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#### NOTES:

ALL ON-SITE ENTRANCE ROAD IMPROVEMENT CONSTRUCTION SHALL ADHERE TO AMERICAN ASSOCIATION  
OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) GUIDE FOR DESIGN OF PAVEMENT  
STRUCTURES.

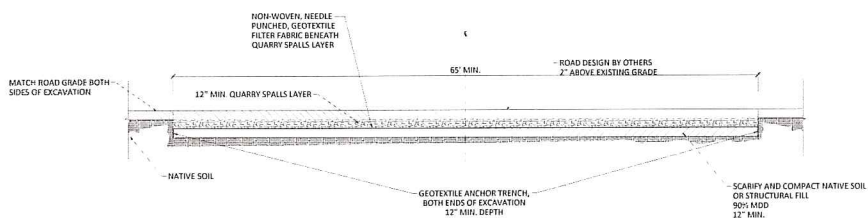
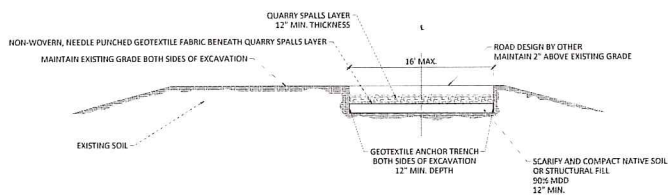
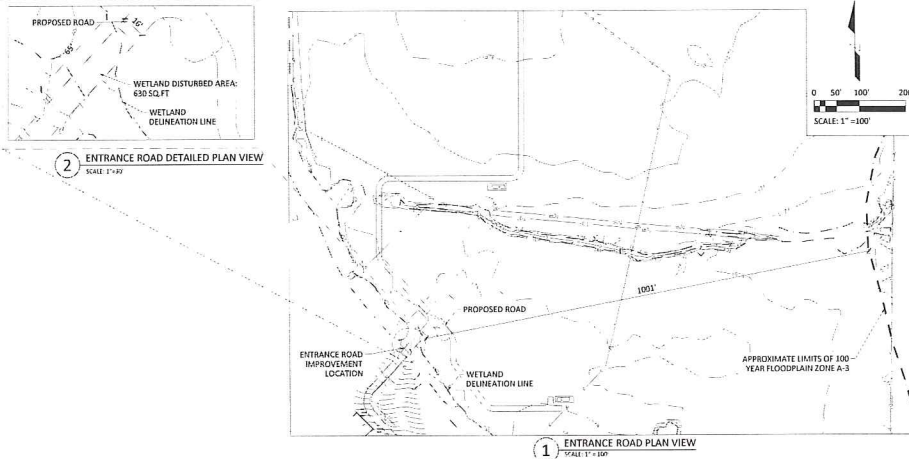
ALL EARTHWORK AND TESTING SHALL ADHERE TO THE RECOMMENDATIONS OF THE GEOTECHNICAL  
REPORT PRODUCED BY SWIFTWATER ENVIRONMENTAL & GEOTECHNICAL TITLED "GEOTECHNICAL  
ENGINEERING STUDY, PHASE 1, TYPHA SOLAR ARRAY SITE" DATED JUNE 16, 2017. EARTHWORK ON THE SITE  
SHOULD BE OBSERVED AND EVALUATED BY SWIFTWATER. THE EVALUATION OF EARTHWORK SHOULD  
INCLUDE OBSERVATION AND TESTING OF ON-SITE BACKFILL MATERIAL AND OTHER GEOTECHNICAL  
CONDITIONS EXPOSED DURING ENTRANCE ROAD IMPROVEMENT WORK.

#### EARTHWORK

1. COMPACTION STANDARD IS 90% OF MATERIALS MAXIMUM MODIFIED PROCTOR DRY DENSITY TEST  
(ASTM D1557).
2. MOISTURE CONTENT OF ON-SITE SOILS SHALL BE  $\leq 3\%$  THE OPTIMUM MOISTURE CONTENT VALUE AS  
DETERMINED BY THE MAXIMUM MODIFIED PROCTOR DRY DENSITY TEST AT THE TIME OF PLACEMENT  
AND COMPACTION.
3. COMPACTION TESTING PROTOCOL: AT LEAST TWO TESTS PER LIFT PER DAY.
4. PLACE FILL IN MAXIMUM 12" INCH LIFTS.
5. PRIOR TO PLACING FILL, ALL UNSUITABLE MATERIAL SHALL BE REMOVED FROM THE CONSTRUCTION  
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DISTURBED SOIL, AND OTHER DELETERIOUS MATERIALS THAT MAY EXIST WITHIN THE AREA OF THE  
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6. STRUCTURAL FILL SHALL MEET THE FOLLOWING MATERIAL REQUIREMENTS:

GRADATION (ASTM C 136)	PERCENT FINER BY WEIGHT
NO. 40 SIEVE	100
NO. 100 SIEVE	35 - 100
NO. 200 SIEVE	LESS THAN 5%
MAXIMUM LIQUID LIMIT (LL)	35
MAXIMUM PLASTICITY INDEX (PI)	15
MAXIMUM EXPANSIVE POTENTIAL (EP)	4
MAXIMUM SULFATE CONTENT (%)	0
MAXIMUM SOLUBILITY (%)	2

7. ALL EARTHWORK, UNLESS SPECIFIED ON DRAWINGS SHALL BE CONSIDERED STRUCTURAL FILL.
8. IF UNDERGROUND FACILITIES ARE ENCOUNTERED DURING SITE CLEARING, SUCH FEATURES SHOULD BE  
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9. DRY AND LOW-DENSITY SOIL SHOULD BE REMOVED OR COMPACTED IN-PLACE PRIOR TO PLACING FILL.



DATE	2/2/2017	BY	PP
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TYPHA SOLAR PROJECT

ELLENBURC  
KITITITAS COUNTY  
WA, 98921

FOR PERMIT PREVIEW

PP

DG

TYPICAL CIVIL DETAIL

C-2







**Legend**  
 Project Site

0 200 400 Feet  
 0 50 100 Meters

TUUSSO Typha Solar Project  
 Joint Aquatic Resources Permit Application  
 Kittitas County, WA

**SWCA**<sup>®</sup>

ENVIRONMENTAL CONSULTANTS

221 First Avenue West, Suite 205

Seattle, WA 98119

[www.swca.com](http://www.swca.com)



Project 00707-05

December 05, 2017





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# TYPHA SOLAR PROJECT - ENTRANCE ROAD IMPROVEMENT

5MWac SOLAR PV POWER PLANT  
KITITITAS COUNTY WASHINGTON



STATE MAP:



PROJECT TEAM:

**PROJECT DEVELOPER:**  
TUUSSO ENERGY, LLC  
500 YALE AVE. NORTH  
SEATTLE, WASHINGTON 98109

**CIVIL ENGINEER:**  
SIERRA OVERHEAD ANALYTICS, INC.  
P.O. BOX 17116 TWIN HARTS, CA 95383

**AUTHORITY HAVING JURISDICTION:**  
US ARMY CORP OF ENGINEERS  
KITITITAS COUNTY BUILDING DEPARTMENT

SITE DETAILS:

**SITE LIMIT OF DISTURBANCE (LOD):** 456 ACRES  
**PROJECT DISTURBED AREA (PDA):** 630 SQ.FT.

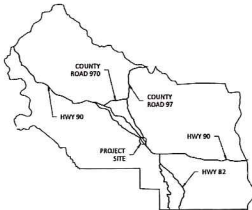
**NOTE:** LIMIT OF DISTURBANCE (LOD) INCLUDES  
THE ENTIRE AREA WITHIN THE PROJECT FENCE AND  
PERIMETER CONTROLS, INCLUDING JURISDICTIONAL  
WETLANDS AS DEPICTED UNLESS OTHERWISE  
PERMITTED.

**THE PROJECT DISTURBED AREA (PDA) IS THE  
ESTIMATED LAND DISTURBANCE FROM  
CONSTRUCTION ACTIVITIES FOR THIS ENTRANCE ROAD  
IMPROVEMENT PROJECT.**

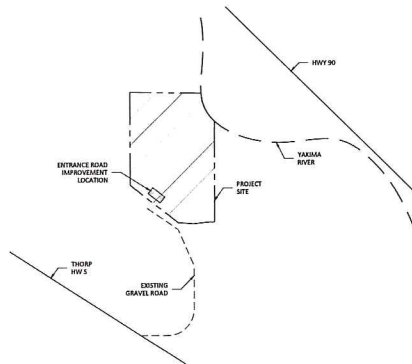
DRAWING SHEET INDEX:

C-100 COVER SHEET  
C-101 TYPICAL CIVIL DETAILS

COUNTY MAP:



PROJECT MAP:



GENERAL NOTES:

**SCOPE OF WORK:**  
THIS PROJECT ENTAILS THE IMPROVEMENT OF A SECTION OF THE PROJECT ENTRANCE ROAD, THE  
IMPROVEMENT WILL ALLOW CONSTRUCTION EQUIPMENT TO PASS TO THE TYPHA SITE OF TUUSSO'S PV  
DEVELOPMENT PROJECT.

**PROJECT LOCATION:**  
SECTION 30, TOWNSHIP 18 NORTH; RANGE 18 EAST  
LAT/LON: 47.024157 N; 120.628488 W  
KITITITAS COUNTY TAX PARCEL IDENTIFICATION NUMBERS: 712633; 752633.

**SYSTEM DESCRIPTION:**  
THE ACCESS RAMP TO THE CONSTRUCTION STAGING AREA WILL BE IMPROVED FOR PASSAGE OF  
CONSTRUCTION TRAFFIC USING QUARRY SPALLS AND GEOTEXTILE.

**PERMITTEE:**  
TUUSSO ENERGY, LLC  
500 YALE AVENUE NORTH  
SEATTLE, WASHINGTON 98109

**KITITITAS COUNTY APPROVAL**

**US ARMY CORP OF ENGINEERS APPROVAL**



DATE	DESCRIPTION	BY
11/28/17	ISSUED FOR PERMIT	PP

TYPHA SOLAR PROJECT

**PROJECT LOCATION:**  
ELLENBURK  
KITITITAS COUNTY  
WA, 98921

DATE	28-Nov-17
PROJECT	000-000-000
PROJECT	PP
PROJECT	DG
PROJECT	COVER SHEET
PROJECT	C-1
PROJECT	A



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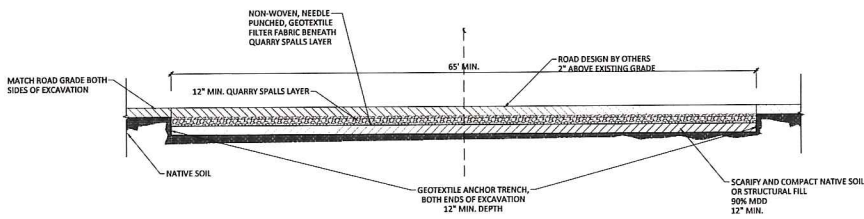
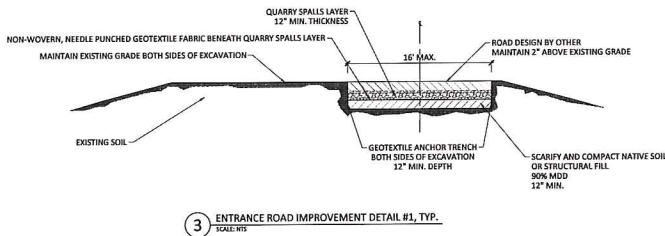
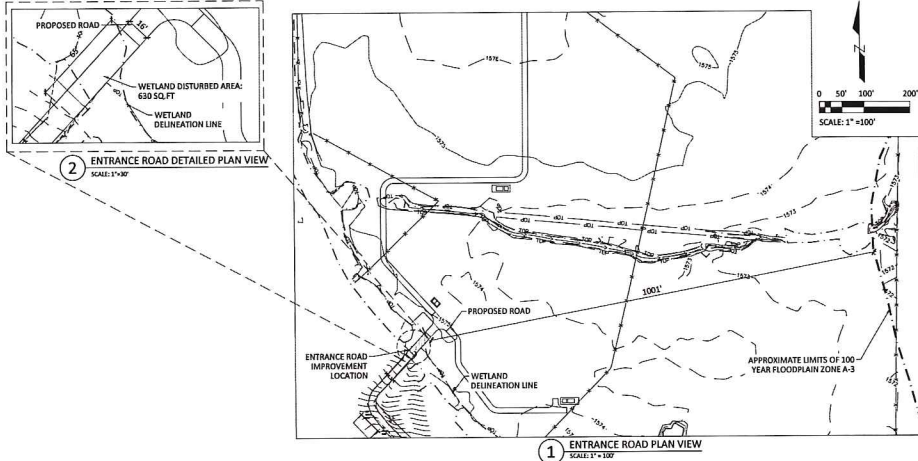
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2. MOISTURE CONTENT OF ON-SITE SOILS SHALL BE 1.5% THE OPTIMUM MOISTURE CONTENT VALUE AS  
DETERMINED BY THE MAXIMUM MODIFIED PROCTOR DRY DENSITY TEST AT THE TIME OF PLACEMENT  
AND COMPACTION
3. COMPACTION TESTING PROTOCOL: AT LEAST TWO TESTS PER LIFT PER DAY
4. PLACE FILL IN MAXIMUM 12 INCH LIFTS
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DISTURBED SOIL, AND OTHER DELETERIOUS MATERIALS THAT MAY EXIST WITHIN THE AREA OF THE  
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6. STRUCTURAL FILL SHALL MEET THE FOLLOWING MATERIAL REQUIREMENTS:

GRADATION (ASTM C 136)	PERCENT FINER BY WEIGHT
3"	100
NO. 40 SIEVE	35 - 100
NO. 200 SIEVE	LESS THAN 5%
MAXIMUM LIQUID LIMIT (LL)	35
MAXIMUM PLASTICITY INDEX (PI)	15
MAXIMUM EXPANSIVE POTENTIAL (NP)	4
MAXIMUM SULFATE CONTENT (%)	0
MAXIMUM SOLUBILITY (%)	2

7. ALL EARTHWORK, UNLESS SPECIFIED ON DRAWINGS SHALL BE CONSIDERED STRUCTURAL FILL
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9. DRY AND LOW-DENSITY SOIL SHOULD BE REMOVED OR COMPACTIONED IN-PLACE PRIOR TO PLACING FILL



REV	DESCRIPTION	DATE
1	ISSUED FOR PERMIT	11/16/17
2	ISSUED FOR PERMIT	11/16/17
3	ISSUED FOR PERMIT	11/16/17
4	ISSUED FOR PERMIT	11/16/17
5	ISSUED FOR PERMIT	11/16/17
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7	ISSUED FOR PERMIT	11/16/17
8	ISSUED FOR PERMIT	11/16/17
9	ISSUED FOR PERMIT	11/16/17
10	ISSUED FOR PERMIT	11/16/17

#### TYPHA SOLAR PROJECT

PROJECT LOCATION  
ELLENBURG  
KITITAS COUNTY  
WA, 98921

DATE: 28-Nov-17  
PROJECT: 000-000-000  
DRAWN: PP  
CHECKED: DG  
TYPICAL CIVIL DETAILS

FOR PERMIT PREVIEW  
C-2 A









[illegible][illegible]

## STANDARD GRADING NOTES:

1. ALL GRADING ACTIVITIES, INCLUDING EROSION, SHOULDER, AND COMPACTION, SHALL BE DONE IN ACCORDANCE WITH STATE OR COUNTY STANDARDS, AS APPLICABLE.
2. ALL EXISTING AND PROPOSED DRIVEWAYS SHALL BE CONSTRUCTED TO A MINIMUM OF 12 FEET WIDE. THE SURF SHALL BE SCAFFED, MOVED, OR RECONSTRUCTED, AND COMPACTED TO AT LEAST SIX WATKINS DENSITY.
3. COMPACTION SHALL OBTAIN AN APPROVAL BY THE GEOLOGICAL ENGINEER PRIOR TO PROCEEDING WITH ANY GRADING. COMPACTION SHALL OBTAIN APPROVAL FROM THE GEOTECHNICAL ENGINEER WITH GEOLOGICAL EVIDENCE.
4. COMPACTION SHALL BE DONE IN ACCORDANCE WITH THE FOLLOWING: ALL EXISTING AND PROPOSED DRIVEWAYS SHALL BE CONSTRUCTED TO A MINIMUM OF 12 FEET WIDE. THE SURF SHALL BE SCAFFED, MOVED, OR RECONSTRUCTED, AND COMPACTED TO AT LEAST SIX WATKINS DENSITY.
5. ALL TEMPORARY CUT SLOPES SHALL NOT EXCEED 1:1.5 H:1 V. ALL PERMANENT CUT SLOPES SHALL NOT EXCEED 1:1.5 H:1 V OF 50% OR FLAT. ALL PERMANENT FILL SLOPES SHALL NOT EXCEED 1:1.5 H:1 V.
6. CONTRACTOR SHALL PROVIDE APPROPRIATE PROTECTION AND TREATMENT CONTROLLING DRAINAGE.
7. ANY AND ALL MATERIAL PLACED ON THE LOT SHALL BE COMPACTED AND A COMPACTION REPORT SUBMITTED TO THE STATE OF CALIFORNIA. THE COMPACTION REPORT SHALL BE PROVIDED TO THE STATE OF CALIFORNIA AS APPLICABLE WITHIN 60 DAYS OF THE PLACEMENT OF THE MATERIAL.
8. ALL EXISTING SOILS SHALL BE RETAINED TO A LOCAL DISPOSAL SITE, AND ALL EXISTING SOILS SHALL BE REUSED TO THE MAXIMUM EXTENT POSSIBLE ON THE APPLICABLE PROJECT.
9. ALL CUT AND FILL SLOPES AND ALL EXPOSED BENT SHALL BE PLANTED, MAINTAINED, AND MONITORED TO PREVENT EROSION. EROSION CONTROL MEASURES SHALL BE INSTALLED TO THE SATISFACTION OF THE STATE OF CALIFORNIA.
10. CONTRACTOR SHALL PROVIDE REASONABLE EARTHWORK CALCULATIONS FOR CUT AND FILL.

