetland vegetation. However, during the May 2018 field visit, three was no consistent wetland hydrology and inconclusive hydric soil characteristics due to damage from what was most likely an old logging deck in that area. That area was revisited in July and October of 2019 to review and collect additional data, together with a representative from Ecology. The area did not show clear evidence of long-duration saturation within 12 inches of the surface during the growing season, and therefore, was not flagged as wetland.

Another area at the headwaters of Ns West was assessed for wetland conditions, responding to questions from a Chelan County third-party reviewer. This area had no wetland hydrology during any of the field visits, including the May 2018 field visit when other wetlands downslope had current hydrology. Additional work in 2019 showed the same results as were determined during the May 2018 field work – no wetland conditions in the headwaters area of Ns West. This is not surprising as there was no flow or evidence of recent flow in the Ns West stream channel during the May 2018 field visit.

3.4.1 Wetland Vegetation Community (similar in all three systems)

The vegetation from within to outside of the wetland areas reflected a transition from wetland to upland conditions, as would be expected. But the majority of wetland vegetation in all three wetlands (A, B and C) was Facultative, reflecting the seasonally wet conditions expected in this area (Figure 10). Obligate vegetation was documented only in Wetland C or near the mud-bog Np road crossings where water backed up and ponded for long periods above the partially blocked culvert.

Dominant wetland species include:

Trees

Red alder (*Alnus rubra*)
Quaking aspen (*Populus tremuloides*)

Shrubs

Serviceberry *(Amelanchier alnifolia)*
Twinberry (*Lonicera-involucrata*)
Red osier dogwood (*Cornus sericea*)
Wild crabapple (*Malus fusca*)
Wild rose (*Rosa spp)*

Herbs, Ferns and Vines

Water parsley (*Oenanthe sarmentosa*)
Wild columbine (*Aquilegia formosa)*
Yellow lily *(Iris pseudacorus*)
Wild iris (*Iris missouriensis)*
Sedge spp (*Carex spp)*
Coltsfoot (*Tussilago farfara*)
Small-fruited bulrush (*Scirpus microcarpus*)
Horsetail (*Equisetum spp*)
Spike rush (*Eleocharis palustris*)
Spreading buttercup (*Ranunculus repens*)

Dominant upland species include:

Trees

Quaking aspen (*Populus tremuloides*)
Ponderosa pine *(Pinus ponderosa*)
Red alder (*Alnus rubra*)

Shrubs

Oregon grape *(Mahonia aquifolium)*
Bitterbrush *(Purshia tridentate*)

Figure 10. Example of Facultative Wetland plant community and adjacent upslope Buffer vegetation community

Oceanspray (*Holodiscus discolor*)
Snowberry *(Symphoricarpos albus)*
Wild rose (*Rosa spp)*

Herbs, Ferns and Vines
Yarrow (*Achillea millefolium)*
Arrow leaf balsamroot (*Balsamorhiza sagittate*)
Violet (*Viola spp*)
Lupine (*Lupinus spp*)
Wild geranium (*Geranium maculatum*)
Bleeding heart (*Dicentra formosa*)
Trillium (*Trillium ovatum)*

3.4.2 Hydrology

Hydrology for all three wetlands is from direct precipitation (rain and snow), and subsequent concentration of stormwater and snow melt in low-lying areas (Figure 11). On the day of the site visit, groundwater was at or near the surface in Wetland A areas adjacent to the stream with only minor surface ponding. When surface elevation increased by one to two feet in the riparian area relative to the stream elevation, wetland conditions were no longer present, resulting in a very narrow linear wetland along the edge of the stream.

Figure 11. Showing groundwater hydrology conditions in Wetland A, within 1 ft elevation of the adjacent stream channel.

Hydrology in both Wetland B and C was at the surface, but there were indications that it was diminishing as the season progressed. We assume that all of these seasonal wetlands systems have no hydrology by mid to late summer.

3.4.3 Soil Conditions

Soils in the surrounding area are very generally mapped as Stemilt ashy silt loam, which is not a wetland soil map unit. However, the map unit does contain wetland and stream areas where terrain directs seasonal water and snow melt to low lying areas or ravines.

Soils within the wetlands expressed a variety of hydric soil indicators, ranging from A11 (Depleted Below Dark Surface), to A4 (Hydrogen sulfide) to F6 (Redox Dark Surface) (Figure 12).

Figure 12. Example of Hydric Soil with Indicator F6 – Redox dark surface.

3.5 WETLAND RATING RESULTS

The wetlands were rated using the 2014 Eastern Washington Rating System, as required in Chelan County Code.

Wetland A's rating results indicated that it had **moderate** Site and Landscape potential to provide for water quality treatment and flood storage, but **low** Value, due to the lack of significant pollution and flooding problems – i.e., its potential to treat water quality or to store flood water was not needed in the current setting. Wetland A scored **moderate** for habitat Site and Landscape potential and **high** Value for habitat functions. The final combined score was 18 points – a Category III wetland system.

Wetlands B and C were rated as one system, partly because they were associated, but also because they were similar systems. The Wetland B/C rating results indicated that for Water Quality functions and values, these wetlands had **low** Site potential and **moderate** Landscape potential to provide for water quality treatment –due to lack of physical structure and ponding, which would provide for more effective treatment. They had **low** Value for water quality treatment due to the lack of pollutants in the area.

For Hydrologic functions and values, Wetland B/C had **low** Site and Landscape potential to provide for water storage–due to being small with minimal ponding depths. However, they had **high** Value for hydrologic functions due to helping provide off-road storage in an area that periodically floods.

Wetland B/C's final combined score was 17 points – a Category III wetland system. Per Chelan County Code, a Category III wetland adjacent to Low Intensity Development (agriculture) is assigned a standard buffer of 75 feet.

3.6 PROPOSED MITIGATION

The wetland and stream enhancement proposal in the southern portion of Section 17 is only a few acres within the greater habitat mitigation plan for Section 17; however, it will have a disproportionate effects as it will involve restoration of areas that can be sued by elk during the spring months when they are onsite for breeding and calving. Because these systems are only seasonally wet, they will not provide a water source in most summers past late June. However, as May and June are the calving season, this are will provide High quality habitat during a critical period of the year for elk.

It is proposed to restore Ns West to its original stream channel, about 100 ft north of its current flow pathway down a logging road. Because the current empty channel is well-vegetated, no need for significant erosion control measures are anticipated once the flow pathway is restored. The portions of the riparian buffer that are degraded from the old logging road will be replanted with dense native trees and shrubs, similar to those already growing in the area. The entire perimeter of the Ns West buffer will be fenced and signed to ensure there is no entry from the adjacent orchard activities.

Ns North will remain in its current flow pathway, but will require erosion control measures to reduce current gully erosion in certain sections. Similar to Ns West, an old logging parallels this stream system. That road will be maintained for future orchard operations, but will be realigned to run outside of the stream buffer. The edge of the buffer will be fenced, and the portions of the riparian buffer that are degraded from the old logging road will be replanted with dense native trees and shrubs, as was described above for Ns West.