[illegible]

LEGEND	EXISTING	PROPOSED
1/4" LINE (RIGHT-OF-WAY)		
LET LINE		
3" REEF WOUND (H) (CONCRETE)		①
PROPERTY CORNER		②
BOUNDARY MARK (POST)		③
TEMPORARY BOUNDARY MARK		④
EASEMENT LINE		⑤
CENTERLINE		⑥
CURB/OUTER/SEWER/LINE		⑦
EDGE OF PAVED/UNT LANE		⑧
DRINK WALL FENCE LINE		⑨
SON		⑩
STREET LIGHT (ELECTROPOD)		⑪
GRADE BREAK LINE		⑫
CONTOUR LINE (ANALOG)		⑬
CONTOUR LINE (DIGITAL)		⑭
CATCH BASIN (TYPE 1)		⑮
STORM DRAIN MANHOLE/CATCH BASIN TYPE 2		⑯
STORM DRAIN LINE		⑰
CONCRETE STRUCTURE		⑱
PP-100 PIP		⑲
SANITARY SENDER LINE		⑳
SANITARY SENDER CLEANOUT		㉑
SANITARY SENDER MANHOLE		㉒
WATERMETER LINE		㉓
GATE VALVE (UNDERGROUND JOINT)		㉔
GATE VALVE (FLANGE)		㉕
WATER METER		㉖
PAVE WARDEN		㉗
CAP		㉘
GPS LINE		㉙
UNDERGROUND ELECTRIC LINE		㉚
POWER POLE / UTILITY POLE		㉛
DEY WARDEN		㉜
ELECTRICAL TRANSFORMER / VAULT		㉝
TELEPHONE VHAUT/FEDESTAL		㉞
TELEPHONE MANHOLE		㉟
100 YR FLOODPLAIN HATCH		
CONCRETE HATCH		
GRAVEL HATCH		
ALL WEATHER ROAD HATCH (EQUIPPED STOP OF GRAVEL)		
PROPOSED LANDSCAPING STRIP		

**CONTRACTOR RESPONSIBILITY:**

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY, DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, AND THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

**DISCREPANCIES:**

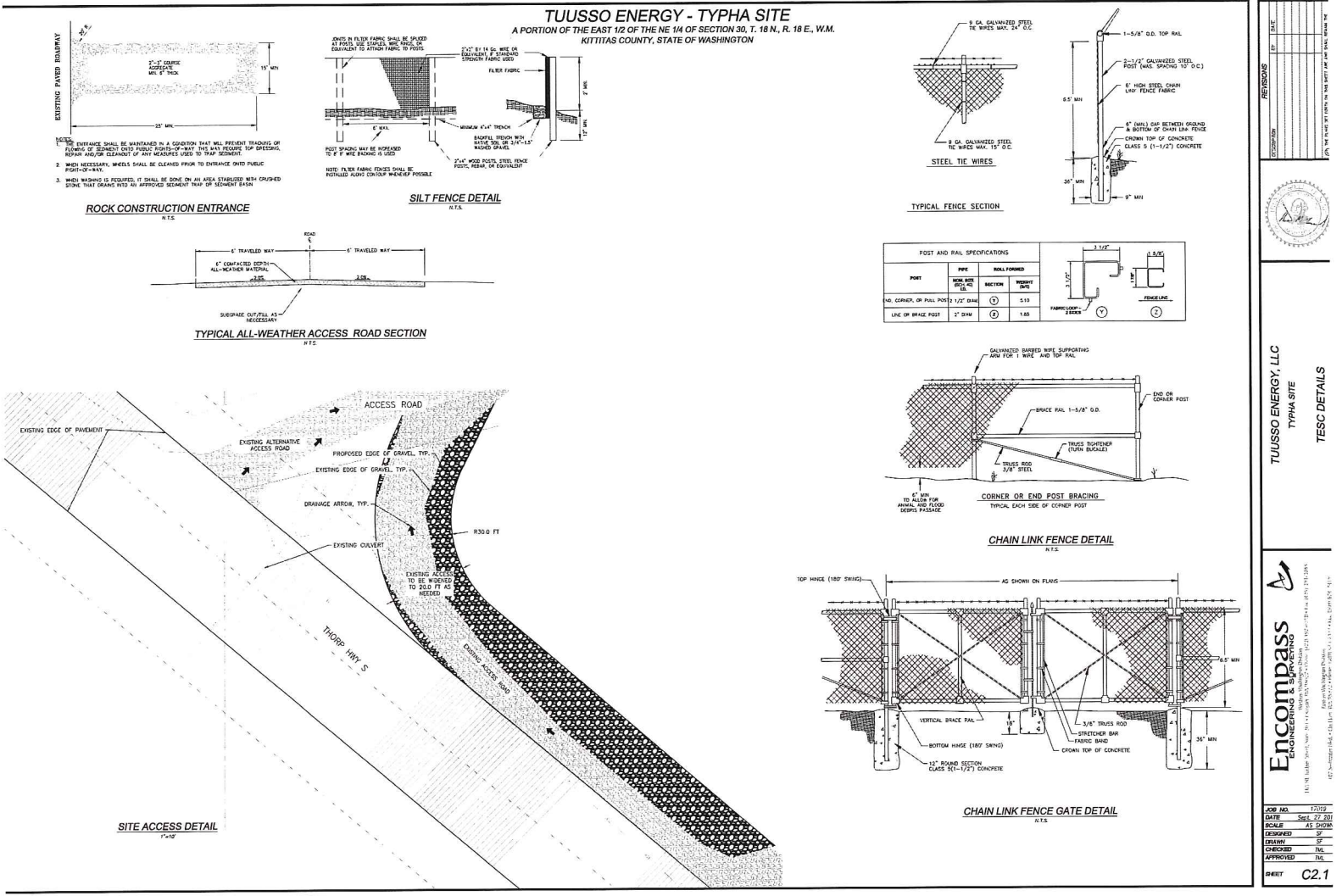
IF THERE ARE ANY DISCREPANCIES BETWEEN DIMENSIONS IN DRAWINGS AND EXISTING CONDITIONS WHICH WILL AFFECT THE WORK, THE CONTRACTOR SHALL BRING SUCH DISCREPANCIES TO THE ATTENTION OF THE ENGINEER FOR ADJUSTMENT BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER FITTING OF THE WORK AND FOR THE COORDINATION OF ALL TRADES, SUBCONTRACTORS, AND PERSONS ENGAGED UNDER THIS CONTRACT.









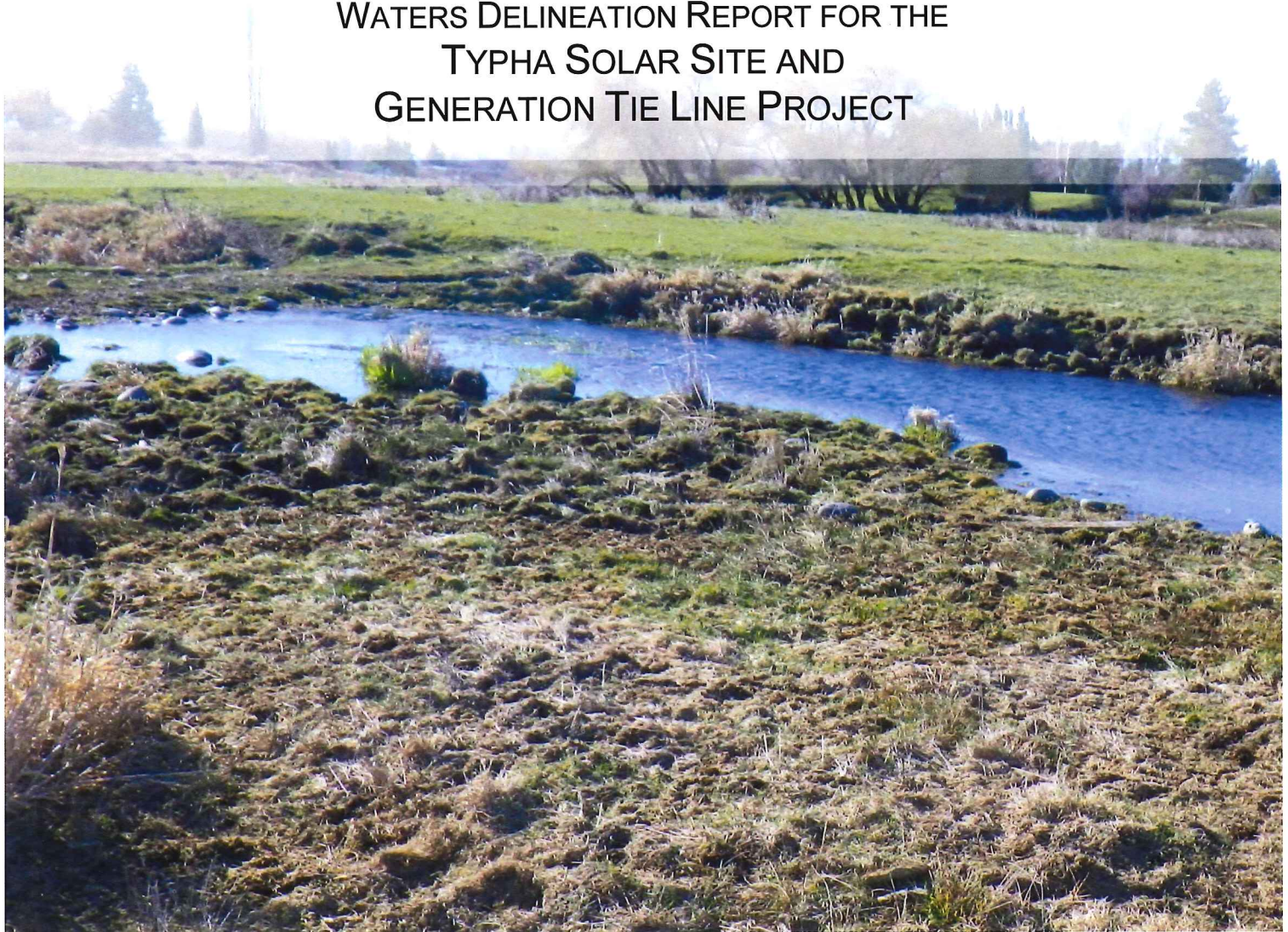








CRITICAL AREAS WETLAND AND  
WATERS DELINEATION REPORT FOR THE  
TYPHA SOLAR SITE AND  
GENERATION TIE LINE PROJECT



July 10, 2017

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SWCA ENVIRONMENTAL CONSULTANTS  
SEATTLE, WASHINGTON



CRITICAL AREAS WETLAND AND  
WATERS DELINEATION REPORT FOR THE  
TYPHA SOLAR SITE AND  
GENERATION TIE LINE PROJECT  
KITITITAS COUNTY, WASHINGTON

Section 30, Township 18 North, Range 18 East  
Parcel Numbers 712633, 752633, 802633, and 832633

Report Prepared for  
TUUSSO Energy, LLC

By  
Evan Dulin

July 10, 2017

Project Number 38727.05

SWCA Environmental Consultants  
221 1st Ave W, Suite 205  
Seattle, Washington 98119





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## **1 INTRODUCTION**

This report describes the methods and findings of wetland, stream, and other critical areas delineation for the proposed Typha Solar Site and Transmission Line Project (Typha Solar Project). The report was prepared by SWCA Environmental Consultants (SWCA), and is intended to address permitting requirements under Energy Facility Site Evaluation Council (EFSEC) Washington Administrative Code (WAC) 463-60-322, -332, and -333, and to show compliance of the proposed project with Kittitas County's Code for Critical Areas Ordinance (KCC Chapter 17A).

### **1.1 Background**

TUUSSO Energy, LLC (TUUSSO) is proposing to construct a new photovoltaic solar facility installation on approximately 49.7 acres of private agricultural land, including the construction of a switchyard with a short (0.45-mile-long, 4.4-acre) generation tie line into an existing Puget Sound Energy (PSE) distribution transmission line, located northwest of Ellensburg, Kittitas County, Washington. The project is intended to provide up to 5 MW of solar energy to PSE for use within their service area.

### **1.2 Project Setting**

The Typha Solar Project site primarily consists of fallow agricultural land located just west of the Yakima River and north of Thorp Highway, west of Ellensburg in unincorporated Kittitas County, Washington. The Typha Solar Project would be located approximately 1.1 miles east of the intersection of Thorp Highway and Cove Road, in Section 30 of Township 18 North, Range 18 East, Willamette Meridian (Figure 1). The generation tie line would originate from the southwestern project site boundary and follow existing power poles to cross south along an existing access road, crossing the Ellensburg Power (EP) Canal three times and passing through the Ellensburg Golf and Country Club, to connect to the existing PSE distribution transmission line along Thorp Highway. The Typha Solar Project site is approximately 54.1 acres and the generation tie line is approximately 4.4 acres, totaling 54.1 acres for the overall project. Topography of the site generally slopes to the east toward the Yakima River. Surface elevation within the solar site and generation tie line ranges from 1,570 to 1,614 feet above mean sea level, the lowest elevation being along the eastern site boundary closest to the Yakima River and the highest elevation being at the southern end of the generation tie line near Thorp Highway.

## **2 METHODS**

### **2.1 Study Area**

The Typha Solar Project site is approximately 54.1 acres and the generation tie line is approximately 4.4 acres, totaling 54.1 acres for the overall project. The generation tie line portion of the project is 80 feet wide centered on the existing power poles and new proposed line connecting the solar site to the existing poles (Figure 1). Wetlands and streams outside of the project site and generation tie line but that occur within 200 feet of these boundaries and had the potential to have buffers extend into the project were included in the study area. Wetlands and streams outside of the project site and within the study area were visually inspected but not formally delineated.

### **2.2 Review of Existing Information**

Prior to conducting fieldwork, background materials were reviewed to determine the potential for wetlands, floodplains, habitats, and other critical areas and their buffers to occur within the study area. Materials referenced during the desktop study are listed below. The following checklist follows the KCC Critical Areas required checklist outlined in KCC Chapter 17A.03.035.



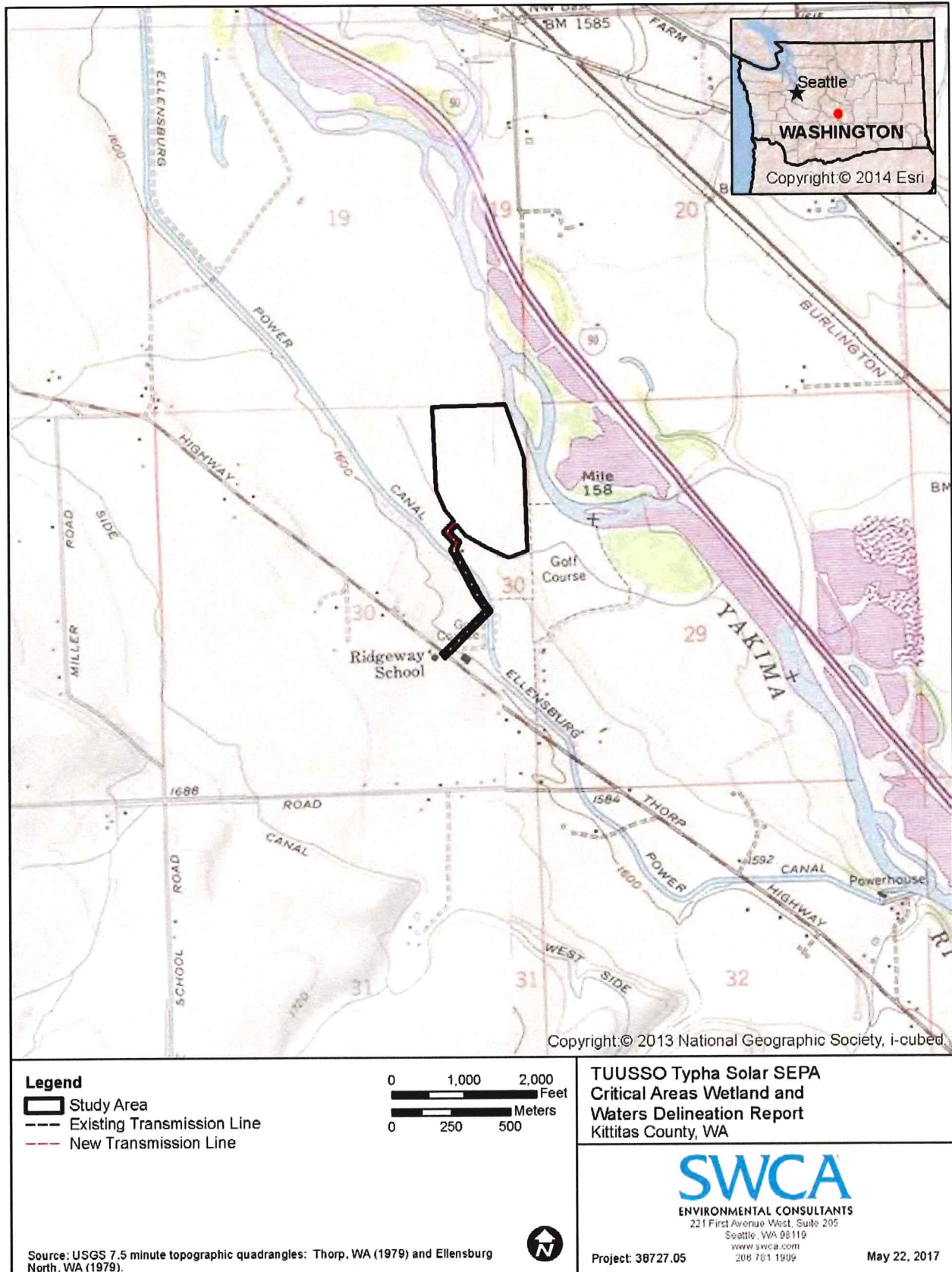


Figure 1. Project vicinity map.



Wetlands (KCC Chapter 17A.04)

- Historical Google Earth aerial photography (2000–2015).
- U.S. Department of Agriculture (USDA) historical imagery (USDA 1954).
- U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps for Ellensburg North and Thorp, Washington, included in Figure 1.
- USFWS National Wetlands Inventory (NWI) data and USGS National Hydrography Dataset (NHD), included in Figure 2.
- Natural Resources Conversation Service (NRCS) Soil Survey of Kittitas County Area, Washington and NRCS Web Soil Survey map of the study area, included in Figure 3.

Frequently flooded areas (KCC Chapter 17A.05)

- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel 5300950438C (as cited by Kittitas County 2017), included in Figure 2.

Geologically hazardous areas (KCC Chapter 17A.06)

- Includes erosion, landslide, mine, and seismic hazard areas.
- Kittitas County COMPAS mapping tool.

Habitats (KCC Chapter 17A.07)

- Includes riparian habitats and streams and rivers.
- Washington State Department of Fish and Wildlife (WDFW) SalmonScape online mapper.
- WDFW Priority Habitats and Species (PHS) online mapper, included in Figure 3.

Aquifer recharge areas (KCC Chapter 17A.08)

- No critical aquifer recharge locations have been identified in Kittitas County.

Spatial data obtained during the review of existing information were incorporated into Typha Solar Project base maps (Figures 1–3).

## 2.3 Field Investigation

Following the desktop review of existing information, a team of two biologists conducted site visits on April 3, 4, and 12, 2017, to assess the study area for the presence of wetland and waterbody features and to record data relevant to the Washington State Department of Ecology's (Ecology's) most recently approved version of the *Washington State Wetland Rating System for Eastern Washington, 2014 Update* (Hruby 2014). Visual observations were recorded within 200 feet of the project site and generation tie line, and included wildlife and habitat data.

Precipitation data were obtained from the closest wetlands climate analysis (WETS) climate station, the Ellensburg National Weather Service (NWS) station (ELBW1), approximately 5.5 miles to the southeast of the project site in southern Ellensburg, Washington. Historical (1971–2000) average annual rainfall is listed as 8.96 inches. Table 1 shows the monthly precipitation at the Ellensburg NWS weather station for the 3 months prior to the April 3, 4, and 12, 2017, site visits. Table 2 shows the rainfall received 2 weeks prior to the site visits, and the water-year-to-date (WYTD) rainfall. Rainfall recorded 3 months prior to fieldwork was wetter than normal.

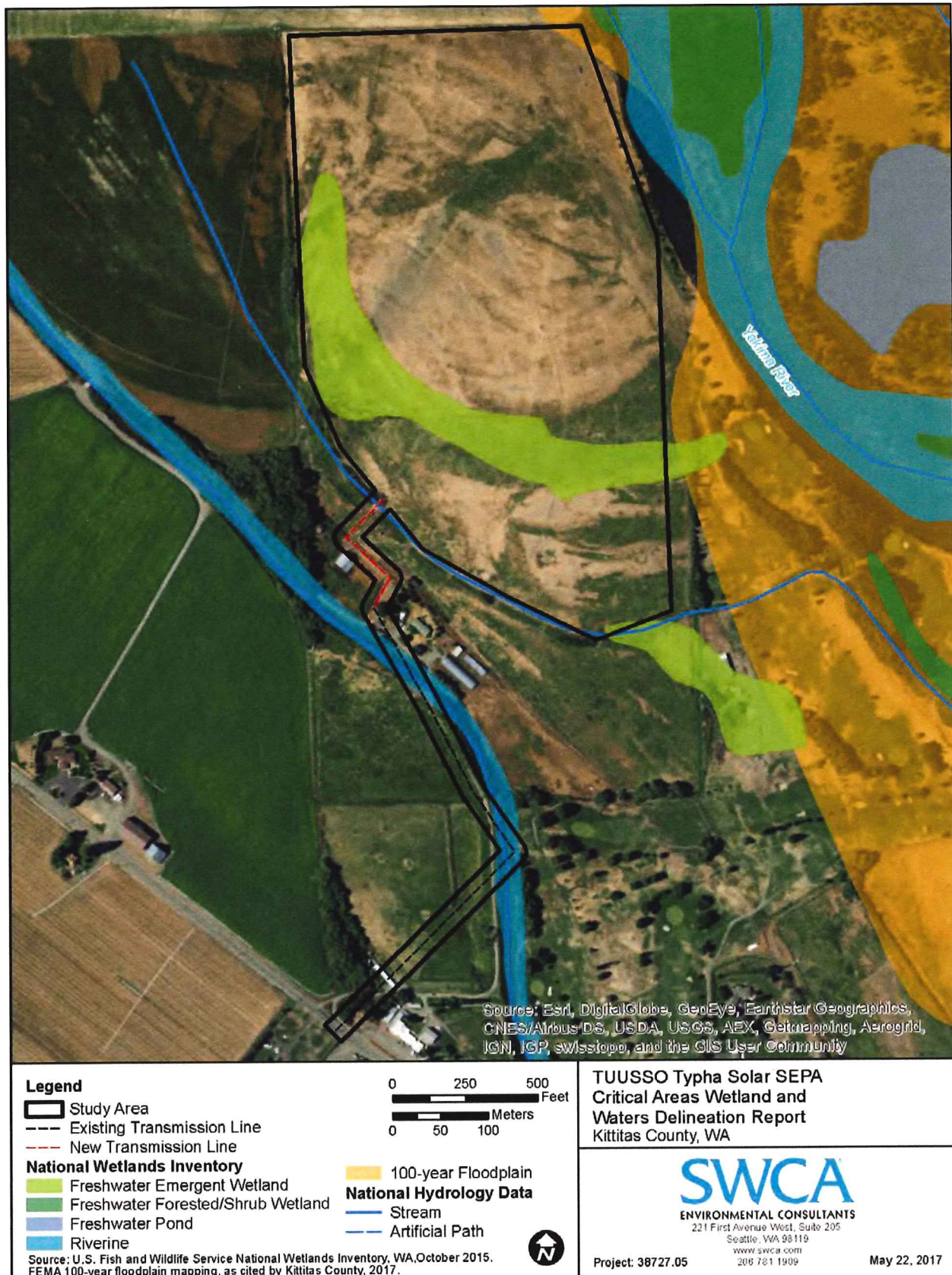


Figure 2. NWI, NHD, and floodplain mapping.



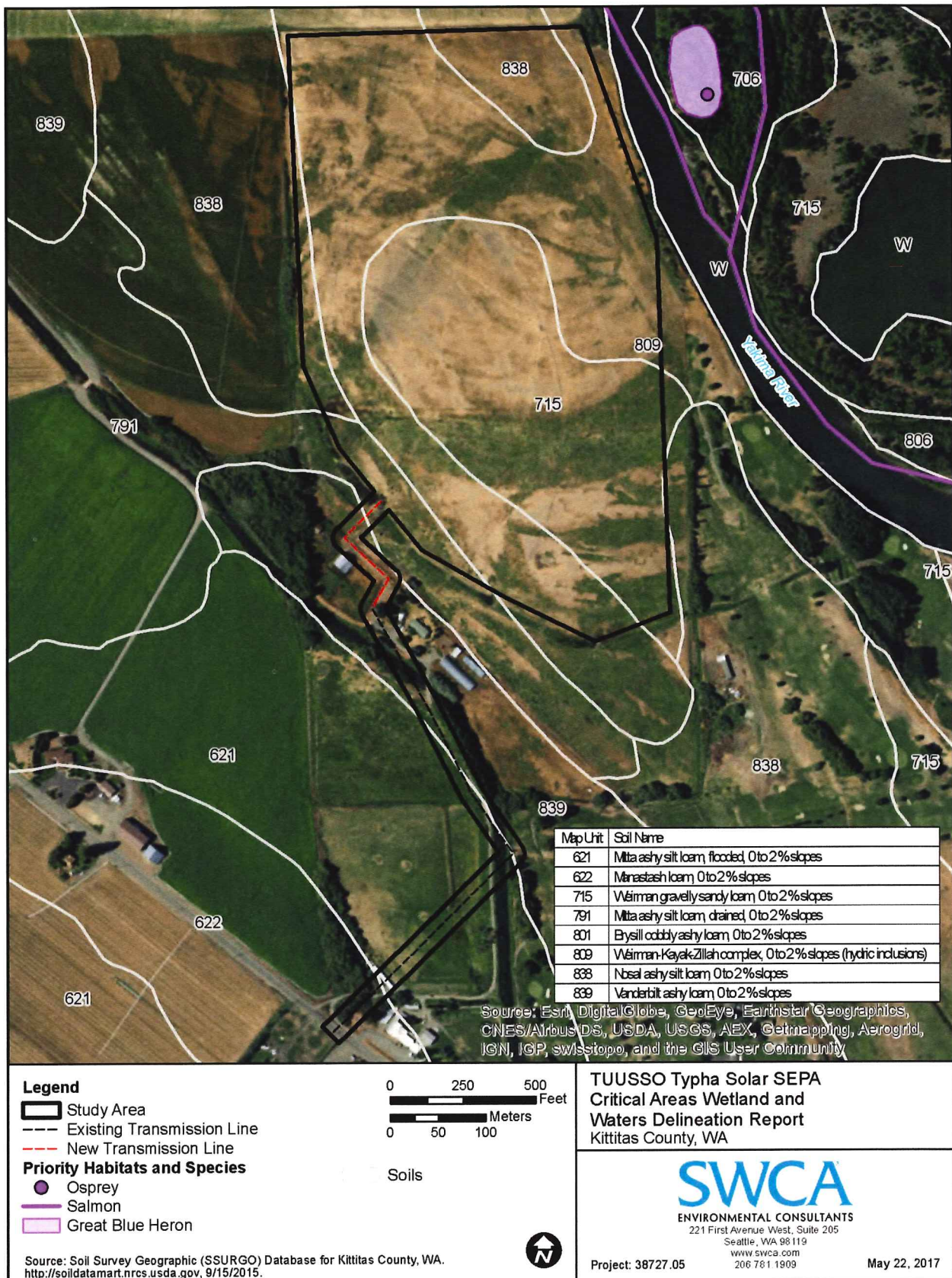


Figure 3. Soils and PHS mapping.



Table 1. Precipitation for 3 Months Prior to Site Visits (in inches)

Month	Average	30% Chance Will Have		Observed Precipitation	Within Normal Range?
		Less Than	More Than		
March	0.76	0.36	0.93	1.49	Above
February	0.91	0.59	1.10	2.04	Above
January	1.19	0.65	1.45	1.54	Above

Source: NRCS 2017b.

Table 2. Precipitation 2 Weeks Prior to Site Visits (in inches)

Field Study	Precipitation 2 Weeks Prior	WYTD	Inches Above or Below Normal WYTD*
April 2–March 20, 2017	0.79	8.93	2.80 above
April 3–March 21, 2017	0.79	8.93	2.78 above
April 11–March 29, 2017	0.61	9.38	3.08 above

\*Based on average precipitation from 1981 to 2010.

Source: NRCS 2017b.

### 2.3.1 Wetlands

The study area was investigated for wetlands in accordance with the current methodology of the U.S. Army Corps of Engineers' (USACE's) 2008 *Arid West Regional Supplement (Version 2)* and the *Wetlands Delineation Manual* (Environmental Laboratory 1987). A detailed description of the field methods used in this study is provided in Appendix A.

A Trimble Geo XT global positioning system (GPS) unit was used by the field team to assist in identifying the project site and generation tie line boundaries and to record site spatial data. This device is capable of submeter accuracy. The full extent of the study area was covered by the team of biologists. Photographs were collected and vegetation, soil, and hydrology characteristics were documented. The boundaries for wetlands located outside of the project site and generation tie line but within the study area were approximated using field observations and aerial imagery to determine the extent of on-site wetland buffers.

Geographic information system (GIS) software were used to analyze data and to produce the report figures (Figures 4 and 5). Per WAC 463-60-333 and KCC Chapter 17A, wetlands were rated using the *Washington State Wetland Rating System for Eastern Washington, 2014 Update*. Per KCC 17A.04.020, the resulting wetland ratings were used to determine the County-prescribed range of wetland buffers for each wetland. Table 3 lists Ecology's wetland rating criteria. Kittitas County's definition of a wetland is based on the Revised Code of Washington (RCW) 36.70A.030, which states:

(21) "Wetland" or "wetlands" means areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from nonwetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificial wetlands intentionally created from nonwetland areas created to mitigate conversion of wetlands.

Table 3. Washington State Department of Ecology Wetland Rating System

**Category**

I	II	III	IV
<p>Category I wetlands: Represent a unique or rare wetland type; are more sensitive to disturbance than most wetlands; are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime; or provide a high level of functions. Specific wetlands that meet the Category I criteria include:</p> <ol style="list-style-type: none"> <li>1. alkali wetlands, characterized by the presence of shallow saline water with a high pH;</li> <li>2. natural heritage wetlands, specifically, wetlands identified by the Washington Natural Heritage Program/DNR as high quality relatively undisturbed wetlands; and wetlands that support state-listed threatened or endangered plants;</li> <li>3. bogs and calcareous fens;</li> <li>4. mature and old-growth forested wetlands with slow growing trees that are over 0.25 acre in size; and</li> <li>5. wetlands that perform many functions very well, as indicated by a score of 22 or more points out of 27 on the wetland rating form.</li> </ol>	<p>Category II wetlands: Wetlands that are difficult, though not impossible, to replace, and provide high levels of some functions. Specific wetlands that meet the Category II criteria include:</p> <ol style="list-style-type: none"> <li>1. forested wetlands in the floodplains of rivers;</li> <li>2. mature and old-growth forested wetlands with fast growing trees that are over 0.25 acre in size;</li> <li>3. vernal pool that are located in a landscape with other wetlands and that are relatively undisturbed during the early spring; and</li> <li>4. wetlands scoring between 19 and 21 points, out of 27, on the wetland rating form.</li> </ol>	<p>Category III wetlands: Wetlands that provide a moderate level of functions. Specific wetlands that meet the Category III criteria include:</p> <ol style="list-style-type: none"> <li>1. wetlands scoring between 16 and 18 points, out of 27, on the wetland rating form.</li> </ol>	<p>Category IV wetlands: Wetlands that have the lowest levels of functions and are heavily disturbed. Specific wetlands that meet the Category IV criteria include:</p> <ol style="list-style-type: none"> <li>1. wetlands scoring less than 16 points out of 27 on the wetland rating form.</li> </ol>

Source: Hruby (2014).  
Kittitas County wetland category definitions defer to Washington Administrative Code for guidance.  
Appendix F includes the County-issued guidance.



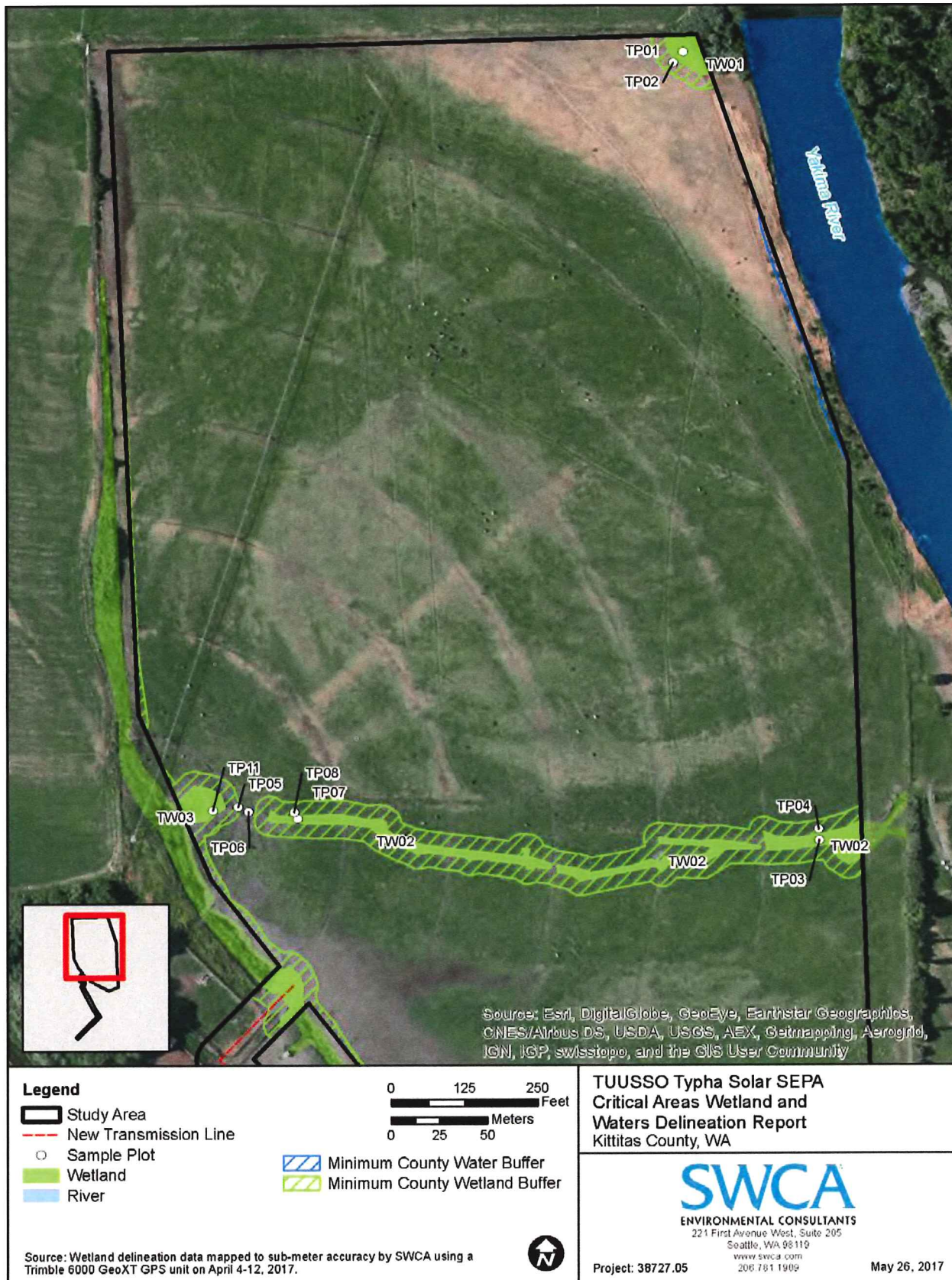


Figure 4. Wetland and waters delineation map, north portion.



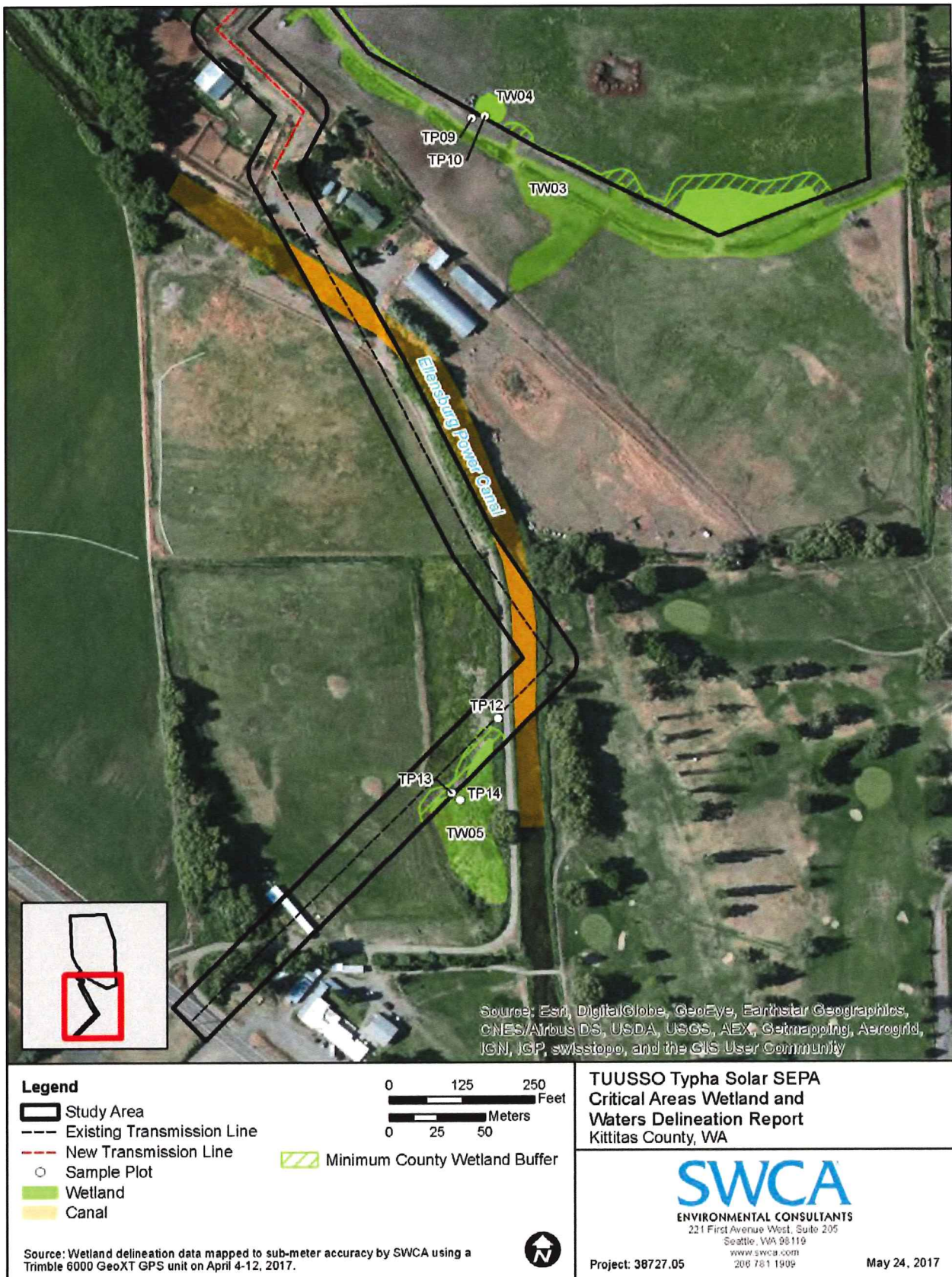


Figure 5. Wetland and waters delineation map, south portion.



A detailed analysis of wetland functions is not included in this report; however, a brief description of wetland functions is provided as part of the general description for each wetland.

### 2.3.2 Riparian Habitats

Biologists also investigated the Typha Solar Project study area for the presence of non-wetland waters and used a GPS device to delineate the ordinary high water marks (OHWMs) of streams per the definitions in WAC 173-22-030 (Figure 5). The OHWMs of streams and rivers outside of the project site and generation tie line but within the study area were approximated using field observations and aerial imagery to determine the extent of on-site stream buffers.

Streams identified in the study areas were classified according to the WAC stream typing system (WAC 222-16-030). Criteria for this typing system are described in Table 4. The stream types described in this report are based on the stream reaches within the study area; downstream reaches may be rated higher.