The logging road that currently runs between Wetlands B and C as well as the downslope "mud bog" area will be ripped and replanted in native wetland vegetation, similar to what is growing in nearby systems. The total area covered by this wetland restoration proposal is about 300,000 sqft (about 7

acres); and the additional enhancement proposals for Ns West (restoration to native channel flow; enhancing buffer vegetation) and Ns North (erosion controls and enhancing buffer vegetation), which is about 200,000 sqft (about 4.5 acres).

The entire perimeter of the orchard will have an 8-ft tall elk exclusion fence, which will run along the edge of the wetland buffer in this area, surrounding the wetland restoration and enhancement area and ensuring that no entry is possible from the orchard.

An existing road in this area which crosses Wetland A and crosses again at the confluence of Ns West and Ns North will be retained, but realigned to minimize the crossing distance, and to remove the road from the Ns North stream buffer (Figure 13). The road will run along the inside of the orchard perimeter fence. The crossings will be culverted and sized to ensure that the seasonal flows are not restricted.

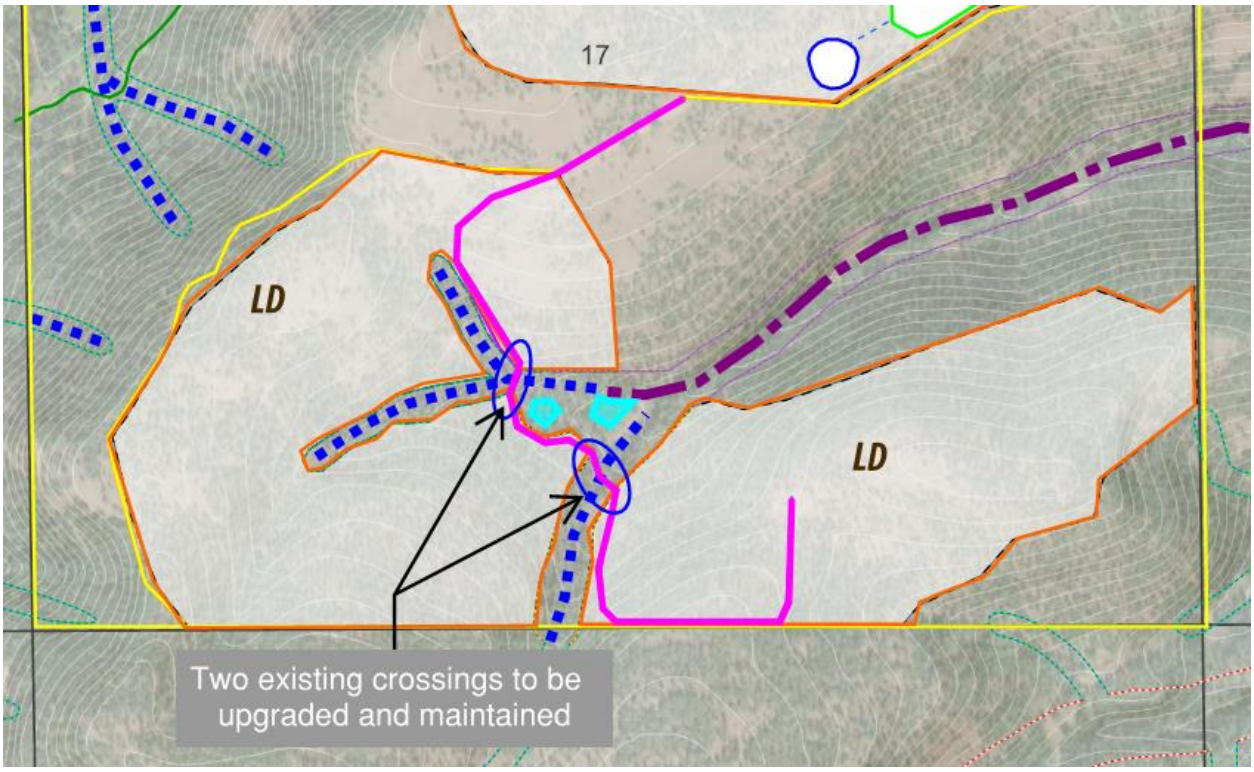

Figure 13. Showing the proposed orchard road realignment and crossings.

3.7 MITIGATION GOAL

The primary goal of the Conceptual Mitigation described above is to restore soils, hydrology and plant communities in the disturbed mud-bog areas and to restore natural stream flow to the old Ns West channel. This will result in expansion of wetland acreage in the confluence area described above, and will improve water quality and potentially could extend the duration of seasonal stream flows in downstream areas by increasing infiltration and storage in soils around the restored wetland perimeter.

If this Conceptual Mitigation Proposal is accepted by Chelan County, a detailed Planting, Monitoring and Maintenance Mitigation Plan with clearly defined Performance Standards will be developed and provided for final review and approval.

Figure 14. Example of disturbed area near Wetland B that will be restored during mitigation work.

4. SUMMARY

Wheeler Ridge LLC is proposing to convert 260 acres of forest habitat within a 640 historical working forest to orchard development. Mitigation to compensate for impacts to upland habitats is described in other reports. The mitigation described in this report is limited to work that will be carried out in the southern portion of Section 17 to restore a severely disturbed stream and wetland complex.

The proposed mitigation will enhance and restore about 7 acres of a wetland complex and about 4.5 acres of an Ns stream systems and its associated riparian buffer. If the Conceptual Mitigation Proposal described above is accepted, a detailed Planting Plan and final Mitigation Plan – including a standard Monitoring and Maintenance Plan -- will be prepared for review and approval. Wheeler Ridge LLC will consult with permitting agencies to ensure conceptual mitigation recommendations are implemented to maximize benefits to wildlife and their habitat.

5. REFERENCES

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Chelan County GIS System

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Hruby, T., *Washington State Wetland Rating System for Eastern Washington – Revised.* Publication Number 14-06029. Washington State Department of Ecology, 2014.

https://data.wa.gov/Natural-Resources-Environment/Water-Resource-Inventory-Areas-WRIA-Washington-Sta/fwgq-q5ti

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USDA Natural Resources Conservation Service Plants Database, 2018 (for hydrophytic plant classification): http://plants.usda.gov/ .

Washington Department of Fish and Wildlife Priority Habitats and Species Maps 2018 http://wdfw.wa.gov/mapping/phs/.

Washington Department of Fish and Wildlife SalmonScape Maps 2018 http://apps.wdfw.wa.gov/salmonscape/map.html

Washington State Department of Natural Resources FPARS mapping system, 2018 (for stream typing): http://fortress.wa.gov/dnr/app1/fpars/viewer.htm.

Washington State Department of Natural Resources WRIA mapping database.