Table 4. Summary of the Water Typing System

Stream Type	Definition <sup>a</sup>
S	All waters, within their bankfull width, as inventoried as "shorelines of the state" under Chapter 90.58 RCW and the rules promulgated pursuant to Chapter 90.58 RCW including periodically inundated areas of their associated wetlands.
F	All segments of natural waters that are not Type S waters, and that contain fish or fish habitat, including: <ol style="list-style-type: none"> <li>1) waters diverted for domestic use by more than 10 residential or camping units or by a public accommodation facility;</li> <li>2) waters diverted for use by a federal, state, or Tribal fish hatchery from the point of diversion for 1,500 feet or the entire tributary if the tributary is highly significant for protection of downstream water quality;</li> <li>3) waters that are within a federal, state, local, or private campground having more than 10 camping units; or</li> <li>4) riverine ponds, wall-based channels, and other channel features that are used by fish for off-channel habitat.</li> </ol>
Np	All segments of natural waters within the bankfull width of defined channels that are perennial non-fish habitat streams. Perennial streams are flowing waters that do not go dry any time of a year of normal rainfall and include the intermittent dry portions of the perennial channel below the uppermost point of perennial flow.
Ns	All segments of natural waters within the bankfull width of the defined channels that are not Type S, F, or Np waters. These are seasonal, non-fish habitat streams in which surface flow is not present for at least some portion of a year of normal rainfall and the stream is not located downstream from any stream reach that is a Type Np water. Ns waters must be physically connected by an above-ground channel system to Type S, F, or Np waters.

<sup>a</sup> Definitions are summarized from WAC 222-16-030. Kittitas County stream type definitions defer to WAC for guidance.

## 3 RESULTS AND DISCUSSION

The Typha Solar Project site consists of formerly irrigated and grazed pasture along the right bank (when facing downstream) of the Yakima River. The site is currently fallow and dominated by weeds and non-native herbaceous species in upland areas, including tall false rye grass (*Schedonorus arundinaceus*), bluegrass (*Poa* spp.), remnant planted common timothy (*Phleum pratense*), garden yellow rocket (*Barbarea vulgaris*), hairy cat's-ear (*Hypochaeris radicata*), common dandelion (*Taraxacum officinale*), and white clover (*Trifolium repens*). In addition, the site has patches of noxious weeds, including Canadian thistle (*Cirsium arvense*), Scotch thistle (*Onopordum acanthium*), yellow nutsedge (*Cyperus esculentus*), and reed canary grass (*Phalaris arundinacea*). The generation tie line crosses areas of rural residential use, existing driveways and access roads, and a manicured golf course, including some areas with mature grand fir (*Abies grandis*), ponderosa pine (*Pinus ponderosa*), quaking aspen (*Populus tremuloides*), and crack willow (*Salix X fragilis*) trees, with Nootka rose (*Rosa nutkana*) shrubs along the EP Canal and nearby residences and other structures further south. Refer to Appendix B for a complete list of vegetation observed within the study area.



The proposed solar site is situated between the Yakima River and the Ellensburg Golf and Country Club to the east, active agricultural land to the north and west, and a wetland drainage and rural residence to the south. The generation tie line crosses over the EP Canal three times and over two ephemeral ditches that run along the existing access road and pass under the road through a culvert, until it ultimately terminates at Thorp Highway South to the south.

According to NRCS, the Typha Solar Project study area encompasses four different soil map units within the project site and three different soil map units with the generation tie line (Table 5). These soil map units range from somewhat poorly drained to well drained soils that occur on terraces, floodplains, valleys, and fans. The Weirman-Kayak-Zillah complex soil unit is on the National Hydric Soils list (NRCS 2015), which is a list of soils that can be indicative of saturated, flooded, or ponded areas that could meet the definition of a hydric soil.

Table 5. Soil Mapping within the Study Area

Map Unit Symbol	Map Unit Name	Hydric
621	Mitta ashy silt loam, flooded, 0%–2% slopes	No
622	Manastash loam, 0%–2% slopes	No
715	Weirman gravelly sandy loam, 0%–2% slopes	No
791	Mitta ashy silt loam, drained, 0%–2% slopes	No
809	Weirman-Kayak-Zillah complex, 0%–2% slopes	Yes
838	Nosal ashy silt loam, 0%–2% slopes	No
839	Vanderbilt ashy loam, 0%–2% slopes	No

Source: NRCS 2015 and 2017b.

### 3.1 Wetlands

Five wetlands were delineated within the Typha Solar Project study area (three only on the solar site, one only on the generation tie line, and one on both). Wetlands were distinguished from adjoining uplands by the presence or absence of indicators for wetland hydrology, hydric soils, and hydrophytic vegetation. Wetland delineation data sheets are provided in Appendix C, photographs are provided in Appendix D, and wetland rating forms are provided in Appendix E.

Table 6 summarizes the size, rating, and classification of wetlands found within the study area. All delineated wetlands would fall under the jurisdiction of the USACE, Ecology, and Kittitas County. Figures 4 and 5 show the locations of the wetlands, streams, data plots, and their associated minimum protection buffers. The minimum wetland protection buffers were calculated per KCC guidance based on Ecology's Wetland Rating for each wetland. Detailed descriptions of each wetland are provided in the following sections.

Table 6. Wetland Size, Rating, and Classification for Wetlands within the Study Area

Wetland Name	Delineated Area within the Project (Wetland Rating Unit Size) <sup>a</sup> (acres)	Wetland Rating <sup>b</sup>	Hydrogeomorphic Classification	Cowardin Classification <sup>c</sup>	Dominant Species Observed within Wetland
<b>Solar Site</b>					
TW01	0.07 (estimated 0.33)	II	Riverine	PEM/PSS	Narrow-leaf willow, Nootka rose, red osier dogwood, common panic grass, and hairy cat's-ear
TW02	0.38 (estimated 0.68)	II	Riverine	PEM	Baltic rush, tall false rye grass, common timothy, reed canary grass, and Fuller's teasel
TW03	0.35 (estimated 8.45)	II	Riverine	PEM/PSS	Reed canary grass, common duckweed, Rocky Mountain iris, and bluegrass
TW04	0.04 (0.05)	III	Depressional	PEM	Broad-leaf cat-tail, reed canary grass, and tall false rye grass
<b>Generation Tie Line</b>					
TW03	0.07 (estimated 8.45)	II	Riverine	PEM/PSS	Reed canary grass, common duckweed, Rocky Mountain iris, and bluegrass
TW05	0.03 (estimated 0.47)	III	Riverine	PEM	Broad-leaf cat-tail, reed canary grass, and Baltic rush

a Wetland rating unit size is the total area of wetland delineated or estimated based on aerial photograph interpretation and field reconnaissance. Area of delineated portions of the wetlands is based on SWCA survey data.

b Wetland ratings are based on *Washington State Wetland Rating System for Eastern Washington – Revised* (Hruby 2014).

c Cowardin et al. (1979).

### 3.1.1 Wetland TW01

Palustrine emergent/scrub-shrub

Category II

0.07 acre within the project site, approximately 0.33 acre in total

Wetland TW01 is a riverine wetland located in the northeastern corner of the Typha Solar Project site, within the floodplain of the Yakima River (see Figure 5; and wetland rating Figures 1 through 4 in Appendix E). Delineation data were recorded at sample plots TP01 and TP02, provided on datasheets in Appendix C. The wetland extends off-site to the east to connect to the Yakima River, with its southwestern boundary defined by a subtle rise in topography and a change in the plant community. Wetland TW01 is located within the 100-year floodplain for the Yakima River (see Figure 2).

Wetland TW01 is composed of two Cowardin types, with palustrine emergent (PEM) wetland on the project side of the property boundary fence and palustrine scrub-shrub (PSS) wetland on the other side of the fence toward the Yakima River (Cowardin et al. 1979). Refer to Table A-1 in Appendix A for definitions of wetland indicator statuses listed in this section (i.e., FACU, FAC, FACW, and OBL). The PEM side is sparsely vegetated and consists of narrow-leaf willow (*Salix exigua*, FACW) saplings, common panic grass (*Panicum capillare*, FACU), and hairy cat's-ear (FACU). The off-site PSS portion of the wetland is dominated by narrow-leaf willow, red osier dogwood (*Cornus alba*, FACW), and Nootka rose (FACU).

Soils in Wetland TW01 are mapped as Weirman-Kayak-Zillah complex, with 0% to 2% slopes (NRCS 2017a) (see Figure 3). The typical soil profile observed within 16 inches of the soil surface consists of very dark brown (10YR 2/2) silt loam with redoximorphic features starting at 7 inches (Munsell Color 2009). The soils in Wetland TW01 meet the hydric soil indicator for Redox Dark Surface (F6).



No primary indicators of hydrology within the wetland were observed. The only secondary indicator observed was saturation visible on aerial imagery. This wetland was determined to have problematic hydrology under the USACE's 2008 *Arid West Regional Supplement (Version 2)* and, therefore, the presence of positive hydric soil and wetland vegetation indicators, and relative landscape position within the 100-year floodplain, was relied upon for the wetland determination.

Wetland TW01 is rated as a Category II wetland in the Ecology rating system (see Table 3), with a moderately high score for water quality improvement (7/9 points) and moderate scores for hydrologic function (6/9) and habitat function (5/9 points). Wetland TW01 has moderately high potential to provide water quality improvements because of its position within the Yakima River floodplain, which is a 303(d) listed water, which has total maximum daily load (TMDL) limits, and has flooding problems within its watershed.

### 3.1.2 Wetland TW02

Palustrine emergent

Category II

0.38 acre within the project site, approximately 0.68 acre in total

Wetland TW02 is a riverine wetland drainage that crosses the southern middle of the site from west to east, is fed from overbank flooding from Wetland TW03, and feeds into the Yakima River east of the Typha Solar Project site (see Figure 5; and wetland rating Figures 1 through 5 in Appendix E). Delineation data were recorded at sample plots TP03, TP04, TP06, TP07, and TP08 and is provided on datasheets in Appendix C. This wetland has small areas of upland separating the wetland areas because of the slight berms along the tracks of the circular irrigator that passes through this wetland. The upland boundary of the wetland is defined by an obvious rise in elevation on either side of this wetland drainage.

Wetland TW02 is a PEM wetland habitat type (Cowardin et al. 1979). The wetland is dominated by Baltic rush (*Juncus balticus*, FACW), tall false rye grass (FACU), and remnant planted common timothy (FACU), with Nootka rose, narrow-leaf willow, Fuller's teasel (*Dipsacus fullonum*, FAC), and reed canary grass off-site to the east of the project site. The dominance of these species meets the wetland vegetation criteria. Wetland TW02 is partially located within a NWI-mapped palustrine emergent, persistent, seasonally flooded (PEM1C) wetland (see Figure 2).

Soils in Wetland TW02 are mapped as Weirman-Kayak-Zillah complex, with 0% to 2% slopes, and Weirman gravelly sandy loam, with 0% to 2% slopes (NRCS 2017a) (see Figure 3). The soil profile observed within 16 inches of the soil surface in the eastern portion of the wetland consists of black (2.5Y 2.5/1) silt loam over a black silty clay loam with depletions of dark grayish brown (2.5Y 4/2) and redoximorphic features starting at 3 inches (Munsell Color 2009). The soil profile in the western portion of the wetland consists of black (10YR 2/1) silty clay loam with redoximorphic features starting at 7 inches, with a thin layer of sand at 10 inches. The soils in Wetland TW02 meet the hydric soil indicator for Redox Dark Surface (F6).

Primary indicators of hydrology within the wetland include saturation within the upper 12 inches and surface soil cracks. Secondary indicators of hydrology observed within the wetland include drainage patterns and saturation visible on aerial imagery. The presence of these indicators meets wetland hydrology criteria.

Wetland TW02 is rated as a Category II wetland in the Ecology rating system, with a moderately high score for hydrologic function (7/9 points) and moderate scores for habitat function (6/9 points) and water quality improvement (6/9 points). Wetland TW02 has moderately high potential to provide

hydrologic functions because of its potential to slow down water movement and help reduce flooding issues directly downstream in the Yakima River.

### 3.1.3 Wetland TW03

Palustrine emergent/scrub-shrub

Category II

0.35 acre in the project site and 0.07 acre in the generation tie line, approximately 8.45 acres in total for the wetland unit

Wetland TW03 is a riverine wetland that surrounds a drainage that starts just outside of the western project site boundary and extends south and east along the southern study area boundary. This wetland is fed by runoff and irrigation from the agricultural fields to the north and west of the wetland and includes areas of open water as the drainage extends south and west, eventually feeding into the Yakima River east of the study area (see Figure 5; and wetland rating Figures 1 through 5 in Appendix E). Delineation data were recorded at sample plots TP05 and TP11 and is provided on datasheets in Appendix C. The drainage passes through many culverts along its route east, but the culverts are partially obstructed, causing the water to flood over the higher elevation areas between the main drainage reaches; therefore, these areas are included in the wetland. The upland boundary of the wetland is defined by an obvious rise in elevation on either side of the overall drainage.

Wetland TW03 is mostly a PEM wetland habitat type with some PSS areas off-site to the east of the project site (Cowardin et al. 1979). The wetland is dominated by reed canary grass, common duckweed (*Lemna minor*, OBL), Rocky Mountain iris (*Iris missouriensis*, FACW), bluegrass (*Poa* spp., FAC), tall false rye grass, and yellow nutsedge (FACW), with some broad-leaf cat-tail (*Typha latifolia*, OBL), Fuller's teasel, and narrow-leaf willow in the eastern portion of the wetland. The dominance of these species meets the wetland vegetation criteria. Wetland TW03 is located within two different NWI-mapped PEM1C wetland polygons, one along the western project site boundary and one in the southeastern corner of the project site that extends off-site (see Figure 2).

Soils in Wetland TW03 are mapped as Nosal ashy silt loam with 0% to 2% slopes; Mitta ashy silt loam, drained with 0% to 2% slopes; Weirman-Kayak-Zillah complex with 0% to 2% slopes; and Weirman gravelly sandy loam with 0% to 2% slopes (NRCS 2017a) (see Figure 3). The soil profile observed within 16 inches of the soil surface consists of black (2.5Y 2.5/1) silty clay loam with depletions of dark grayish brown (10YR 4/2) and redoximorphic features starting at 8 inches (Munsell Color 2009). The soils in Wetland TW03 meet the hydric soil indicator for Redox Dark Surface (F6).

Primary indicators of hydrology within this wetland include aquatic invertebrates. Secondary indicators of hydrology observed within the wetland include drift deposits (riverine) and drainage patterns. The presence of these indicators meets wetland hydrology criteria.

Wetland TW03 is rated as a Category II wetland in the Ecology rating system, with a high score for hydrologic function (8/9 points) and moderate scores for habitat function (6/9 points) and water quality improvement (6/9 points). Wetland TW03 has high potential to provide hydrologic functions because of its large wetland to channel width ratio and its potential to help reduce flooding issues directly downstream in the Yakima River.



### 3.1.4 Wetland TW04

Palustrine emergent

Category III

0.04 acre within the project site, 0.05 acre in total

Wetland TW04 is a depressional wetland located at the southern project site boundary, approximately 25 feet north of TW03 (see Figure 5; and wetland rating Figures 1 through 5 in Appendix E). Delineation data were recorded at sample plots TP09 and TP10 and is provided on datasheets in Appendix C. This wetland is fed by overland flow that is intercepted before entering TW03 and has seasonal ponding that provides frog habitat. Frog egg masses were observed in this wetland during the site visit. The upland boundary of the wetland is defined by an obvious rise in elevation in all directions.

Wetland TW04 is a PEM wetland habitat type (Cowardin et al. 1979). The wetland is dominated by broad-leaf cat-tail, reed canary grass, and tall false rye grass. The dominance of these species meets the wetland vegetation criteria.

Soils in Wetland TW04 are mapped as Weirman-Kayak-Zillah complex with 0% to 2% slopes, and Mitta ashy silt loam, drained with 0% to 2% slopes (NRCS 2017a) (see Figure 3). The soil profile observed within 16 inches of the soil surface consists of black (10YR 2/1) silt loam with depletions of dark grayish brown (2.5Y 4/2) and medium to large rocks throughout (Munsell Color 2009). This wetland was determined to have problematic soils under the USACE's 2008 *Arid West Regional Supplement (Version 2)* and, therefore, the presence of positive wetland hydrology and wetland vegetation indicators, and the presence of rocks throughout the soil profile, which made detecting redoximorphic features difficult, was relied upon for the wetland determination.

Primary indicators of hydrology within the wetland include saturation and a high water table within the upper 12 inches and drift deposits (nonriverine). The presence of these indicators meets wetland hydrology criteria.

Wetland TW04 is rated as a Category III wetland in the Ecology rating system, with moderate scores for water quality improvement (6/9 points), hydrologic function (6/9 points), and habitat function (6/9 points). Wetland TW04 has moderate potential to provide water quality improvement and hydrologic function because of its lack of a surface water outlet, and it provides moderate habitat function because it provides amphibian egg laying habitat, as positively observed in the field.

### 3.1.5 Wetland TW05

Palustrine emergent

Category III

0.03 acre within the project site, approximately 0.47 acre in total

Wetland TW05 is a riverine wetland fed by flooding from the EP Canal through a culvert under the access road along the eastern wetland boundary (see Figure 5; and wetland rating Figures 1 through 5 in Appendix E). Delineation data were recorded at sample plots TP12, TP13, and TP14 and is provided on datasheets in Appendix C. This wetland is partially mowed along the western boundary where it overlaps with the Ellensburg Golf and Country Club driving range. The upland boundary of the wetland is defined by an obvious rise in elevation along the access road and a subtle elevation change and vegetation community change to the west.



Wetland TW05 is a PEM wetland habitat type (Cowardin et al. 1979). The wetland is dominated by broad-leaf cat-tail, reed canary grass, and Baltic rush, with a few crack willow (FAC) near the culvert. The dominance of these species meets the wetland vegetation criteria.

Soils in Wetland TW05 are mapped as Mitta ashy silt loam, flooded, with 0% to 2% slopes (NRCS 2017a) (see Figure 3). The soil profile observed within 16 inches of the soil surface consists of black (2.5Y 2.5/1) mucky mineral soil over a black gleyed (N 2.5/0) layer within the upper 5 inches and very dark gray (2.5Y 3/1) silt loam with depletions of greyish brown (2.5Y 5/2) below 5 inches (Munsell Color 2009). The soils in Wetland TW05 meet the hydric soil indicator for Loamy Gleyed Matrix (F2).

Primary indicators of hydrology within the wetland include a water table at 12 inches and saturation to the soil surface. The presence of these indicators meets wetland hydrology criteria.

Wetland TW05 is rated as a Category III wetland in the Ecology rating system, with a moderately high score for hydrologic function (7/9 points), a moderately low score for water quality improvement (5/9 points), and a low score for habitat function (4/9 points). Wetland TW05 has moderately high potential to provide hydrologic functions because of its potential to store floodwaters and help reduce flooding issues directly downstream in the Yakima River, and it has a low score for habitat function because it does not provide adequate habitat structure and is isolated from habitat in the surrounding area.

### **3.2 Frequently Flooded Areas**

FEMA floodplain mapping depicts the 100-year floodplain adjacent to the Yakima River, which extends onto the northeastern corner of the project site (see Figure 2). This area overlaps Wetland TW01 with a total area of 0.11 acre within the project site, and will likely be avoided during project design. Development within the 100-year floodplain will be avoided; therefore, no net loss of floodplain storage will be achieved.

### **3.3 Geologically Hazardous Areas**

The Typha Solar Project site is not within any mapped geologically hazardous areas. No erosion/landslide geologic hazard areas, snow avalanche hazards, or mine hazard areas are mapped on any of the parcels that encompass the project site (Kittitas County 2017). The project will not require specialized engineering to ascertain that the property is suitable for development.

### **3.4 Habitats**

Based on the criteria provided in KCC Chapter 17A.07, the Typha Solar Project study area includes riparian habitat and priority species habitat. The Typha Solar Project is not located on federal land or land owned or leased by the WDFW, and therefore is not considered big game winter range.

#### **3.4.1 Riparian Habitat**

One perennial canal (EP Canal) and two ephemeral ditches are located in the Typha Solar Project study area. In addition, the Yakima River is located within 200 feet of the project site. Based on the field observations, the EP Canal and the Yakima River are considered jurisdictional waters for the USACE, Ecology, and Kittitas County because they satisfy the definition of “waters of the United States” under the Clean Water Rule 40 CFR 230.3. The two ephemeral ditches ultimately feed into the EP Canal; one that runs along the south side of the access road and another that crosses under the road from north to south through a culvert, connecting to the first ditch. Because these ditches are hydrologically connected to the EP Canal, they will likely be considered jurisdictional. Table 7 summarizes the size,

rating, and classification of the streams found in the study area (see Figures 4 and 5). Photographs of these features are provided in Appendix D.

Table 7. Summary of Streams in the Study Area

Stream Name	Tributary to	Stream Type <sup>a</sup>	USACE Jurisdiction <sup>b</sup>	Average Width in Study Area (feet) <sup>c</sup>	Approximate Length in the Project (feet) <sup>c</sup>
Yakima River	Columbia River	S	RPW	158	0
EP Canal (TS01)	Yakima River	N/A	RPW	45	540
Unnamed Ephemeral Ditch 1	EP Canal	N/A	NRPW	4	115
Unnamed Ephemeral Ditch 2	EP Canal	N/A	NRPW	10	42

<sup>a</sup> S = shoreline of the state (WAC 222-16-030), N/A = not applicable, due to ditches and canals being excluded from the WAC typing system.

<sup>b</sup> RPW = relatively permanent water; NRPW = non-relatively permanent water.

<sup>c</sup> Average widths and approximate lengths were determined based on SWCA survey data and field observations.

#### 3.4.1.1 Yakima River

The Yakima River is a perennial, fish bearing tributary of the Columbia River with a 6,150-square-mile drainage basin. The Yakima River is located approximately 35 feet outside of the project site, but is within 200 feet of the eastern project site boundary for approximately 1,150 feet. In the vicinity of the study area, the Yakima River is approximately 160 feet wide, with Wetland TW01 delineated within the 100-year floodplain. The project site is located near the cut bank, actively eroding, west side of the Yakima River, which may pose a long-term threat to the stability of the project site near the river. The thin riparian area between the project site and the Yakima River is dominated by herbaceous species, including stinging nettle (*Urtica dioica*), Fuller's teasel, Canadian thistle, and great mullein (*Verbascum thapsus*), with some areas of shrubs and saplings that included ponderosa pine, black hawthorn (*Crataegus douglasii*), narrow-leaf willow, red osier dogwood, and Nootka rose. According to WDFW mapping (WDFW 2017a, WDFW 2017b), coho (*Oncorhynchus kisutch*), Chinook (*O. tshawytscha*), steelhead (*O. mykiss*), cutthroat (*O. clarki lewisi*), and bull trout (*Salvelinus confluentus*) are present in the Yakima River in the vicinity of the project site. Based on the Washington Water Typing Criteria (WAC 222-16-030) and the Shoreline Management Act's list of streams and rivers constituting shorelines of the state for Kittitas County (WAC 173-18-230), this portion of the Yakima River is designated as a shoreline of the state (Type S).

#### 3.4.1.2 Ellensburg Power Canal

The EP Canal is a perennial canal tributary to the Yakima River, located in the generation tie line, and is spanned three times by the existing line. Wetland TW05 receives floodwater from the EP Canal through a culvert under the access road that passes along the southwestern bank and crosses over the canal to the north. Within the study area, the EP Canal's OHWM is approximately 45 feet wide at each of the crossings. Vegetation on the riparian banks of this stream primarily consists of reed canary grass, stinging nettle, prickly lettuce (*Lactuca serriola*), Nootka rose, crack willow, narrow-leaf willow, black locust (*Robinia pseudoacacia*), quaking aspen, ponderosa pine, and grand fir.



Current WDFW mapping suggests that fish species do not occur in the EP Canal (WDFW 2017a, 2017b). This canal is highly manipulated by flow control measures to manage irrigation in the area; therefore, it is highly unlikely to support fish populations. Based on the Washington Water Typing Criteria (WAC 222-16-031) guidance, EP Canal does not fall into this typing system because it is a managed canal and not a stream.

### 3.4.2 Priority Habitats and Species

PHS fish species are designated in the portion of the Yakima River that is adjacent to the Typha Solar Project study area and include coho, rainbow trout (*O. mykiss*), summer steelhead, spring Chinook, bull trout (*Salvelinus malma*), and westslope cutthroat (WDFW 2017a). In addition, there is a great blue heron (*Ardea herodias*) rookery and osprey (*Pandion haliaetus*) occurrence point on the east bank of the Yakima River, opposite and within 300 feet of the project site (WDFW 2017a). Great blue heron were observed during site visits foraging in the project site. PHS mapping is depicted in Figure 3.

These PHS-mapped areas occur off-site and within the protection buffers of other wetland and water features; therefore, no additional designation will be required under KCC 17A.07.020.

## 3.5 Aquifer Recharge Areas

As described in KCC 17A.08.010, no critical aquifer recharge locations have been identified in Kittitas County. Additionally, the Typha Solar Project will not involve any hazardous materials or disposal of on-site sewage. No well-heads have been identified within the study area.

## 4 CONCLUSIONS AND RECOMMENDATIONS

EFSEC will provide permitting requirements for the Typha Solar Project, but this report evaluates and shows compliance with County requirements. A review of the Typha Solar Project study area determined that the following Kittitas County defined critical areas have the potential to be affected by the project:

- Wetlands
- Frequently Flooded Areas
- Habitats:
  - Riparian Habitat

A summary of all wetlands, waters, and critical area buffers documented within the study area is provided in Table 8. The wetland and non-wetland waters identified in and adjacent to the study area will likely be determined jurisdictional by Ecology and the USACE. Although EFSEC will provide permitting requirements for the proposed project, to show compliance with County requirements, KCC guidance (Chapter 17A.07.010) defines a minimum 40-foot protection buffer for Type S waters, such as the Yakima River. However, up to a 200-foot protection buffer could be requested once Kittitas County has had the opportunity to review the results of this study and has had discussions with TUUSSO Energy (see Figures 4 and 5). KCC guidance does not define protection buffers for irrigation canals and ditches, such as The EP Canal and the delineated ephemeral ditches, because they do not qualify as streams. The minimum and maximum wetland protection buffers required by the KCC (Chapter 17A.04.020) are listed in Appendix F, and are provided for these wetlands in Table 8, but only the minimum protection buffers are depicted on Figures 4 and 5. Consultation with the County would be required to determine exact buffer distances.

Table 8. Wetland and Waters Summary

Critical Area	Wetland Rating/Water Typing <sup>a</sup>	Kittitas County Minimum/Maximum Buffer Distances (feet) <sup>b</sup>	Total Size of Feature Within the Project (acres) <sup>c</sup>
<b>Wetlands</b>			
Wetland TW01	II	25 / 100	0.07
Wetland TW02	II	25 / 100	0.38
Wetland TW03	II	25 / 100	0.42
Wetland TW04	III	0 / 0 <sup>d</sup>	0.04
Wetland TW05	III	20 / 80	0.03
<b>Frequently Flooded Areas</b>			
Yakima River flood zone	N/A	N/A	0.11
<b>Riparian Habitat</b>			
Yakima River	S	40 / 200	0.00
EP Canal (TS01)	N/A	None	0.44
Ditches	N/A	None	0.02

<sup>a</sup> II = Category II (Hruby 2014); III = Category III (Hruby 2014); S = shoreline of the state (WAC 22-16-030);

<sup>b</sup> Only minimum buffer distances are depicted on maps;

<sup>c</sup> Does not include buffer areas;

<sup>d</sup> No Kittitas County buffer is defined because the wetland area is below the minimum size threshold for protection; however, building setbacks may be required based on zoning lot line setbacks, but would not exceed 25 feet.

Design plans are incomplete for the proposed Typha Solar Project; however, TUUSSO Energy will attempt to design the project to avoid, reduce, or eliminate impacts to wetlands, waters, and their buffers. Following the finalization of the design footprint, all removal-fill activities proposed within jurisdictional features would require a Joint Aquatic Resources Permit Application (JARPA) submitted for USACE and Ecology review.

There is no minimum threshold to implement mitigation sequencing for potential impacts to wetland and waters features. Where possible, the Typha Solar Project should demonstrate avoidance of jurisdictional features and then minimization of impacts. Avoidance and minimization could be achieved by making minor design alterations around delineated feature boundaries.

Where impact avoidance is not possible, mitigation measures should be implemented to minimize temporary construction disturbance and other permanent alterations to the features. Mitigation would include the implementation of construction best management practices. Where permanent alterations to wetland and waters features are unavoidable, wetland mitigation measures to achieve “no net loss” would be required. Desktop research shows that there are no approved mitigation banks or in-lieu fee programs in Kittitas County; therefore, any mitigation that would be required must be conducted as an Advance Permittee-Responsible Mitigation. Under KCC guidance (Chapter 17A.04.050), the mitigation ratio for a Category II wetland is 2:1, and the mitigation ratio for a Category III wetland is 1:1.

## **5 DISCLAIMER**

This report documents the investigation, best professional judgment, and conclusions of the investigators. This should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and is not a final determination.



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## **APPENDIX A: WETLAND DELINEATION METHODOLOGY**



Wetlands are defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and which under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The methods used to delineate wetlands within the study area conform to guidance in the *Washington State Wetland Identification and Delineation Manual* (Ecology 1997), the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008).

To be considered a wetland by the U.S. Army Corps of Engineers (USACE), an area must express hydrophytic vegetation, hydric soils, and wetland hydrology. SWCA Environmental Consultants (SWCA) staff documented site conditions for these parameters in areas representative of the study area and in areas most likely to exhibit wetland features. Staff collected additional data in associated uplands, as needed, to confirm wetland boundaries. Wetland boundaries, stream boundaries, and wetland data plot locations in the study area were recorded with a Trimble Geo XT global positioning system (GPS) unit. All delineated wetlands and streams were processed and projected onto existing base maps using ArcGIS software.

## Vegetation

The dominant and sub-dominant plants were identified and recorded at each sample plot location. These plants were evaluated based on their wetland indicator status to determine if the vegetation was hydrophytic. SWCA biologists utilized the 50/20 rule per USACE recommendations to determine which plants were dominant at each sample plot. Under this guidance, absolute cover estimates were made for each species found rooted within the sample plot radius for each vegetative strata found in the habitat (tree, sapling/shrub, herb, and woody vine). Refer to the USACE regional supplement for exact applications of this method of determining dominance (USACE 2008).

Sample plot radii varied in size depending on site topography and habitat complexity. When documenting vegetation in smaller or oddly-shaped wetlands or habitat features, vegetation strata radii may be adjusted to more accurately depict vegetation rooted within the wetland or habitat feature being delineated.

Hydrophytic vegetation is defined as vegetation adapted to wetland conditions, such as inundation or prolonged saturation. To meet the hydrophytic vegetation criterion, more than 50% of the total dominant plants across all strata must have a wetland indicator status of Facultative (FAC), Facultative Wetland (FACW), or Obligate (OBL). The wetland indicator status is assigned to plant species that have the potential to occur in wetlands by the USACE (Lichvar et al. 2016). Table A-1 lists the definitions for each wetland indicator status.

Table A-1. Definitions for Each Wetland Plant Indicator Status

Wetland Indicator Status	Symbol	Definition
Obligate Wetland Plants	OBL	Plants that almost always (> 99% of the time) occur in wetlands, but which may rarely (< 1% of the time) occur in non-wetlands.
Facultative Wetland Plants	FACW	Plants that often (67 to 99% of the time) occurs in wetlands, but sometimes (1 to 33% of the time) occur in non-wetlands.
Facultative Plants	FAC	Plants with a similar likelihood (34 to 66% of the time) of occurring in both wetlands and non-wetlands.
Facultative Upland Plants	FACU	Plants that sometimes (1 to 33% of the time) occur in wetlands, but occur more often (67 to 99% of the time) in non-wetlands.
Upland Plants	UPL	Plants that rarely (< 1% of the time) occur in wetlands, and almost always (> 99% of the time) occur in non-wetlands.

Source: Lichvar et al. (2016).



SWCA biologists identified plants found in the field to species whenever possible, when adequate vegetative or flowering characteristics were available. Scientific and common plant names were reported with the currently accepted nomenclature.

## **Soils**

An area typically must contain hydric soils to be considered a wetland, except when problematic site conditions occur. Hydric soils typically form under an area that experiences durations of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper portion of the soil profile. Chemical and biological processes in saturated soil result in reduced oxygen concentrations and promote anaerobic metabolism in microorganisms. These prolonged anaerobic conditions often create mottling and other distinct patterns in the soil, which are used as indicators of hydric soils. The hue, value, and chroma and relative percentage of mottling are recorded in the field at each data plot location. Other important hydric soil indicators include organic matter accumulations in the surface horizon, reduced sulfur odors, and organic matter staining in the soil profile (Natural Resource Conservation Service [NRCS] 2017a).

SWCA staff examined soil profiles at each data plot location by excavating sample pits to a depth of 16 to 20 inches to observe the soil profile, colors, and textures. In some cases, a shallower soil pit was used due to shovel refusal from obstructions in the soil profile, such as gravel, bedrock, thick roots, or clay hardpan. Munsell color charts (Munsell Color 2009) were used to determine soil colors in the field.

## **Hydrology**

SWCA staff investigated the entire project area for evidence of wetland hydrology. Where data plot locations were taken, additional notes were recorded to fully document the presence of primary and secondary wetland hydrology indicators at the sample location. According to the USACE, wetland hydrology criteria were considered to be satisfied if the soil was seasonally inundated or saturated to the surface for a consecutive number of days greater than or equal to 12.5% of the growing season. The growing season for the area was determined based on the period in which temperatures are above 28 degrees Fahrenheit 5 out of 10 years (Ecology 1997) using the long-term climatological data collected by the NRCS (2017). Using the wetlands climate analysis (WETS) table for the nearest station (Ellensburg, Washington), the growing season was approximated as typically between April 20 and October 10, or a total of 173 days (NRCS 17b).

However, often times multiple site visits to determine the duration of seasonal inundation or saturation are not possible. Therefore, field indicators are used in an attempt to determine an area's hydro-period through field observations. Wetland hydrology indicators are divided into two categories: primary and secondary indicators (USACE 2008). Primary indicators of hydrology include, but are not limited to, surface inundation and high water table and saturated soils within 12 inches of the soil surface. The presence of one primary indicator is sufficient to conclude that wetland hydrology is present. Secondary hydrology indicators are also recorded and may substitute in the case of a lack of any primary indicators if multiple secondary indicators are observed. Secondary indicators of hydrology include, but are not limited to, drainage patterns, crayfish burrows, and dry-season water table (USACE 2008). If no primary indicators, and fewer than two secondary indicators, are observed within the sample area, then it is likely that the area is not considered a wetland, unless problematic conditions exist on-site. Aerial and historic imagery are often reviewed before and after site visits to ensure all possible hydrology indicators are taken into account.

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## **APPENDIX B: VEGETATION LIST**



**Typha Solar Site and Transmission Line Project**  
**Vegetation Table**  
**April 3, 4, and 12, 2017**

Common Name	Scientific Name	Wetland Indicator Status <sup>1</sup>	Native / Introduced and Invasive / Noxious
Grand Fir	<i>Abies grandis</i>	FACU	native
Garden Yellow-Rocket	<i>Barbarea vulgaris</i>	FAC	non-native
Canadian Thistle	<i>Cirsium arvense</i>	FACU	invasive, noxious
Red Osier	<i>Cornus alba</i>	FACW	native
Black Hawthorn	<i>Crataegus douglasii</i>	FAC	native
Chufa (yellow nutsedge)	<i>Cyperus esculentus</i>	FACW	native, noxious
Fuller's Teasel	<i>Dipsacus fullonum</i>	FAC	invasive, noxious
Hairy Cat's-Ear	<i>Hypochaeris radicata</i>	FACU	non-native, noxious
Rocky Mountain Iris	<i>Iris missouriensis</i>	FACW	native
Baltic Rush	<i>Juncus balticus</i>	FACW	native
Prickly Lettuce	<i>Lactuca serriola</i>	FACU	non-native
Common Duckweed	<i>Lemna minor</i>	OBL	native
Spearmint	<i>Mentha spicata</i>	FACW	non-native
scotch thistle	<i>Onopordum acanthium</i>	NOL	noxious
Common Panic Grass	<i>Panicum capillare</i>	FACU	native
Reed Canary Grass	<i>Phalaris arundinacea</i>	FACW	invasive, noxious
Common Timothy	<i>Phleum pratense</i>	FACU	non-native
Ponderosa Pine	<i>Pinus ponderosa</i>	FACU	native
bluegrass	<i>Poa species</i>	FAC ?	-
Quaking Aspen	<i>Populus tremuloides</i>	FACU	native
Black Locust	<i>Robinia pseudoacacia</i>	FACU	non-native
Nootka Rose	<i>Rosa nutkana</i>	FACU	native
Curly Dock	<i>Rumex crispus</i>	FAC	non-native
Narrow-Leaf Willow	<i>Salix exigua</i>	FACW	native
crack willow	<i>Salix X fragilis</i>	FAC	non-native
Tall False Rye Grass	<i>Schedonorus arundinaceus</i>	FACU	non-native
Common Dandelion	<i>Taraxacum officinale</i>	FACU	non-native
False Mayweed	<i>Tripleurospermum maritimum</i>	FACU	non-native, noxious
White Clover	<i>Trifolium repens</i>	FACU	non-native
Broad-Leaf Cat-Tail	<i>Typha latifolia</i>	OBL	native
Stinging Nettle	<i>Urtica dioica</i>	FAC	native
Great Mullein	<i>Verbascum thapsus</i>	FACU	non-native

<sup>1</sup>Wetland Indicator Status (WIS) from the NWPL AW Region - see below.

A question mark (?) preceded by a space indicates our default assumption that the plant is FAC.

Wetland Indicator Status (WIS) and taxonomy for the AW Region per the National Wetland Plant List 2016v3.3:

(common names are capitalized) <http://wetland-plants.usace.army.mil/> Accessed January 10, 2017

WIS for non-wetland plants and taxonomy from Reed 1988 and Reed et al. 1993, and the USDA PLANTS database:

(common names are not capitalized) <http://plants.usda.gov/> Accessed multiple dates

Native per Hitchcock & Cronquist 1973 and <http://plants.usda.gov/>

Noxious per Washington State NWCB 2017

<http://www.nwcb.wa.gov/>



<b>WETLAND INDICATOR STATUS - Arid West Region</b>	
OBL	<b>Obligate Wetland</b> – Almost always is a hydrophyte, rarely in uplands. Examples: broad-leaf cat-tail, yellow-skunk-cabbage
FACW	<b>Facultative Wetland</b> - Usually is a hydrophyte but occasionally found in uplands. Examples: Oregon ash, red osier
FAC	<b>Facultative</b> – Commonly occurs as either a hydrophyte or non-hydrophyte. Examples: red alder, salmon raspberry
FACU	<b>Facultative Upland</b> - Occasionally is a hydrophyte but usually occurs in uplands. Examples: big-leaf maple, Himalayan blackberry
UPL	<b>Upland</b> - Rarely is a hydrophyte, almost always in uplands. These plants have been removed from the NWPL WMVC Region.
NOL	<b>Not Listed</b> - Not on the list; assumed to be UPL.