APPENDIX A

Wetland Rating Figures and Forms

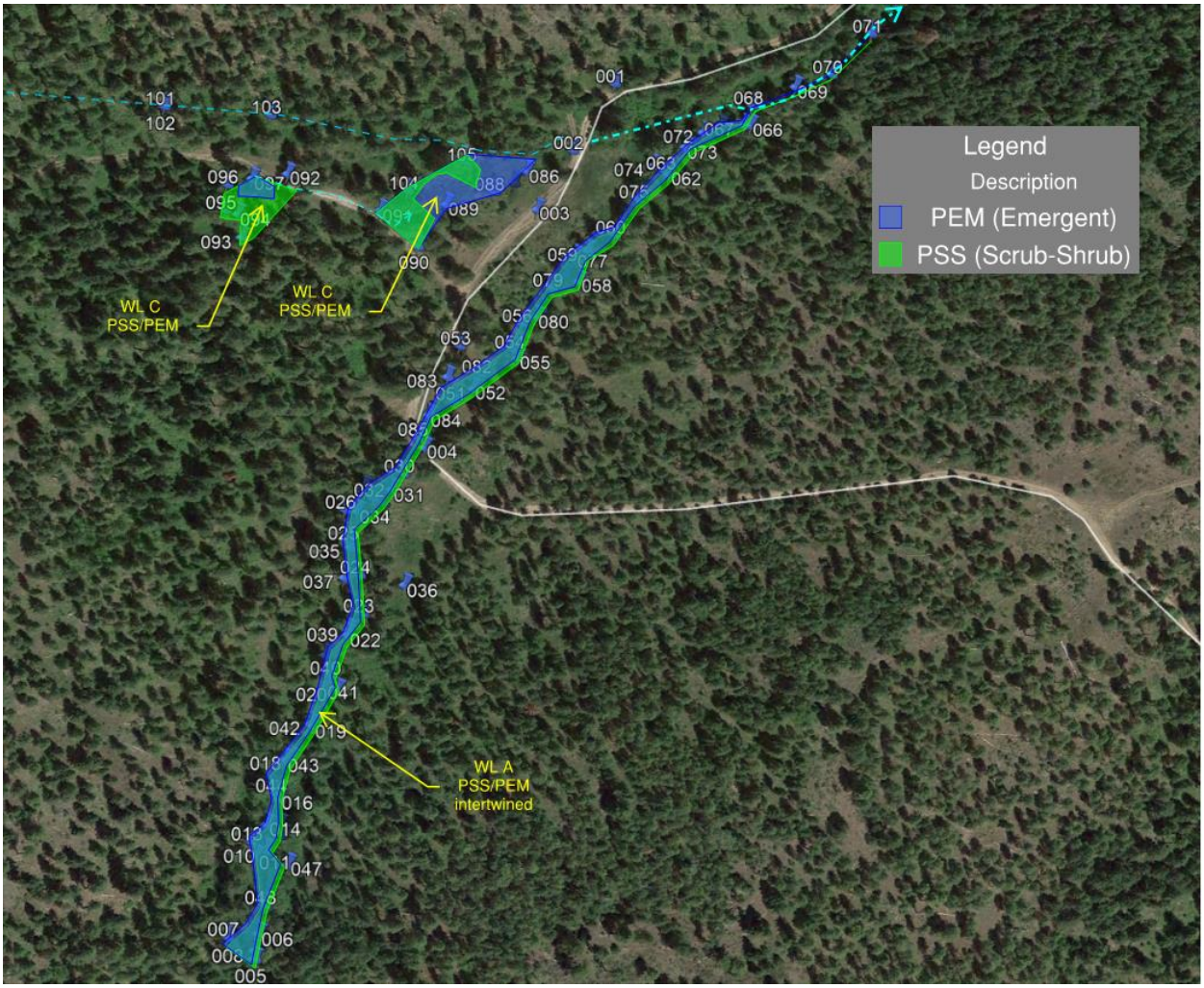


Figure A-15. Cowardin Plant Classes

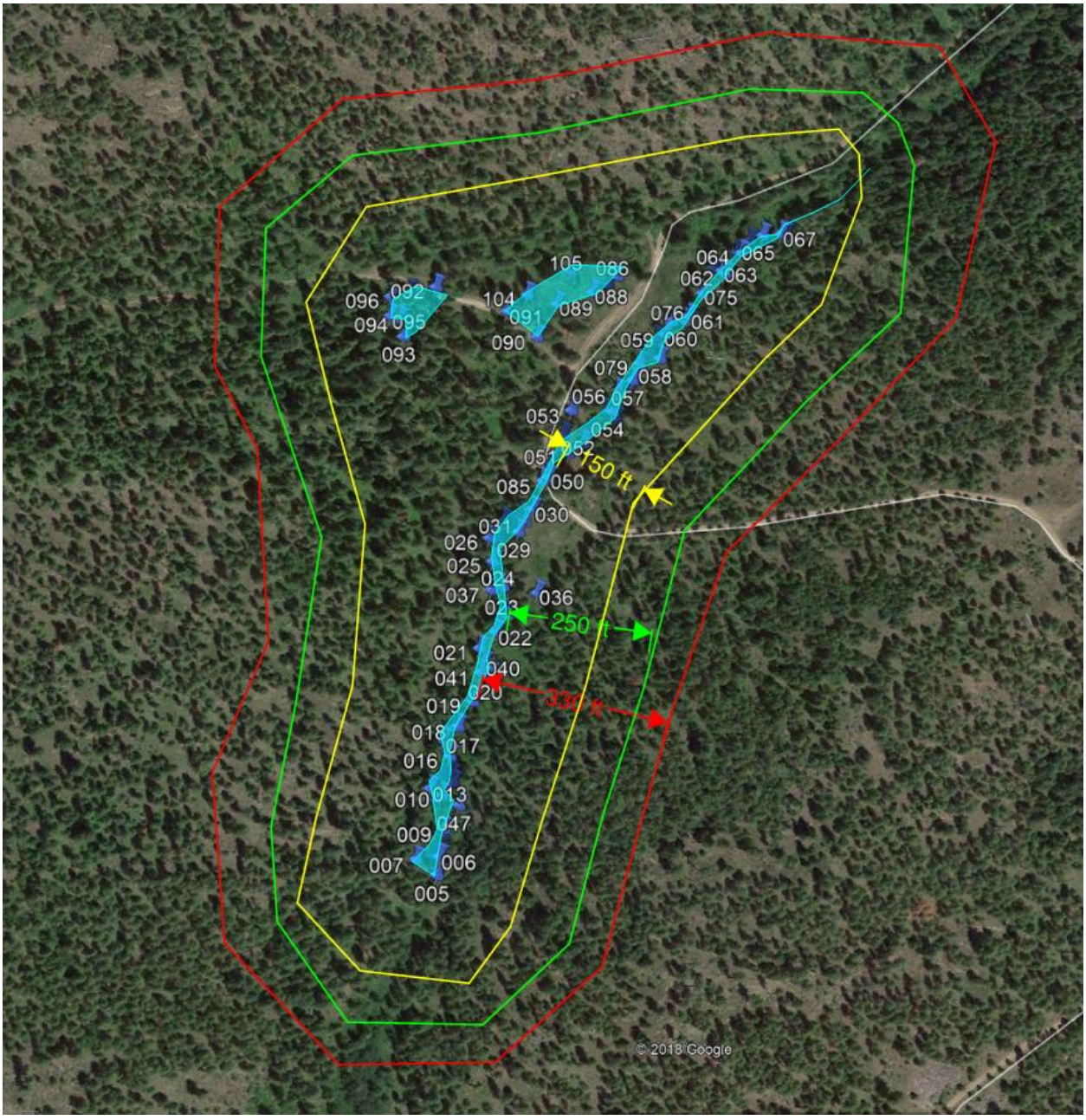


Figure A-16. Areas within 150', 250' and 330' of the wetlands.