## **APPENDIX C: WETLAND DATA SHEETS**





# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Typha Solar Project City/County: - / Kittitas Sampling Date: 4/4/2017  
 Applicant/Owner: TUUSO Energy, LLC State: WA Sampling Point: TP01  
 Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 30, T18N, R18E  
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 2  
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 47.028478 Long: -120.625543 Datum: NAD 1983  
 Soil Map Unit Name: Weirman-Kayak-Zillah complex, 0 to 2 percent slopes (809) NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X (If no, explain in Remarks)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 <u>X</u>	No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present?	Yes <u>X</u>	No _____	
Wetland Hydrology Present?	Yes <u>X</u>	No _____	
Precipitation prior to fieldwork: <u>0.79"</u> two weeks prior, <u>2.32"</u> above normal for CYTD, <u>2.78"</u> above normal for WYTD. *Wetter than normal.			
Remarks: <b>TWO1.</b> Wetland is located within the 100-year floodplain of the Yakima River. PEM on-site and PSS off-site.			

## VEGETATION

Tree Stratum	(Plot size: <u>30' r</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)  Total Number of Dominant Species Across All Strata: <u>5</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>40%</u> (A/B)
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	
		0% = Total Cover			
Sapling/Shrub Stratum	(Plot size: <u>10' r</u> )				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: _____  OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>20</u> x 2 = <u>40</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>15</u> x 4 = <u>60</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>35</u> (A) <u>100</u> (B) Prevalence Index = B/A = <u>2.86</u>
1.	<u>Salix exigua</u>	<u>15%</u>	<u>Yes</u>	<u>FACW</u>	
2.	<u>Rosa nutkana</u>	<u>5%</u>	<u>Yes</u>	<u>FACU</u>	
3.	<u>Cornus alba</u>	<u>5%</u>	<u>Yes</u>	<u>FACW</u>	
4.	_____	_____	_____	_____	
		25% = Total Cover			
Herb Stratum	(Plot size: <u>5' r</u> )				<b>Hydrophytic Vegetation Indicators:</b> 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% X 3 - Prevalence Index is ≤3.0 <sup>1</sup> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants <sup>1</sup> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.  <b>Hydrophytic Vegetation</b> Yes <u>X</u> No _____ <b>Present?</b>
1.	<u>Panicum capillare</u>	<u>5%</u>	<u>Yes</u>	<u>FACU</u>	
2.	<u>Hypochaeris radicata</u>	<u>5%</u>	<u>Yes</u>	<u>FACU</u>	
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	
5.	_____	_____	_____	_____	
6.	_____	_____	_____	_____	
7.	_____	_____	_____	_____	
8.	_____	_____	_____	_____	
9.	_____	_____	_____	_____	
10.	_____	_____	_____	_____	
		10% = Total Cover			
Woody Vine Stratum	(Plot size: <u>10' r</u> )				
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
		0% = Total Cover			
% Bare Ground in Herb Stratum <u>90%</u>					

Remarks: \_\_\_\_\_ Entered by: KL/ED QC by: TJD  
 The off-site PSS wetland portion is dominated by *Rosa nutkana*, *Salix exigua*, *Cornus alba*, and *Crataegus douglasii*.

## SOIL

Sampling Point: TP01

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-7	10YR 2/2	100					SiL	
7-10+	10YR 2/2	97	7.5YR 3/3	3	C	M, PL	SiL	

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

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

Indicators for Problematic Hydric Soils<sup>3</sup>:

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

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: NoneDepth (inches): N/AHydric Soil Present? Yes X No       

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)  
 Shovel refusal at 10" due to large rocks.

## HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Water Marks (B1) (Riverine)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Biotic Crust (B12)	<input type="checkbox"/> Sediment Deposits (B2) (Riverine)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input checked="" type="checkbox"/> Drift Deposits (B3) (Riverine)
<input type="checkbox"/> Water Marks (B1) (Nonriverine)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3) (Nonriverine)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes        No X Depth (inches): N/A  
 Water Table Present? Yes        No X Depth (inches): >10  
 Saturation Present? Yes        No X Depth (inches): >10  
 (includes capillary fringe)

Wetland Hydrology Present?

Yes X No       

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

Remarks:

Entered by: KL/ED QC by: TJD

Snow mold was prevalent in the area. Some old drift deposits were visible in the off-site PSS portion.



# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Typha Solar Project City/County: - / Kittitas Sampling Date: 4/4/2017  
 Applicant/Owner: TUUSO Energy, LLC State: WA Sampling Point: TP02  
 Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 30, T18N, R18E  
 Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): None Slope (%): 1  
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 47.028432 Long: -120.625613 Datum: NAD 1983  
 Soil Map Unit Name: Weirman-Kayak-Zillah complex, 0 to 2 percent slopes (809) NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X\* (If no, explain in Remarks)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Precipitation prior to fieldwork: <u>0.79"</u> two weeks prior, <u>2.32"</u> above normal for CYTD, <u>2.78"</u> above normal for WYTD. *Wetter than normal. Remarks:			

## VEGETATION

Tree Stratum	(Plot size: <u>30' r</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)  Total Number of Dominant Species Across All Strata: <u>1</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0%</u> (A/B)
1.					
2.					
3.					
4.					
5.					
Sapling/Shrub Stratum (Plot size: <u>10' r</u> )		0% = Total Cover			<b>Hydrophytic Vegetation Indicators:</b> 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 <sup>1</sup> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants <sup>1</sup> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.  <b>Hydrophytic Vegetation Present?</b> Yes _____ No <u>X</u>
1.					
2.					
3.					
4.					
5.					
Herb Stratum (Plot size: <u>5' r</u> )		0% = Total Cover			
1.	<u>Schedonorus arundinaceus</u>	<u>20%</u>	<u>Yes</u>	<u>FACU</u>	
2.	<u>Barbarea vulgaris</u>	<u>5%</u>	<u>No</u>	<u>FAC</u>	
3.	<u>Panicum capillare</u>	<u>2%</u>	<u>No</u>	<u>FACU</u>	
4.	<u>Hypochaeris radicata</u>	<u>1%</u>	<u>No</u>	<u>FACU</u>	
5.					
6.					
7.					
8.					
9.					
10.					
11.					
Woody Vine Stratum (Plot size: <u>10' r</u> )		28% = Total Cover			
1.					<b>Hydrophytic Vegetation Present?</b> Yes _____ No <u>X</u>
2.					
% Bare Ground in Herb Stratum <u>72%</u>		0% = Total Cover			

Remarks:  
 Sparsely vegetated.

Entered by: KL/ED QC by: TJD



## SOIL

Sampling Point: **TP02**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-10	10YR 3/1	100					SiL	

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

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

Indicators for Problematic Hydric Soils<sup>3</sup>:

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

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None  
 Depth (inches): N/A

Hydric Soil Present? Yes          No **X**

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)  
 Large rocks (shovel refusal at 10")

## HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Water Marks (B1) ( <b>Riverine</b> )
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Biotic Crust (B12)	<input type="checkbox"/> Sediment Deposits (B2) ( <b>Riverine</b> )
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Drift Deposits (B3) ( <b>Riverine</b> )
<input type="checkbox"/> Water Marks (B1) ( <b>Nonriverine</b> )	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Sediment Deposits (B2) ( <b>Nonriverine</b> )	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3) ( <b>Nonriverine</b> )	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes          No **X**      Depth (inches): N/A  
 Water Table Present? Yes          No **X**      Depth (inches): >10  
 Saturation Present? Yes          No **X**      Depth (inches): >10  
 (includes capillary fringe)

Wetland Hydrology Present?  
 Yes          No **X**

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

Remarks: Entered by: KL/ED QC by: TJD

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Typha Solar Project City/County: - / Kittitas Sampling Date: 4/4/2017  
 Applicant/Owner: TUUSO Energy, LLC State: WA Sampling Point: TP03  
 Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 30, T18N, R18E  
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1  
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 47.024787 Long: -120.624788 Datum: NAD 1983  
 Soil Map Unit Name: Weirman gravelly sandy loam, 0 to 2 percent slopes (715) NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X (If no, explain in Remarks)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 <u>X</u>	No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present?	Yes <u>X</u>	No _____	
Wetland Hydrology Present?	Yes <u>X</u>	No _____	
Precipitation prior to fieldwork: <u>0.79"</u> two weeks prior, <u>2.32"</u> above normal for CYTD, <u>2.78"</u> above normal for WYTD. *Wetter than normal.			
Remarks: <b>TW02.</b> PEM wetland that drains off-site to the east, slightly impounded flow along the wetland every 180' at bermed tracks for the irrigation system.			

## VEGETATION

Tree Stratum	(Plot size: <u>30' r</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)  Total Number of Dominant Species Across All Strata: <u>4</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)
1.					
2.					
3.					
4.					
		0% = Total Cover			
Sapling/Shrub Stratum	(Plot size: <u>10' r</u> )				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: _____  OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>30</u> x 2 = <u>60</u> FAC species <u>20</u> x 3 = <u>60</u> FACU species <u>30</u> x 4 = <u>120</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>80</u> (A) <u>240</u> (B) Prevalence Index = B/A = <u>3.00</u>
1.					
2.					
3.					
4.					
5.					
		0% = Total Cover			
Herb Stratum	(Plot size: <u>5' r</u> )				<b>Hydrophytic Vegetation Indicators:</b> 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% X 3 - Prevalence Index is ≤3.0 <sup>1</sup> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants <sup>1</sup> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.  <b>Hydrophytic Vegetation</b> Yes <u>X</u> No _____ <b>Present?</b>
1.	<u>Juncus balticus</u>	<u>30%</u>	<u>Yes</u>	<u>FACW</u>	
2.	<u>Schedonorus arundinaceus</u>	<u>15%</u>	<u>Yes</u>	<u>FACU</u>	
3.	<u>Poa species</u>	<u>15%</u>	<u>Yes</u>	<u>FAC ?</u>	
4.	<u>Phleum pratense</u>	<u>15%</u>	<u>Yes</u>	<u>FACU</u>	
5.	<u>Rumex crispus</u>	<u>3%</u>	<u>No</u>	<u>FAC</u>	
6.	<u>Barbarea vulgaris</u>	<u>2%</u>	<u>No</u>	<u>FAC</u>	
7.					
8.					
9.					
10.					
11.					
		80% = Total Cover			
Woody Vine Stratum	(Plot size: <u>10' r</u> )				
1.					
2.					
		0% = Total Cover			
% Bare Ground in Herb Stratum <u>20%</u>					
Remarks: <u>Phalaris arundinacea</u> is dominant further east.					

## SOIL

Sampling Point: TP03

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-3	2.5Y 2.5/1	100					SiL	
3-13	2.5Y 2.5/1	68	2.5Y 4/2	30	D	M	SiCL	
			10YR 4/4	2	C	M, PL		

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

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

Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<input type="checkbox"/> 1 cm muck (A9) (LRR C)
<input type="checkbox"/> 2 cm Muck (A10) (LRR B)
<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): N/A

Hydric Soil Present? Yes ☒ No ☐

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Shovel refusal at 13" due to large rocks.

## HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Water Marks (B1) (Riverine)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Biotic Crust (B12)	<input type="checkbox"/> Sediment Deposits (B2) (Riverine)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Drift Deposits (B3) (Riverine)
<input type="checkbox"/> Water Marks (B1) (Nonriverine)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3) (Nonriverine)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): N/A

Water Table Present? Yes ☒ No ☐ Depth (inches): 13

Saturation Present? Yes ☒ No ☐ Depth (inches): 12

(includes capillary fringe)

Wetland Hydrology Present?

Yes ☒ No ☐

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

Remarks: Entered by: KL/ED QC by: TJD

In addition, saturation at 0-3" was observed from recent heavy rainfall. Surface water is present to the east. Some hummocky ground.



# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Typha Solar Project City/County: - / Kittitas Sampling Date: 4/4/2017  
 Applicant/Owner: TUUSO Energy, LLC State: WA Sampling Point: TP04  
 Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 30, T18N, R18E  
 Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): Concave Slope (%): 2  
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 47.024839 Long: -120.624789 Datum: NAD 1983  
 Soil Map Unit Name: Weirman gravelly sandy loam, 0 to 2 percent slopes (715) NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X\* (If no, explain in Remarks)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Precipitation prior to fieldwork: <u>0.79" two weeks prior, 2.32" above normal for CYTD, 2.78" above normal for WYTD. *Wetter than normal.</u>			
Remarks:			

## VEGETATION

Tree Stratum	(Plot size: <u>30' r</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)  Total Number of Dominant Species Across All Strata: <u>2</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0%</u> (A/B)
1.					
2.					
3.					
4.					
		0% = Total Cover			
<b>Sapling/Shrub Stratum</b> (Plot size: <u>10' r</u> )					
1.					
2.					
3.					
4.					
<b>Herb Stratum</b> (Plot size: <u>5' r</u> )					<b>Hydrophytic Vegetation Indicators:</b> 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 <sup>1</sup> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants <sup>1</sup> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
1.	<u>Schedonorus arundinaceus</u>	<u>50%</u>	<u>Yes</u>	<u>FACU</u>	
2.	<u>Phleum pratense</u>	<u>45%</u>	<u>Yes</u>	<u>FACU</u>	
3.	<u>Onopordum acanthium</u>	<u>1%</u>	<u>No</u>	<u>NOL</u>	
4.					
5.					
6.					
7.					
8.					
9.					
10.					
<b>Woody Vine Stratum</b> (Plot size: <u>10' r</u> )					<b>Hydrophytic Vegetation</b> Yes _____ No <u>X</u> <b>Present?</b>
1.					
2.					
% Bare Ground in Herb Stratum <u>4%</u>					

Remarks:

Entered by: KL/ED QC by: TJD

## SOIL

Sampling Point: **TP04**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-10	2.5Y 2.5/1	100					SiL	
10-14	2.5Y 2.5/1	74	2.5Y 4/2	25	D	M	SiCL	
			10YR 3/4	1	C	M, PL		

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

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

### Indicators for Problematic Hydric Soils<sup>3</sup>:

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

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: None

Depth (inches): N/A

Hydric Soil Present? Yes No **X**

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)  
Thick roots present in the 0-10" layer.

## HYDROLOGY

### Wetland Hydrology Indicators:

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

**Secondary Indicators (2 or more required)**

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

- \_\_\_\_\_ 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 <u>X</u> _____	Depth (inches):	<u>N/A</u>
Water Table Present?	Yes _____	No <u>X</u> _____	Depth (inches):	<u>&gt;14</u>
Saturation Present? (includes capillary fringe)	Yes _____	No <u>X</u> _____	Depth (inches):	<u>&gt;14</u>

**Wetland Hydrology Present?**

Yes	No	<b>X</b>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:	Entered by: KL/ED QC by: TJD
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# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Typha Solar Project City/County: - / Kittitas Sampling Date: 4/4/2017  
 Applicant/Owner: TUUSSO Energy, LLC State: WA Sampling Point: TP05  
 Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 30, T18N, R18E  
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 1  
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 47.025029 Long: -120.628765 Datum: NAD 1983  
 Soil Map Unit Name: Nosal ashy silt loam, 0 to 2 percent slopes (838) NWI classification: PEMC  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X\* (If no, explain in Remarks)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u>	No _____	
Precipitation prior to fieldwork: <u>0.79"</u> two weeks prior, <u>2.32"</u> above normal for CYTD, <u>2.78"</u> above normal for WYTD. *Wetter than normal.			
Remarks: Sample plot taken in upland area between wetlands TW02 and TW03. Water appears to overflow from TW03 into TW02.			

## VEGETATION

Tree Stratum	(Plot size: <u>30' r</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)  Total Number of Dominant Species Across All Strata: <u>2</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0%</u> (A/B)
1.					
2.					
3.					
4.					
		0% = Total Cover			
<b>Sapling/Shrub Stratum</b> (Plot size: <u>10' r</u> )					
1.					
2.					
3.					
4.					
5.					
		0% = Total Cover			
<b>Herb Stratum</b> (Plot size: <u>5' r</u> )					
1.	<u>Schedonorus arundinaceus</u>	<u>50%</u>	<u>Yes</u>	<u>FACU</u>	<b>Hydrophytic Vegetation Indicators:</b> 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 <sup>1</sup> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants <sup>1</sup> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
2.	<u>Phleum pratense</u>	<u>40%</u>	<u>Yes</u>	<u>FACU</u>	
3.	<u>Phalaris arundinacea</u>	<u>5%</u>	<u>No</u>	<u>FACW</u>	
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
		95% = Total Cover			
<b>Woody Vine Stratum</b> (Plot size: <u>10' r</u> )					
1.					<b>Hydrophytic Vegetation Present?</b> Yes _____ No <u>X</u>
2.					
		0% = Total Cover			
% Bare Ground in Herb Stratum		<u>5%</u>			
Remarks: _____ Entered by: <u>KL/ED</u> QC by: <u>TJD</u>					



# SOIL

Sampling Point: **TP05**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-7	2.5Y 2.5/1	100					SiL	
7	10YR 4/2	100					Sand	Very thin layer
7-12	2.5Y 2.5/1	100					SiL	
12-14	2.5Y 2.5/1	98	7.5YR 4/6	2	C	M	SiCL	

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

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

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

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

<input type="checkbox"/> 1 cm muck (A9) ( <b>LRR C</b> )
<input type="checkbox"/> 2 cm Muck (A10) ( <b>LRR B</b> )
<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: None  
Depth (inches): N/A

**Hydric Soil Present?** Yes ☐ No ☒

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)  
Sand layer at 7" could be from historic 500-year level flood event.

## HYDROLOGY

**Wetland Hydrology Indicators:**

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

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

**Secondary Indicators (2 or more required)**

<input type="checkbox"/> Water Marks (B1) ( <b>Riverine</b> )
<input type="checkbox"/> Sediment Deposits (B2) ( <b>Riverine</b> )
<input type="checkbox"/> Drift Deposits (B3) ( <b>Riverine</b> )
<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): N/A  
Water Table Present? Yes ☐ No ☒ Depth (inches): >14  
Saturation Present? Yes ☐ No ☒ Depth (inches): >14  
(includes capillary fringe)

**Wetland Hydrology Present?**

Yes ☒ No ☐

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

Remarks: Snail shells present nearby towards TW03.

Entered by: KL/ED QC by: TJD

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Typha Solar Project City/County: - / Kittitas Sampling Date: 4/4/2017  
 Applicant/Owner: TUUSSO Energy, LLC State: WA Sampling Point: TP06  
 Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 30, T18N, R18E  
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0  
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 47.025004 Long: -120.628694 Datum: NAD 1983  
 Soil Map Unit Name: Weirman-Kayak-Zillah complex, 0 to 2 percent slopes (809) NWI classification: PEMC  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X (If no, explain in Remarks)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u>	No _____	
Precipitation prior to fieldwork: <u>0.79"</u> two weeks prior, <u>2.32"</u> above normal for CYTD, <u>2.78"</u> above normal for WYTD. *Wetter than normal.			
Remarks: Sample plot located in dry slight depression between wetlands TW02 and TW03.			

## VEGETATION

Tree Stratum	(Plot size: <u>30' r</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)  Total Number of Dominant Species Across All Strata: <u>4</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)
1.					
2.					
3.					
4.					
5.					
		0% = Total Cover			
<b>Sapling/Shrub Stratum</b> (Plot size: <u>10' r</u> )					
1.					
2.					
3.					
4.					
5.					
		0% = Total Cover			
<b>Herb Stratum</b> (Plot size: <u>5' r</u> )					
1.	<u>Juncus balticus</u>	<u>35%</u>	<u>Yes</u>	<u>FACW</u>	<b>Hydrophytic Vegetation Indicators:</b> 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 <sup>1</sup> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants <sup>1</sup> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
2.	<u>Schedonorus arundinaceus</u>	<u>20%</u>	<u>Yes</u>	<u>FACU</u>	
3.	<u>Phleum pratense</u>	<u>20%</u>	<u>Yes</u>	<u>FACU</u>	
4.	<u>Poa species</u>	<u>20%</u>	<u>Yes</u>	<u>FAC ?</u>	
5.					
6.					
7.					
8.					
9.					
10.					
11.					
		95% = Total Cover			
<b>Woody Vine Stratum</b> (Plot size: <u>10' r</u> )					
1.					<b>Hydrophytic Vegetation Present?</b> Yes _____ No <u>X</u>
2.					
		0% = Total Cover			
% Bare Ground in Herb Stratum		<u>5%</u>			
Remarks: _____ Entered by: <u>KL/ED</u> QC by: <u>TJD</u>					

## SOIL

Sampling Point: TP06

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-5	2.5Y 2.5/1	100					SiL	
5	10YR 4/2	100					Sand	Very thin layer
5-11	2.5Y 2.5/1	100					SiCL	
11-14	2.5Y 2.5/1	98	7.5YR 4/6	2	C	PL	SiCL	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils <sup>3</sup> :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 1 cm muck (A9) (LRR C)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> 2 cm Muck (A10) (LRR B)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Stratified Layers (A5) (LRR C)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 1 cm Muck (A9) (LRR D)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Vernal Pools (F9)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)		

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):		Hydric Soil Present? Yes _____ No <b>X</b>
Type: <u>None</u>		
Depth (inches): <u>N/A</u>		

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)  
Sand layer at 5" could be from historic 500-year level flood event.

## HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
Primary Indicators (minimum of one required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Water Marks (B1) (Riverine)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Biotic Crust (B12)	<input type="checkbox"/> Sediment Deposits (B2) (Riverine)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Drift Deposits (B3) (Riverine)
<input type="checkbox"/> Water Marks (B1) (Nonriverine)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3) (Nonriverine)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:				Wetland Hydrology Present? Yes <b>X</b> No _____
Surface Water Present?	Yes _____ No <b>X</b>	Depth (inches):	<u>N/A</u>	
Water Table Present?	Yes <b>X</b> No _____	Depth (inches):	<u>13</u>	
Saturation Present? (includes capillary fringe)	Yes <b>X</b> No _____	Depth (inches):	<u>12</u>	

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

Remarks: \_\_\_\_\_ Entered by: KL/ED QC by: TJD



# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Typha Solar Project City/County: - / Kittitas Sampling Date: 4/4/2017  
 Applicant/Owner: TUUSO Energy, LLC State: WA Sampling Point: TP07  
 Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 30, T18N, R18E  
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0  
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 47.024964 Long: -120.628357 Datum: NAD 1983  
 Soil Map Unit Name: Weirman-Kayak-Zillah complex, 0 to 2 percent slopes (809) NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X (If no, explain in Remarks)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 <u>X</u>	No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present?	Yes <u>X</u>	No _____	
Wetland Hydrology Present?	Yes <u>X</u>	No _____	
Precipitation prior to fieldwork: <u>0.79"</u> two weeks prior, <u>2.32"</u> above normal for CYTD, <u>2.78"</u> above normal for WYTD. *Wetter than normal.			
Remarks: <b>TW02.</b> Wetland is fed by overflow from TW03. Problematic wetland vegetation, assumed wetland based on soils and hydrology.			

## VEGETATION

Tree Stratum	(Plot size: <u>30' r</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)  Total Number of Dominant Species Across All Strata: <u>2</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)
1.					
2.					
3.					
4.					
5.					
Sapling/Shrub Stratum (Plot size: <u>10' r</u> )		0% = Total Cover			
1.					
2.					
3.					
4.					
5.					
Herb Stratum (Plot size: <u>5' r</u> )		0% = Total Cover			
1.	<u>Schedonorus arundinaceus</u>	<u>25%</u>	<u>Yes</u>	<u>FACU</u>	
2.	<u>Poa species</u>	<u>25%</u>	<u>Yes</u>	<u>FAC ?</u>	
3.	<u>Phleum pratense</u>	<u>15%</u>	<u>No</u>	<u>FACU</u>	
4.	<u>Juncus balticus</u>	<u>15%</u>	<u>No</u>	<u>FACW</u>	
5.					
6.					
7.					
8.					
9.					
10.					
11.					
		80% = Total Cover			
Woody Vine Stratum (Plot size: <u>10' r</u> )		0% = Total Cover			
1.					
2.					
		0% = Total Cover			
% Bare Ground in Herb Stratum <u>20%</u>					

**Hydrophytic Vegetation Indicators:**

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0<sup>1</sup>

4 - Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)

5 - Wetland Non-Vascular Plants<sup>1</sup>

X Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup>Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** Yes X No \_\_\_\_\_

Remarks: \_\_\_\_\_ Entered by: KL/ED QC by: TJD  
 This site has been actively grazed which may have prevented the growth of wetland plants in the drier areas of the wetland.

## SOIL

Sampling Point: TP07

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-7	10YR 2/1	100					SiCL	
7-10	10YR 2/1	93	7.5YR 4/6	7	C	M. PL	SiCL	
10	10YR 4/2	100					Sand	Very thin layer
10-15	10YR 2/1	93	7.5YR 4/6	7	C	M. PL	SiCL	

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

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

Indicators for Problematic Hydric Soils<sup>3</sup>:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 1 cm muck (A9) (LRR C)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> 2 cm Muck (A10) (LRR B)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Stratified Layers (A5) (LRR C)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 1 cm Muck (A9) (LRR D)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Vernal Pools (F9)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)		

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None  
Depth (inches): N/AHydric Soil Present? Yes X No       Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)  
Sand layer at 10" could be from historic 500-year level flood event.

## HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Water Marks (B1) (Riverine)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Biotic Crust (B12)	<input type="checkbox"/> Sediment Deposits (B2) (Riverine)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Drift Deposits (B3) (Riverine)
<input type="checkbox"/> Water Marks (B1) (Nonriverine)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3) (Nonriverine)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input checked="" type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes        No X Depth (inches): N/A

Water Table Present? Yes        No X Depth (inches): >15

Saturation Present? Yes        No X Depth (inches): >15  
(includes capillary fringe)

Wetland Hydrology Present?

Yes X No       

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

Remarks: Sparsely vegetated concave area along wetland drainage. Entered by: KL/ED QC by: TJD



# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Typha Solar Project City/County: - / Kittitas Sampling Date: 4/4/2017  
 Applicant/Owner: TUUSO Energy, LLC State: WA Sampling Point: TP08  
 Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 30, T18N, R18E  
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Convex Slope (%): 1  
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 47.024995 Long: -120.628381 Datum: NAD 1983  
 Soil Map Unit Name: Weirman-Kayak-Zillah complex, 0 to 2 percent slopes (809) NWI classification: PEMC  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X\* (If no, explain in Remarks)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Precipitation prior to fieldwork: <u>0.79" two weeks prior, 2.32" above normal for CYTD, 2.78" above normal for WYTD. *Wetter than normal.</u>			
Remarks:			

## VEGETATION

Tree Stratum	(Plot size: <u>30' r</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)  Total Number of Dominant Species Across All Strata: <u>3</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33%</u> (A/B)
1.					
2.					
3.					
4.					
		0% = Total Cover			<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: _____ OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>10</u> x 2 = <u>20</u> FAC species <u>25</u> x 3 = <u>75</u> FACU species <u>66</u> x 4 = <u>264</u> UPL species <u>1</u> x 5 = <u>5</u> Column Totals: <u>102</u> (A) <u>364</u> (B) Prevalence Index = B/A = <u>3.57</u>
Sapling/Shrub Stratum (Plot size: <u>10' r</u> )					
1.					
2.					
3.					
4.					
5.					
		0% = Total Cover			<b>Hydrophytic Vegetation Indicators:</b> 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 <sup>1</sup> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants <sup>1</sup> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
Herb Stratum (Plot size: <u>5' r</u> )					
1.	<u>Schedonorus arundinaceus</u>	<u>40%</u>	<u>Yes</u>	<u>FACU</u>	
2.	<u>Poa species</u>	<u>25%</u>	<u>Yes</u>	<u>FAC ?</u>	
3.	<u>Phleum pratense</u>	<u>25%</u>	<u>Yes</u>	<u>FACU</u>	
4.	<u>Phalaris arundinacea</u>	<u>10%</u>	<u>No</u>	<u>FACW</u>	
5.	<u>Onopordum acanthium</u>	<u>1%</u>	<u>No</u>	<u>NOL</u>	
6.	<u>Taraxacum officinale</u>	<u>1%</u>	<u>No</u>	<u>FACU</u>	
7.					
8.					
9.					
10.					
11.					
		102% = Total Cover			<b>Hydrophytic Vegetation Present?</b> Yes _____ No <u>X</u>
Woody Vine Stratum (Plot size: <u>10' r</u> )					
1.					
2.					
		0% = Total Cover			
% Bare Ground in Herb Stratum <u>0%</u>					
Remarks:					



## SOIL

Sampling Point: **TP08**

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

[illegible]

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

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

### Indicators for Problematic Hydric Soils<sup>3</sup>:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 1 cm muck (A9) ( <b>LRR C</b> )
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> 2 cm Muck (A10) ( <b>LRR B</b> )
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Stratified Layers (A5) ( <b>LRR C</b> )	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 1 cm Muck (A9) ( <b>LRR D</b> )	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Vernal Pools (F9)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)		

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): N/A

Hydric Soil Present?	Yes	No	X
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Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

Rocks and gravels (possibly fill material) from 3 to 8 inches. Shovel refusal at 12" due to large rocks.

## HYDROLOGY

### Wetland Hydrology Indicators:

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

Secondary Indicators (2 or more required)

Surface Water (A1)	Salt Crust (B11)	Water Marks (B1) ( <b>Riverine</b> )
High Water Table (A2)	Biotic Crust (B12)	Sediment Deposits (B2) ( <b>Riverine</b> )
Saturation (A3)	Aquatic Invertebrates (B13)	Drift Deposits (B3) ( <b>Riverine</b> )
Water Marks (B1) ( <b>Nonriverine</b> )	Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)
Sediment Deposits (B2) ( <b>Nonriverine</b> )	Oxidized Rhizospheres along Living Roots (C3)	Dry-Season Water Table (C2)
Drift Deposits (B3) ( <b>Nonriverine</b> )	Presence of Reduced Iron (C4)	Crayfish Burrows (C8)
Surface Soil Cracks (B6)	Recent Iron Reduction in Tilled Soils (C6)	Saturation Visible on Aerial Imagery (C9)
Inundation Visible on Aerial Imagery (B7)	Thin Muck Surface (C7)	Shallow Aquitard (D3)
Water-Stained Leaves (B9)	Other (Explain in Remarks)	FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present?	Yes	No	X	Depth (inches):	N/A
Water Table Present?	Yes	No	X	Depth (inches):	>12
Saturation Present? (includes capillary fringe)	Yes	No	X	Depth (inches):	>12

**Wetland Hydrology Present?**

Yes No **X**

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

Remarks: Entered by: KL/ED QC by: TJD

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Typha Solar Project City/County: - / Kittitas Sampling Date: 4/4/2017  
 Applicant/Owner: TUUSSO Energy, LLC State: WA Sampling Point: TP09  
 Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 30, T18N, R18E  
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Convex Slope (%): 0  
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 47.023402 Long: -120.627208 Datum: NAD 1983  
 Soil Map Unit Name: Mitta ashy silt loam, drained, 0 to 2 percent slopes (791) NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X\* (If no, explain in Remarks)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 <u>X</u>	No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Precipitation prior to fieldwork: <u>0.79"</u> two weeks prior, <u>2.32"</u> above normal for CYTD, <u>2.78"</u> above normal for WYTD. *Wetter than normal.			
Remarks: Sample plot located on berm between TW03 and TW04.			

## VEGETATION

Tree Stratum	(Plot size: <u>30' r</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)  Total Number of Dominant Species Across All Strata: <u>1</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
1.					
2.					
3.					
4.					
5.					
Sapling/Shrub Stratum (Plot size: <u>10' r</u> )		0% = Total Cover			
1.					
2.					
3.					
4.					
5.					
Herb Stratum (Plot size: <u>5' r</u> )		0% = Total Cover			
1.	<u>Poa species</u>	<u>60%</u>	<u>Yes</u>	<u>FAC ?</u>	
2.	<u>Schedonorus arundinaceus</u>	<u>15%</u>	<u>No</u>	<u>FACU</u>	
3.	<u>Trifolium repens</u>	<u>10%</u>	<u>No</u>	<u>FACU</u>	
4.	<u>Phleum pratense</u>	<u>10%</u>	<u>No</u>	<u>FACU</u>	
5.	<u>Iris missouriensis</u>	<u>2%</u>	<u>No</u>	<u>FACW</u>	
6.	<u>Taraxacum officinale</u>	<u>2%</u>	<u>No</u>	<u>FACU</u>	
7.	<u>Tripleurospermum maritimum</u>	<u>1%</u>	<u>No</u>	<u>FACU</u>	
8.					
9.					
10.					
11.					
		100% = Total Cover			
Woody Vine Stratum (Plot size: <u>10' r</u> )					
1.					
2.					
		0% = Total Cover			
% Bare Ground in Herb Stratum <u>0%</u>					
Remarks:					<b>Hydrophytic Vegetation Indicators:</b> 1 - Rapid Test for Hydrophytic Vegetation <u>X</u> 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 <sup>1</sup> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants <sup>1</sup> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.  <b>Hydrophytic Vegetation</b> Yes <u>X</u> No _____ <b>Present?</b>
Entered by: <u>KL/ED</u> QC by: <u>TJD</u>					

## SOIL

Sampling Point: TP09

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-3	10YR 2/1	100					SiL	
3-13	10YR 3/2	100					SaL	

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

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

Indicators for Problematic Hydric Soils<sup>3</sup>:

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

<input type="checkbox"/> 1 cm muck (A9) (LRR C)
<input type="checkbox"/> 2 cm Muck (A10) (LRR B)
<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: NoneDepth (inches): N/AHydric Soil Present? Yes ☐ No ☒Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)  
Large rocks throughout 3-13" layer. Shovel refusal at 13".

## HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Water Marks (B1) (Riverine)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Biotic Crust (B12)	<input type="checkbox"/> Sediment Deposits (B2) (Riverine)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Drift Deposits (B3) (Riverine)
<input type="checkbox"/> Water Marks (B1) (Nonriverine)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3) (Nonriverine)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): <u>N/A</u>
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): <u>&gt;13</u>
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): <u>&gt;13</u>

Wetland Hydrology Present?

Yes ☐ No ☒

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

Remarks:

Entered by: KL/ED QC by: TJD



# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Typha Solar Project City/County: - / Kittitas Sampling Date: 4/4/2017  
 Applicant/Owner: TUUSSO Energy, LLC State: WA Sampling Point: TP10  
 Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 30, T18N, R18E  
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Convex Slope (%): 3  
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 47.023411 Long: -120.627114 Datum: NAD 1983  
 Soil Map Unit Name: Mitta ashy silt loam, drained, 0 to 2 percent slopes (791) NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X\* (If no, explain in Remarks)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil X, 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 <u>X</u>	No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present?	Yes <u>X</u>	No _____	
Wetland Hydrology Present?	Yes <u>X</u>	No _____	
Precipitation prior to fieldwork: <u>0.79"</u> two weeks prior, <u>2.32"</u> above normal for CYTD, <u>2.78"</u> above normal for WYTD. *Wetter than normal.			
Remarks: <b>TW04.</b> Depressional wetland intercepting overland runoff before TW03. Frog egg masses observed.			

## VEGETATION

Tree Stratum	(Plot size: <u>30' r</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)  Total Number of Dominant Species Across All Strata: <u>3</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67%</u> (A/B)
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	
5.	_____	_____	_____	_____	
Sapling/Shrub Stratum (Plot size: <u>10' r</u> )		0% = Total Cover			
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	
5.	_____	_____	_____	_____	
Herb Stratum (Plot size: <u>5' r</u> )		0% = Total Cover			
1.	<u>Schedonorus arundinaceus</u>	<u>25%</u>	<u>Yes</u>	<u>FACU</u>	<b>Hydrophytic Vegetation Indicators:</b> 1 - Rapid Test for Hydrophytic Vegetation X 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 <sup>1</sup> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants <sup>1</sup> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
2.	<u>Poa species</u>	<u>25%</u>	<u>Yes</u>	<u>FAC ?</u>	
3.	<u>Phalaris arundinacea</u>	<u>20%</u>	<u>Yes</u>	<u>FACW</u>	
4.	<u>Typha latifolia</u>	<u>5%</u>	<u>No</u>	<u>OBL</u>	
5.	_____	_____	_____	_____	
6.	_____	_____	_____	_____	
7.	_____	_____	_____	_____	
8.	_____	_____	_____	_____	
9.	_____	_____	_____	_____	
10.	_____	_____	_____	_____	
11.	_____	_____	_____	_____	
Woody Vine Stratum (Plot size: <u>10' r</u> )		75% = Total Cover			
1.	_____	_____	_____	_____	<b>Hydrophytic Vegetation Present?</b> Yes <u>X</u> No _____
2.	_____	_____	_____	_____	
% Bare Ground in Herb Stratum <u>5%</u>		0% = Total Cover			
Remarks: <u>20% open water.</u> Entered by: <u>KL/ED</u> QC by: <u>TJD</u>					

## SOIL

Sampling Point: TP10

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-11	10YR 2/1	98	2.5Y 4/2	2	D	M	SiL	

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

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

Indicators for Problematic Hydric Soils<sup>3</sup>:

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

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: NoneDepth (inches): N/AHydric Soil Present? Yes X No       

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

The large rocks throughout the soil profile may be reducing the ability to locate redox; some small depletions observed.

## HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Water Marks (B1) (Riverine)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Biotic Crust (B12)	<input type="checkbox"/> Sediment Deposits (B2) (Riverine)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Drift Deposits (B3) (Riverine)
<input type="checkbox"/> Water Marks (B1) (Nonriverine)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input checked="" type="checkbox"/> Drift Deposits (B3) (Nonriverine)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes        No X      Depth (inches): N/A  
 Water Table Present? Yes X No             Depth (inches): 9  
 Saturation Present? Yes X No             Depth (inches): 11  
 (includes capillary fringe)

Wetland Hydrology Present?

Yes X No       

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

Remarks:

Surface water was recorded at 5" deep within 5 feet of the sample plot.

Entered by: KL/ED QC by: TJD

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Typha Solar Project City/County: - / Kittitas Sampling Date: 4/4/2017  
 Applicant/Owner: TUUSO Energy, LLC State: WA Sampling Point: TP11  
 Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 30, T18N, R18E  
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 1  
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 47.025016 Long: -120.628938 Datum: NAD 1983  
 Soil Map Unit Name: Nosal ashy silt loam, 0 to 2 percent slopes (838) NWI classification: PEMC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes        No X\* (If no, explain in Remarks)  
 Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes X 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 <u>X</u>	No <u>      </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u>      </u>
Hydric Soil Present?	Yes <u>X</u>	No <u>      </u>	
Wetland Hydrology Present?	Yes <u>X</u>	No <u>      </u>	
Precipitation prior to fieldwork: <u>0.79"</u> two weeks prior, <u>2.32"</u> above normal for CYTD, <u>2.78"</u> above normal for WYTD. *Wetter than normal.			
Remarks: <b>TW03.</b> Sample plot located northeast of the open ponded area where overflowing occurs to feed TW02.			