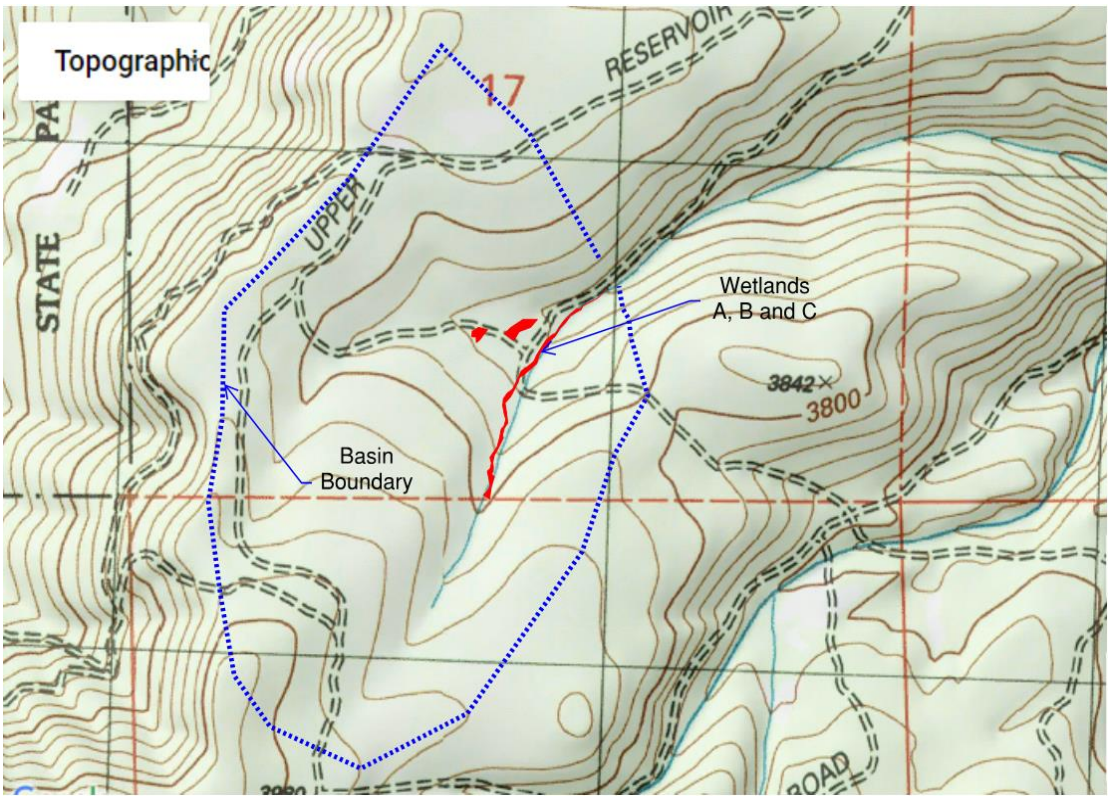


Figure A-17. Map of the Contributing Basin.

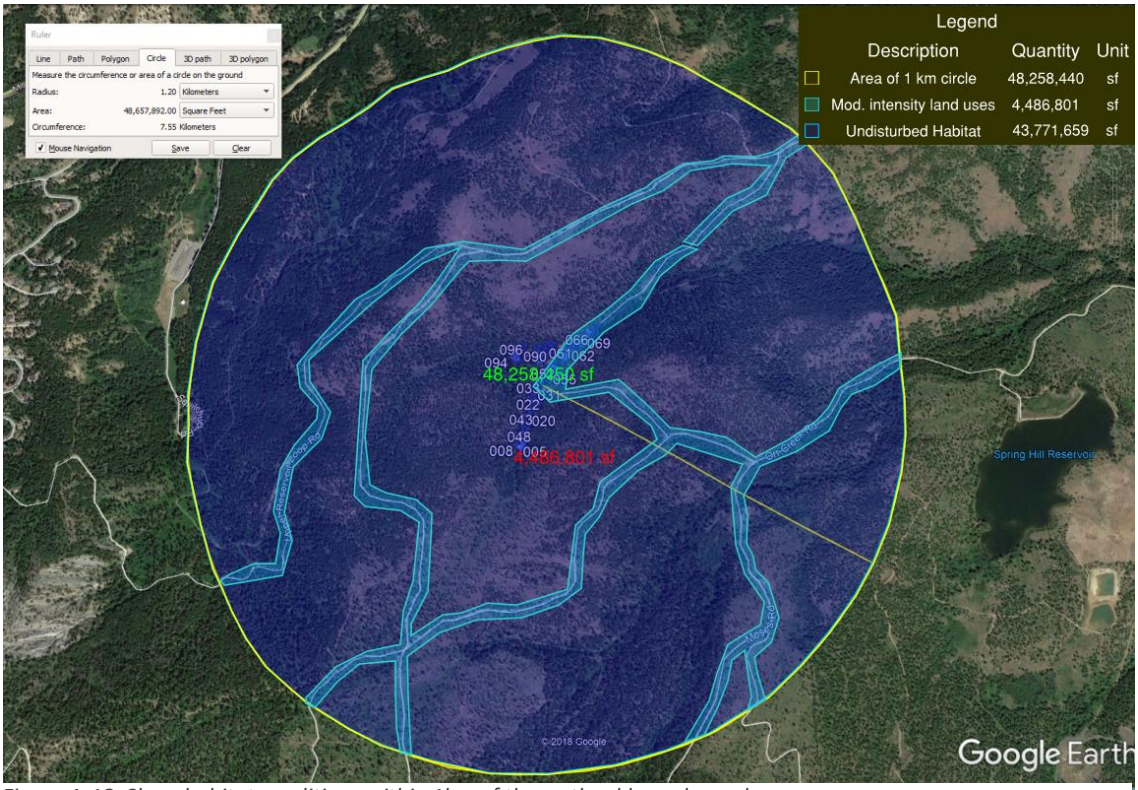


Figure A-18. Show habitat conditions within 1km of the wetland boundary edge.

Figure A-20. Showing project location relative to 303D Waters.

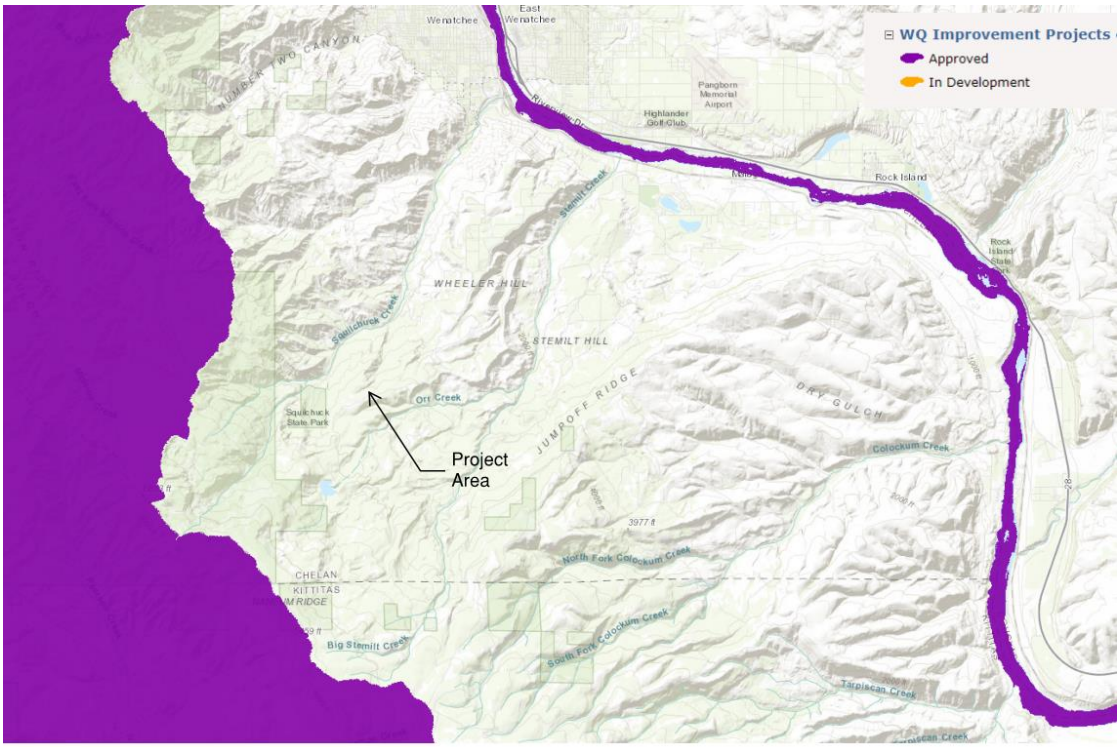


Figure A-19. Showing project location in relation the TMDL studies.

Wetland name or number Wheeler Ridge Wetland A

RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): Wheeler Ridge Wetland A Date of site visit: 5/16/2018

Rated by Lisa Palazzi, PWS, CPSS Trained by Ecology? ☑ Yes ☐ No Date of training 2014

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 Google Earth

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

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

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

xx_____**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	5	5	8	18

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	**II**
None of the above	

Wetland name or number Wheeler Ridge Wetland A

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	Page 45
Hydroperiods	H 1.2, H 1.3	NA
Ponded depressions	R 1.1	NA
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	Page 46
Map of the contributing basin	R 2.2, R 2.3, R 5.2	Page 47
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	Page 45
Width of wetland vs. width of stream *(can be added to another figure)*	R 4.1	NA
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	Page 47
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	Page 48
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	Page 48

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 Wheeler Ridge Wetland A

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.

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 Wheeler Ridge Wetland A

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	0
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	0
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	0
Total for R 2 Add the points in the boxes above	1

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	0
R 3.2. Does the river or stream have TMDL limits for nutrients, toxics, or pathogens? Yes = 1 No = 0	0
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	0
Total for R 3 Add the points in the boxes above	0

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

Wetland name or number Wheeler Ridge Wetland A

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	4
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	8

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

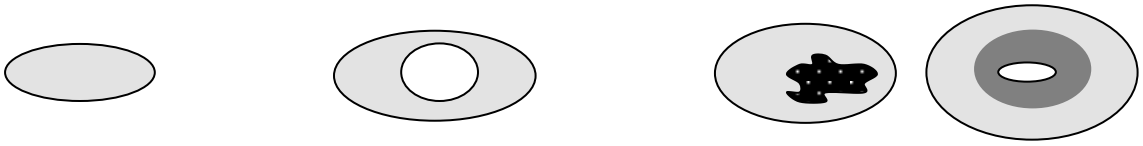
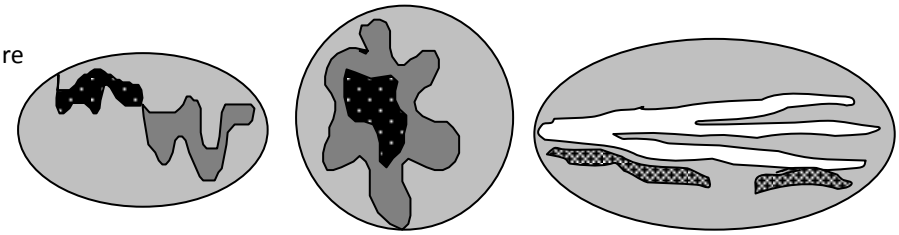
R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
R 5.1. Is the stream or river adjacent to the wetland downcut? Yes = 0 **No = 1**	1
R 5.2. Does the up-gradient watershed include a UGA or incorporated area? Yes = 1 **No = 0**	0
R 5.3. Is the up-gradient stream 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**	0
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	0

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

Wetland name or number Wheeler Ridge Wetland A

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? ***Answer 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	3
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 15 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__ 2

Wetland name or number Wheeler Ridge Wetland A

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)*	2
Total for H 1 — Add the points in the boxes above	11

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 90 + [(% moderate and low intensity land uses)/2] 5 = 95 % > 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	3
H 2.2. Undisturbed habitat in 1 km Polygon around wetland. *Calculate:* % undisturbed habitat 90 + [(% moderate and low intensity land uses)/2] 5 = 95 % 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	3
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	0
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	6

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	2

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

Wetland name or number Wheeler Ridge Wetland A

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 ft²**, 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**	NA
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 ⅓ 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** NA

Wetland name or number Wheeler Ridge Wetland A

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	

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.

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Wetland name or number Wheeler Ridge Wetland B and C

RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): Wheeler Ridge Wetland B and C Date of site visit: 5/16/2018

Rated by Lisa Palazzi, PWS, CPSS Trained by Ecology? ☑ Yes ☐ No Date of training 2014

HGM Class used for rating Slope 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 Google Earth

OVERALL WETLAND CATEGORY III (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

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

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

xx_____**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	4	5	8	17

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	**II**
None of the above	

Wetland name or number Wheeler Ridge Wetland B and C

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	
Hydroperiods	H 1.2, H 1.3	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of wetland vs. width of stream *(can be added to another figure)*	R 4.1	
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)	R 3.1	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	

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	Page 45
Hydroperiods	H 1.2, H 1.3	NA
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	Page 45
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	NA
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	Page 46
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	Page 47
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	Page 48
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	S 3.3	Page 48

Wetland name or number Wheeler Ridge Wetland B and C

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.

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 Wheeler Ridge Wetland B and C

SLOPE WETLANDS **Water Quality Functions** - Indicators that the site functions to improve water quality	Points (only 1 score per box)
S 1.0. Does the site have the potential to improve water quality?	
S 1.1. Characteristics of average slope of wetland: *(a 1% slope has a 1 ft vertical drop in elevation for every 100 ft of horizontal distance*) Slope is 1% or less points = 3 Slope is > 1% - 2% points = 2 Slope is > 2% - 5% points = 1 Slope is greater than 5% points = 0	2
S 1.2. The soil 2 in below the surface (or duff layer) is true clay or tureorganic *(use NRCS definitions)*: Yes = 3 No = 0	0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. *Dense means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 in.* Dense, uncut, herbaceous plants > 90% of the wetland area points = 6 Dense, uncut, herbaceous plants > ½ of area points = 3 Dense, woody, plants > ½ of area points = 2 Dense, uncut, herbaceous plants > ¼ of area points = 1 Does not meet any of the criteria above for plants points = 0	3
Total for S 1 Add the points in the boxes above	5

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

S 2.0. Does the landscape have the potential to support the water quality function at the site?	
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources _____ Yes = 1 No = 0	0
Total for S 2 Add the points in the boxes above	1

Rating of Landscape Potential If score is: ☑ **1-2 = M** ☐ **0 = L** *Record the rating on the first page*

S 3.0. Is the water quality improvement provided by the site valuable to society?	
S 3.1. Does the wetland discharge directly to a stream, river, or lake that is on the 303(d) list (*within 1 mi*)? Yes = 1 No = 0	0
S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? *At least one aquatic resource in the basin is on the 303(d) list*. Yes = 1 No = 0	0
S 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 or basin in which wetland is found*)? Yes = 2 No = 0	0
Total for S 3 Add the points in the boxes above	0

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

Wetland name or number Wheeler Ridge Wetland B and C

SLOPE WETLANDS **Hydrologic Functions** - Indicators that the site functions to reduce flooding and erosion	Points (only 1 score per box)
S 4.0. Does the site have the potential to reduce flooding and erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually > 1/8 in), or dense enough, to remain erect during surface flows*. Dense, uncut, **rigid** plants cover > 90% of the area of the wetland points = 1 All other conditions points = 0	0

Rating of Site Potential If score is: ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses that generate excess surface runoff? Yes = 1 No = 0	0

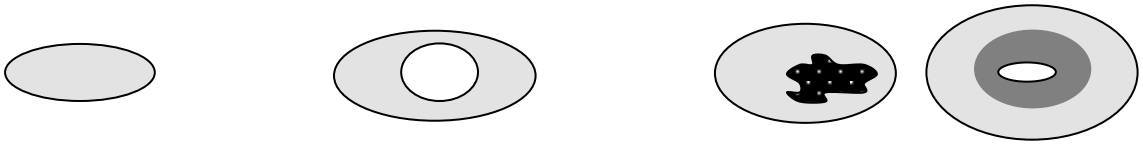
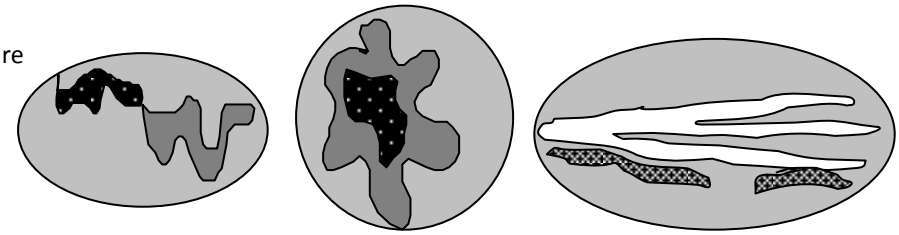
Rating of Landscape Potential If score is: ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems: The sub-basin immediately down-gradient of site has surface flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2 Surface flooding problems are in a sub-basin farther down-gradient points = 1 No flooding problems anywhere downstream points = 0	2
S 6.2. Has the site been identified as important for flood storage and flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for S 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*

NOTES and FIELD OBSERVATIONS:

Wetland name or number Wheeler Ridge Wetland B and C

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	3
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 15 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__ 2

Wetland name or number Wheeler Ridge Wetland B and C

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)*	1
Total for H 1 — Add the points in the boxes above	10

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 90 **+** [(% moderate and low intensity land uses)/2] 5 = 95 % > 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	3
H 2.2. Undisturbed habitat in 1 km Polygon around wetland. *Calculate:* % undisturbed habitat 90 **+** [(% moderate and low intensity land uses)/2] 5 = 95 % 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	3
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	0
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	6

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	2

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

Wetland name or number Wheeler Ridge Wetland B and C

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 ft²**, 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**	NA
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 ⅓ 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** NA

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	

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.

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APPENDIX B

Field Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wheeler Ridge Wetland A City/County: Chelan County near Wenatchee, WA Sampling Date: 05/16/2018

Applicant/Owner: Wheeler Ridge LLC State: WA Sampling Point: WL-A-006

Investigator(s): Lisa Palazzi, CPSS, PWS Section, Township, Range: Section 17, Township 21N, Range 20E

Landform (hillslope, terrace, etc.): Depression, Stream sideslope Local relief (concave, convex, none): Convex Slope (%): 2-5%

Subregion (LRR): LRR B Lat: 47deg 18' 35.77" N Long: 120deg 21' 57.95" W Datum: _____

Soil Map Unit Name: Stemilt Silt Loam, 0-25% slopes NWI classification: PSS

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes XX 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 XX	No _____	**Is the Sampled Area within a Wetland?** Yes XX No _____
Hydric Soil Present?	Yes XX	No _____	
Wetland Hydrology Present?	Yes XX	No _____	

Remarks:
Spring growing season -- hydrology still present but waning

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Red Alder	15%	Y	FAC
2. Quaking aspen	20%	Y	FACU
3.			
4.			
	35	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Cluster rose (Rosa pisocarpa)	25%	Y	FAC
2. Serviceberry (Amelanchier alnifolia)	10%	N	FACU
3. Twinberry (Lonicera involucrata)	15%	N	FAC
4. Red osier dogwood (Cornus sericea)	25%	Y	FACW
5. Wild crabapple (Malus fusca)	15%	N	FAC
	90	= Total Cover	
Herb Stratum (Plot size: 30 ft)			
1. water parsley (Oenanthe_sarmentosa)	20%	N	OBL
2. columbine (Aquilegia formosa)	20%	N	FAC
3. wild iris (blue) (Iris missouriensis)	25%	Y	FACW
4. sedge spp (Carex spp)	25%	Y	FAC (avg)
5. colts foot (Petasites frigidus)	25%	Y	FACW
6. horsetail (Equisetum hyemale)	20%	N	FACW
7. spikerush (Eleocharis palustris)	20%	N	OBL
8. Yellow iris (Iris pseudacorus)	15%	N	OBL
	170	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
		= Total Cover	

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

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 85% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	55	x 1 =	55
FACW species	95	x 2 =	190
FAC species	115	x 3 =	345
FACU species	35	x 4 =	140
UPL species		x 5 =	
Column Totals:	300 (A)		730 (B)

Prevalence Index = B/A = 2.43

Hydrophytic Vegetation Indicators:

- [x] Dominance Test is >50%
- [x] 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 XX No _____

Remarks:
Plants are actively growing; appears to be at least 1-2 months into the growing season

SOIL

Sampling Point: WL WP 006

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 Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR2/1	100	NA				GrSL	
6-18	10YR4/3	75	10YR 4/6	15	C	M	GrSL	

[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** XX **No** _____

Remarks:

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 XX No _____ Depth (inches): 1"

Water Table Present? Yes XX No _____ Depth (inches): 5"

Saturation Present? (includes capillary fringe) Yes XX No _____ Depth (inches): 5"

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

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

Remarks:

Surface water right by stream; farther away, subsurface only

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wheeler Ridge Wetland A City/County: Chelan County near Wenatchee, WA Sampling Date: 05/16/2018

Applicant/Owner: Wheeler Ridge LLC State: WA Sampling Point: WL-A-007

Investigator(s): Lisa Palazzi, COSs, PWS Section, Township, Range: Section 17, Township 21N, Range 20E

Landform (hillslope, terrace, etc.): Depression, Stream swale s Local relief (concave, convex, none): Convex Slope (%): 2-5%

Subregion (LRR): LRR B Lat: 47deg 18' 35.77" N Long: 120deg 21' 57.95" W Datum: _____

Soil Map Unit Name: Stemilt Silt Loam, 0-25% slopes NWI classification: PSS (downslope from this point)

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes XX 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 XX	**Is the Sampled Area within a Wetland?** Yes _____ No XX
Hydric Soil Present?	Yes _____	No XX	
Wetland Hydrology Present?	Yes _____	No XX	

Remarks:
Spring growing season -- hydrology still present but waning

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Red Alder (Alnus rubra)	25%	Y	FAC
2. Quaking aspen (Populus tremuloides)	25%	Y	FACU
3. Ponderosa pine (Pinus ponderosa)	20	Y	FACU
4. Douglas-fir (Pseudotsuga menziesii)	15	N	FACU
	85	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Cluster rose (Rosa pisocarpa)	30%	Y	FAC
2. Oceanspray (Holodiscus discolor)	25%	Y	FACU
3. Snowberry (Symphoricarpos albus)	25%	Y	FACU
4. Oregon grape (Mahonia nervosa)	20%	N	FACU
5. Bitterbrush (Purshia tridentata)	10%	N	NI
	110	= Total Cover	
Herb Stratum (Plot size: 30 ft)			
1. Yarrow (Achillea millefolium)	20%	N	FACU
2. Columbine (Aquilegia formosa)	20%	N	FAC
3. Arrowleaf balsamroot (Balsamorhiza sagittata)	25%	Y	NI
4. Violet (Viola howellii)	25%	Y	NI
5. Bleeding heart (Dicentra formosa)	15%	N	FACU
6. Dusty miller (Senecio cineraria)	10%	N	NI
7. Lupine (Lupinus arbustus)	15%	N	NI
8. Smooth Solomon seal (Polygonatum biflorum)	15%	N	FACU
	130	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
		= Total Cover	

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

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	75	x 3 =	225
FACU species	130	x 4 =	520
UPL species		x 5 =	
Column Totals:	205 (A)		745 (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 XX

Remarks:

SOIL

Sampling Point: UL -- WP 007

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 Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR2/1	100	NA				GrSL	
8-16	10YR4/3	100	NA				GrSL	no redox features

[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** XX

Remarks:

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 XX Depth (inches): _____

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

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

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

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

Remarks:

Shallow water by stream only; this site is farther upslope

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wheeler Ridge Wetland B City/County: Chelan County near Wenatchee, WA Sampling Date: 05/16/2018

Applicant/Owner: Wheeler Ridge LLC State: WA Sampling Point: WL-A-087

Investigator(s): Lisa Palazzi, CPSS, PWS Section, Township, Range: Section 17, Township 21N, Range 20E

Landform (hillslope, terrace, etc.): Depression, Stream sideslope Local relief (concave, convex, none): Convex Slope (%): 2-5%

Subregion (LRR): LRR B Lat: 47deg 18' 35.77" N Long: 120deg 21' 57.95" W Datum: _____

Soil Map Unit Name: Stemilt Silt Loam, 0-25% slopes NWI classification: PSS/ PEM

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes XX 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 XX No _____	**Is the Sampled Area within a Wetland?** Yes XX No _____
Hydric Soil Present?	Yes XX No _____	
Wetland Hydrology Present?	Yes XX No _____	

Remarks:
Spring growing season -- hydrology still present but less than waning

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Red Alder	15%	Y	FAC
2. Quaking aspen	15%	Y	FACU
3.			
4.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Cluster rose (Rosa pisocarpa)	30%	Y	FAC
2. Wild crabapple (Malus fusca)	25%	Y	FAC
3. Twinberry (Lonicera involucrata)	30%	Y	FAC
4. Red osier dogwood (Cornus sericea)	10%	N	FACW
5.			
	95	= Total Cover	
Herb Stratum (Plot size: 30 ft)			
1. Moss (Oligotrichum aligerum)	25%	N	NI
2. False lily of the valley (Maianthemum dilatatum)	35%	Y	FAC
3. wild iris (blue) (Iris missouriensis)	25%	N	FACW
4. sedge spp (Carex spp)	35%	Y	FAC (avg)
5. colts foot (Petasites frigidus)	25%	N	FACW
6. horsetail (Equisetum hyemale)	15%	N	FACW
7.			
8.			
	150	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	_____	= Total Cover	

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

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 85% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	75	x 2 =	150
FAC species	180	x 3 =	540
FACU species	15	x 4 =	60
UPL species		x 5 =	
Column Totals:	310270 (A)		750 (B)

Prevalence Index = B/A = 2.77

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 XX No _____

Remarks:
Plants are actively growing; appears to be at least 1-2 months into the growing season.

SOIL

Sampling Point: WL WP 087

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 Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR2/1	100	NA				GrSL	
6-18	10YR4/3	75	10YR 4/6	15	C	M	GrSL	

[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** XX **No** _____

Remarks:

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 XX No _____ Depth (inches): 1"

Water Table Present? Yes XX No _____ Depth (inches): 5"

Saturation Present? (includes capillary fringe) Yes XX No _____ Depth (inches): 5"

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

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

Remarks:

Saturated soils draining N to stream system

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wheeler Ridge Wetland B City/County: Chelan County near Wenatchee, WA Sampling Date: 05/16/2018

Applicant/Owner: Wheeler Ridge LLC State: WA Sampling Point: WL-B-105

Investigator(s): Lisa Palazzi, CPSS, PWS Section, Township, Range: Section 17, Township 21N, Range 20E

Landform (hillslope, terrace, etc.): Slope by Ns Stream Local relief (concave, convex, none): Convex Slope (%): 2-5%

Subregion (LRR): LRR B Lat: 47deg 18' 35.77" N Long: 120deg 21' 57.95" W Datum: _____

Soil Map Unit Name: Stemilt Silt Loam, 0-25% slopes NWI classification: PSS/PEM (downslope from this point)

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes XX 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 XX	**Is the Sampled Area within a Wetland?** Yes _____ No XX
Hydric Soil Present?	Yes _____	No XX	
Wetland Hydrology Present?	Yes _____	No XX	

Remarks:
Spring growing season

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ponderosa pine (Pinus ponderosa)	45	Y	FACU
2. Quaking aspen (Populus tremuloides)	15	Y	FACU
3.			
4.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Cluster rose (Rosa pisocarpa)	30%	Y	FAC
2. Oceanspray (Holodiscus discolor)	15%	N	FACU
3. Snowberry (Symphoricarpos albus)	45%	Y	FACU
4. Oregon grape (Mahonia nervosa)	10%	N	FACU
5. Serviceberry (Amelanchier alnifolia)	20%	Y	FACU
	100	= Total Cover	
Herb Stratum (Plot size: 30 ft)			
1. Yarrow (Achillea millefolium)	20%	N	FACU
2. Columbine (Aquilegia formosa)	20%	N	FAC
3. Pasture grasses	50%	Y	FAC (avg)
4. Violet (Viola howellii)	15%	Y	NI
5. Bleeding heart (Dicentra formosa)	15%	N	FACU
6. Lupine (Lupinus arbustus)	T	N	NI
7.			
8.			
	120	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
		= Total Cover	

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

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 28% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	100	x 3 =	300
FACU species	140	x 4 =	560
UPL species		x 5 =	
Column Totals:	240 (A)		860 (B)

Prevalence Index = B/A = 3.58

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 XX

Remarks:

SOIL

Sampling Point: UL -- WP 105

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR3/2	100	NA				GrSL	
8-16	10YR4/3	100	NA				GrSL	no redox features

[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** XX

Remarks:

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 XX Depth (inches): _____

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

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

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

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

Remarks:

This site is about 1-2 feet higher in elevation that wetland area

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wheeler Ridge Wetland C City/County: Chelan County near Wenatchee, WA Sampling Date: 05/16/2018

Applicant/Owner: Wheeler Ridge LLC State: WA Sampling Point: WL-C-094

Investigator(s): Lisa Palazzi, CPSS, PWS Section, Township, Range: Section 17, Township 21N, Range 20E

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

Subregion (LRR): LRR B Lat: 47deg 18' 35.77" N Long: 120deg 21' 57.95" W Datum: _____

Soil Map Unit Name: Stemilt Silt Loam, 0-25% slopes NWI classification: PSS/ PEM

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes XX 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 XX No _____	**Is the Sampled Area within a Wetland?** Yes XX No _____
Hydric Soil Present?	Yes XX No _____	
Wetland Hydrology Present?	Yes XX No _____	

Remarks:
Spring growing season -- hydrology still present but waning

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Red Alder	35%	Y	FAC
2. Quaking aspen	15%	Y	FACU
3.			
4.			
	50	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Cluster rose (Rosa pisocarpa)	35%	Y	FAC
2. Wild crabapple (Malus fusca)	25%	Y	FAC
3. Twinberry (Lonicera involucrata)	25%	Y	FAC
4. Red osier dogwood (Cornus sericea)	15%	N	FACW
5.			
	100	= Total Cover	
Herb Stratum (Plot size: 30 ft)			
1. Moss (Oligotrichum aligerum)	50%	Y	NI
2. False lily of the valley (Maianthemum dilatatum)	35%	N	FAC
3. wild iris (blue) (Iris missouriensis)	45%	Y	FACW
4. sedge spp (Carex spp)	35%	N	FAC (avg)
5. colts foot (Petasites frigidus)	25%	N	FACW
6. horsetail (Equisetum hyemale)	20%	N	FACW
7. Small-fruited bulrush (Scirpus microcarpus)	20	N	OBL
8.			
	230	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	_____	= Total Cover	

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

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 85% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	105	x 2 =	210
FAC species	190	x 3 =	570
FACU species	15	x 4 =	60
UPL species		x 5 =	
Column Totals:	310 (A)		840 (B)

Prevalence Index = B/A = 2.71

Hydrophytic Vegetation Indicators:

- [x] Dominance Test is >50%
- [x] 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 XX No _____

Remarks:
Plants are actively growing; appears to be at least 1-2 months into the growing season.

SOIL

Sampling Point: WL C WP 094

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 Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR2/1	100	NA				Mucky SL	Mucky mineral
6-18	10YR43/2	60	10YR 4/6	25	C	M	Mucky SL	Mucky mineral

[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 XX No _____

Remarks:

This system almost meets Black Histic Indicator requirements

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 XX No _____ Depth (inches): 0.5

Water Table Present? Yes XX No _____ Depth (inches): 1

Saturation Present? (includes capillary fringe) Yes XX No _____ Depth (inches): 1

Wetland Hydrology Present? Yes XX No _____

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

Remarks:

Seeping from upslope toward road

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wheeler Ridge Wetland C City/County: Chelan County near Wenatchee, WA Sampling Date: 05/16/2018

Applicant/Owner: Wheeler Ridge LLC State: WA Sampling Point: WL-C-093

Investigator(s): Lisa Palazzi, CPSS, PWS Section, Township, Range: Section 17, Township 21N, Range 20E

Landform (hillslope, terrace, etc.): Slope by Ns Stream Local relief (concave, convex, none): Convex Slope (%): 2-5%

Subregion (LRR): LRR B Lat: 47deg 18' 35.77" N Long: 120deg 21' 57.95" W Datum: _____

Soil Map Unit Name: Stemilt Silt Loam, 0-25% slopes NWI classification: PSS/PEM (downslope from this point)

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes XX 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 XX	**Is the Sampled Area within a Wetland?** Yes _____ No XX
Hydric Soil Present?	Yes _____	No XX	
Wetland Hydrology Present?	Yes _____	No XX	

Remarks:
Spring growing season

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ponderosa pine (Pinus ponderosa)	55	Y	FACU
2. Quaking aspen (Populus tremuloides)	25	Y	FACU
3. Douglas-fir (Pseudotsuga menziesiii)	15	N	FACU
4.			
	90	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Cluster rose (Rosa pisocarpa)	30%	Y	FAC
2. Oceanspray (Holodiscus discolor)	15%	N	FACU
3. Snowberry (Symphoricarpos albus)	45%	Y	FACU
4. Serviceberry (Amelanchier alnifolia)	10%	N	FACU
5.			
	100	= Total Cover	
Herb Stratum (Plot size: 30 ft)			
1. Pasture grasses	30%	Y	FAC (avg)
2. Columbine (Aquilegia formosa)	15%	N	FAC
3. Yarrow (Achillea millefolium)	15%	Y	FACU
4. Violet (Viola howellii)	25%	Y	NI
5. Bleeding heart (Dicentra formosa)	20%	N	FACU
6.			
7.			
8.			
	105	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	_____	= Total Cover	

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

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 28% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	75	x 3 =	225
FACU species	200	x 4 =	800
UPL species		x 5 =	
Column Totals:	275 (A)		1025 (B)

Prevalence Index = B/A = 3.72

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 XX

Remarks:

SOIL

Sampling Point: UL -- WP 093

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR2/2	100	NA				GrSL	
8-16	10YR4/4	100	NA				GrSL	no redox features

[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)
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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** XX

Remarks:

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)
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- ☐ Hydrogen Sulfide Odor (C1)
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- ☐ 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**)
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- ☐ 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 XX Depth (inches): _____

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

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

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

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

Remarks:

This site is about 1-2 feet higher in elevation than wetland area