## VEGETATION

Tree Stratum	(Plot size: <u>30' r</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)  Total Number of Dominant Species Across All Strata: <u>3</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67%</u> (A/B)
1.					
2.					
3.					
4.					
		0% = Total Cover			
<b>Sapling/Shrub Stratum</b> (Plot size: <u>10' r</u> )					
1.					<b>Hydrophytic Vegetation Indicators:</b> 1 - Rapid Test for Hydrophytic Vegetation X 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 <sup>1</sup> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants <sup>1</sup> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
2.					
3.					
4.					
5.					
		0% = Total Cover			
<b>Herb Stratum</b> (Plot size: <u>5' r</u> )					
1.	<u>Schedonorus arundinaceus</u>	<u>45%</u>	<u>Yes</u>	<u>FACU</u>	<b>Hydrophytic Vegetation</b> Yes <u>X</u> No <u>      </u> <b>Present?</b>
2.	<u>Poa species</u>	<u>30%</u>	<u>Yes</u>	<u>FAC ?</u>	
3.	<u>Phalaris arundinacea</u>	<u>20%</u>	<u>Yes</u>	<u>FACW</u>	
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
		95% = Total Cover			
<b>Woody Vine Stratum</b> (Plot size: <u>10' r</u> )					
1.					
2.					
		0% = Total Cover			
% Bare Ground in Herb Stratum <u>5%</u>					
Remarks:					



# SOIL

Sampling Point: TP11

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-8	2.5Y 2.5/1	100					SiCL	
8-13	2.5Y 2.5/1	93	10YR 4/2	5	D	M	SiCL	
			7.5YR 3/3	2	C	PL		

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

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

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

Indicators for Problematic Hydric Soils<sup>3</sup>:

<input type="checkbox"/> 1 cm muck (A9) (LRR C)
<input type="checkbox"/> 2 cm Muck (A10) (LRR B)
<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None  
Depth (inches): N/A

Hydric Soil Present? Yes ☒ No ☐

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

## HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

<input type="checkbox"/> Water Marks (B1) (Riverine)
<input type="checkbox"/> Sediment Deposits (B2) (Riverine)
<input checked="" type="checkbox"/> Drift Deposits (B3) (Riverine)
<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): <u>N/A</u>
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): <u>&gt;13</u>
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): <u>&gt;13</u>

Wetland Hydrology Present?

Yes ☒ No ☐

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

Remarks:  
Snail shells present.

Entered by: KL/ED QC by: TJD

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Typha Solar Project City/County: - / Kittitas Sampling Date: 4/12/2017  
 Applicant/Owner: TUUSO Energy, LLC State: WA Sampling Point: TP12  
 Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 30, T18N, R18E  
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Convex Slope (%): 1  
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 47.020595 Long: -120.627165 Datum: NAD 1983  
 Soil Map Unit Name: Mitta ashy silt loam, flooded, 0 to 2 percent slopes (621) NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes        No X\* (If no, explain in Remarks)  
 Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes X 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 <u>X</u>	No <u>      </u>	Is the Sampled Area within a Wetland? Yes <u>      </u> No <u>X</u>
Hydric Soil Present?	Yes <u>X</u>	No <u>      </u>	
Wetland Hydrology Present?	Yes <u>      </u>	No <u>X</u>	
Precipitation prior to fieldwork: <u>0.61"</u> two weeks prior, <u>2.62"</u> above normal for CYTD, <u>3.08"</u> above normal for WYTD. Wetter than normal.			
Remarks: Sample plot located at the toe of slope for the access road.			

## VEGETATION

Tree Stratum	(Plot size: <u>30' r</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)  Total Number of Dominant Species Across All Strata: <u>2</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)
1.					
2.					
3.					
4.					
5.					
Sapling/Shrub Stratum (Plot size: <u>10' r</u> )		0% = Total Cover			
1.					
2.					
3.					
4.					
5.					
Herb Stratum (Plot size: <u>5' r</u> )		0% = Total Cover			
1.	<u>Phalaris arundinacea</u>	80%	Yes	FACW	<b>Hydrophytic Vegetation Indicators:</b> 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% X 3 - Prevalence Index is ≤3.0 <sup>1</sup> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants <sup>1</sup> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
2.	<u>Cirsium arvense</u>	20%	Yes	FACU	
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
Woody Vine Stratum (Plot size: <u>10' r</u> )		100% = Total Cover			
1.					
2.					
% Bare Ground in Herb Stratum <u>0%</u>		0% = Total Cover			
Remarks:					Entered by: <u>KL/ED</u> QC by: <u>TJD</u>

## SOIL

Sampling Point: **TP12**

<b>Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)</b>								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-7	10YR 3/1	90					SiL	
	10YR 3/1	10					LS	mixed matrix
7-14	2.5Y 3/1	77	7.5YR 4/6	3	C	PL	SiL	
	10YR 4/2	20					LS	mixed matrix

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

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**  
☐ Histosol (A1)                      ☐ Sandy Redox (S5)  
☐ Histic Epipedon (A2)             ☐ Stripped Matrix (S6)  
☐ Black Histic (A3)                  ☐ Loamy Mucky Mineral (F1)  
☐ Hydrogen Sulfide (A4)           ☐ Loamy Gleyed Matrix (F2)  
☐ Stratified Layers (A5) (**LRR C**)   ☐ Depleted Matrix (F3)  
☐ 1 cm Muck (A9) (**LRR D**)       ☒ X Redox Dark Surface (F6)  
☐ Depleted Below Dark Surface (A11) ☐ Depleted Dark Surface (F7)  
☐ Thick Dark Surface (A12)       ☐ Redox Depressions (F8)  
☐ Sandy Mucky Mineral (S1)       ☐ Vernal Pools (F9)  
☐ Sandy Gleyed Matrix (S4)

**Indicators for Problematic Hydric Soils<sup>3</sup>:**  
☐ 1 cm muck (A9) (**LRR C**)  
☐ 2 cm Muck (A10) (**LRR B**)  
☐ Reduced Vertic (F18)  
☐ Red Parent Material (TF2)  
☐ Other (Explain in Remarks)  
  
☐ <sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<b>Restrictive Layer (if present):</b> Type: <u>None</u> Depth (inches): <u>N/A</u>	<b>Hydric Soil Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
---	---

Remarks:      S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)  
Mixed matrix throughout loamy sand and silty loam from disturbance, likely during road construction.

## HYDROLOGY

Wetland Hydrology Indicators:				
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Water Marks (B1) ( <b>Riverine</b> )		
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Biotic Crust (B12)	<input type="checkbox"/> Sediment Deposits (B2) ( <b>Riverine</b> )		
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Drift Deposits (B3) ( <b>Riverine</b> )		
<input type="checkbox"/> Water Marks (B1) ( <b>Nonriverine</b> )	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)		
<input type="checkbox"/> Sediment Deposits (B2) ( <b>Nonriverine</b> )	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)		
<input type="checkbox"/> Drift Deposits (B3) ( <b>Nonriverine</b> )	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)		
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)		
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Shallow Aquitard (D3)		
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)		
<b>Field Observations:</b>		<b>Wetland Hydrology Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>			Depth (inches): <input type="text" value="N/A"/>
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>			Depth (inches): <input type="text" value="&gt;14"/>
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>			Depth (inches): <input type="text" value="&gt;14"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:				
Remarks:		Entered by: <u>KL/ED</u> QC by: <u>TJD</u>		



# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Typha Solar Project City/County: - / Kittitas Sampling Date: 4/12/2017  
 Applicant/Owner: TUUSO Energy, LLC State: WA Sampling Point: TP13  
 Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 30, T18N, R18E  
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0  
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 47.020253 Long: -120.627497 Datum: NAD 1983  
 Soil Map Unit Name: Mitta ashy silt loam, flooded, 0 to 2 percent slopes (621) NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X\* (If no, explain in Remarks)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 <u>X</u>	No _____	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes <u>X</u>	No _____	
Precipitation prior to fieldwork: <u>0.61"</u> two weeks prior, <u>2.62"</u> above normal for CYTD, <u>3.08"</u> above normal for WYTD. Wetter than normal.			
Remarks: Determined not to be a wetland based on lack of hydric soils.			

## VEGETATION

Tree Stratum	(Plot size: <u>30' r</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)  Total Number of Dominant Species Across All Strata: <u>1</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
1.					
2.					
3.					
4.					
		0% = Total Cover			
Sapling/Shrub Stratum	(Plot size: <u>10' r</u> )				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: _____ OBL species <u>10</u> x 1 = <u>10</u> FACW species <u>90</u> x 2 = <u>180</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>100</u> (A) <u>190</u> (B) Prevalence Index = B/A = <u>1.90</u>
1.					
2.					
3.					
4.					
5.					
		0% = Total Cover			
Herb Stratum	(Plot size: <u>5' r</u> )				<b>Hydrophytic Vegetation Indicators:</b> 1 - Rapid Test for Hydrophytic Vegetation X 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 <sup>1</sup> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants <sup>1</sup> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
1.	<u>Phalaris arundinacea</u>	<u>85%</u>	<u>Yes</u>	<u>FACW</u>	
2.	<u>Typha latifolia</u>	<u>10%</u>	<u>No</u>	<u>OBL</u>	
3.	<u>Juncus balticus</u>	<u>5%</u>	<u>No</u>	<u>FACW</u>	
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
		100% = Total Cover			
Woody Vine Stratum	(Plot size: <u>10' r</u> )				<b>Hydrophytic Vegetation Present?</b> Yes <u>X</u> No _____
1.					
2.					
		0% = Total Cover			
% Bare Ground in Herb Stratum		<u>0%</u>			
Remarks:					

## SOIL

Sampling Point: TP13

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-5	10YR 2/1	100						
5-14	2.5Y 3/1	100						

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

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

Indicators for Problematic Hydric Soils<sup>3</sup>:

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

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None  
 Depth (inches): N/A

Hydric Soil Present? Yes            No X

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

## HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Water Marks (B1) (Riverine)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Biotic Crust (B12)	<input type="checkbox"/> Sediment Deposits (B2) (Riverine)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Drift Deposits (B3) (Riverine)
<input type="checkbox"/> Water Marks (B1) (Nonriverine)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3) (Nonriverine)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes            No X      Depth (inches): N/A  
 Water Table Present? Yes X No                 Depth (inches): 12  
 Saturation Present? Yes X No                 Depth (inches): to surface  
 (includes capillary fringe)

Wetland Hydrology Present?

Yes X No           

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

Remarks: Entered by: KL/ED QC by: TJD

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Typha Solar Project City/County: - / Kittitas Sampling Date: 4/12/2017  
 Applicant/Owner: TUUSSO Energy, LLC State: WA Sampling Point: TP14  
 Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 30, T18N, R18E  
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0  
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 47.020219 Long: -120.627443 Datum: NAD 1983  
 Soil Map Unit Name: Mitta ashy silt loam, flooded, 0 to 2 percent slopes (621) NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes        No X\* (If no, explain in Remarks)  
 Are Vegetation       , Soil       , or Hydrology        significantly disturbed? Are "Normal Circumstances" present? Yes X 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 <u>X</u>	No <u>      </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u>      </u>
Hydric Soil Present?	Yes <u>X</u>	No <u>      </u>	
Wetland Hydrology Present?	Yes <u>X</u>	No <u>      </u>	
Precipitation prior to fieldwork: <u>0.61" two weeks prior, 2.62" above normal for CYTD, 3.08" above normal for WYTD. Wetter than normal.</u>			
Remarks: <b>TW05.</b> Wetland fed by overbank flooding of EP Canal via a culvert under the access road separating the wetland from the canal.			

## VEGETATION

Tree Stratum	(Plot size: <u>30' r</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)  Total Number of Dominant Species Across All Strata: <u>2</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
1.					
2.					
3.					
4.					
5.					
		0% = Total Cover			
<b>Sapling/Shrub Stratum</b> (Plot size: <u>10' r</u> )					
1.					
2.					
3.					
4.					
5.					
		0% = Total Cover			
<b>Herb Stratum</b> (Plot size: <u>5' r</u> )					
1.	<u>Typha latifolia</u>	<u>50%</u>	<u>Yes</u>	<u>OBL</u>	<b>Hydrophytic Vegetation Indicators:</b> 1 - Rapid Test for Hydrophytic Vegetation X 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 <sup>1</sup> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants <sup>1</sup> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
2.	<u>Phalaris arundinacea</u>	<u>45%</u>	<u>Yes</u>	<u>FACW</u>	
3.	<u>Juncus balticus</u>	<u>5%</u>	<u>No</u>	<u>FACW</u>	
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
		100% = Total Cover			
<b>Woody Vine Stratum</b> (Plot size: <u>10' r</u> )					
1.					<b>Hydrophytic Vegetation</b> Yes <u>X</u> No <u>      </u> <b>Present?</b>
2.					
		0% = Total Cover			
<b>% Bare Ground in Herb Stratum</b> <u>0%</u>					
Remarks: <span style="float: right;">Entered by: <u>KL/ED</u> QC by: <u>TJD</u></span>					



## SOIL

Sampling Point: TP14

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-3	2.5Y 2.5/1	100					Mucky Mineral	
3-5	N 2.5/0	100					Mucky Mineral	Gleyed
5-15	2.5Y 3/1	98	2.5Y 5/2	2	D	M	SiL	

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

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

Indicators for Problematic Hydric Soils<sup>3</sup>:

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

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None  
 Depth (inches): N/A

Hydric Soil Present? Yes X No       

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)  
 3-5" Layer feels mucky mineral. Thick roots in 0-3" layer.

## HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Water Marks (B1) (Riverine)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Biotic Crust (B12)	<input type="checkbox"/> Sediment Deposits (B2) (Riverine)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Drift Deposits (B3) (Riverine)
<input type="checkbox"/> Water Marks (B1) (Nonriverine)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3) (Nonriverine)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes        No X Depth (inches): N/A  
 Water Table Present? Yes X No        Depth (inches): 12  
 Saturation Present? Yes X No        Depth (inches): to surface  
 (includes capillary fringe)

Wetland Hydrology Present?

Yes X No       

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

Remarks: Entered by: KL/ED QC by: TJD

## **APPENDIX D: WETLAND AND STREAM PHOTOGRAPHS**







**Photo A.** View northeast of Wetland TW01.



**Photo B.** View east of the eastern portion of Wetland TW02 (TP03).



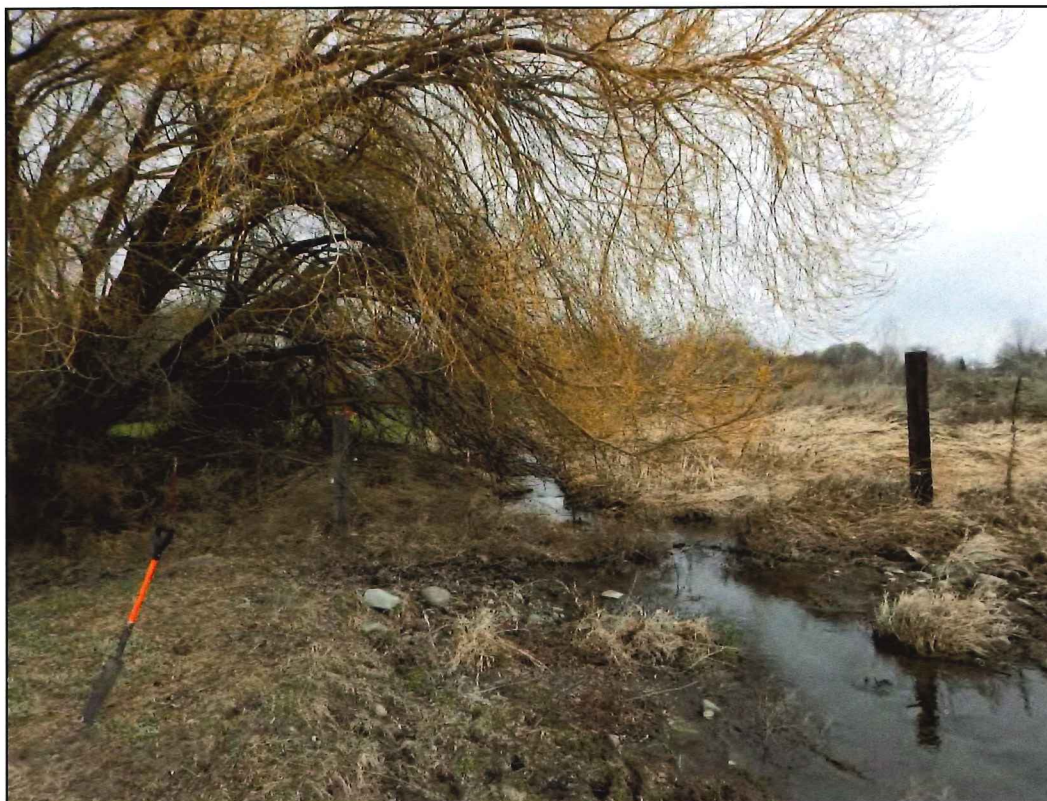


**Photo C.** View east of Wetland TW02 at eastern site boundary, extends off-site.



**Photo D.** View south of the western portion of Wetland TW02 (TP07).





**Photo E.** View east of Wetland TW03 at eastern site boundary, extends off-site.



**Photo F.** View east of Wetland TW03 at one of several culverts.





**Photo G.** View south of open water area in western portion of Wetland TW03 (TP11).



**Photo H.** View northwest of western portion of Wetland TW03.





**Photo I.** View north of off-site portion of Wetland TW03 to the west.



**Photo J.** View west of Wetland TW04.





**Photo K.** View south of Wetland TW04.



**Photo L.** View northwest of EP Canal at first crossing near the road crossing bridge.





**Photo M.** View southeast of EP Canal at second crossing.

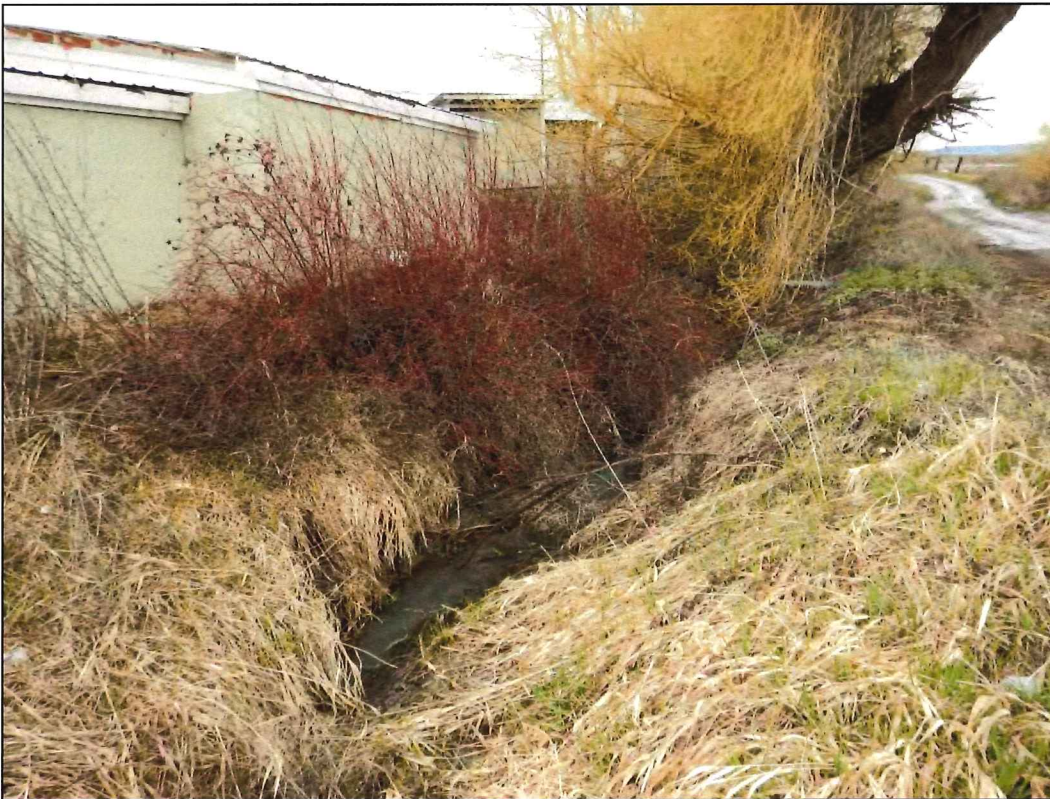


**Photo N.** View northeast of the western wetland boundary for Wetland TW05.





**Photo O.** View west of culvert entering Wetland TW05 from EP Canal.



**Photo P.** View west of roadside ditch on the south side of the access road.





**Photo Q.** View northwest of ditch on the north side of the access road.



**Photo R.** View east of Great Blue Heron rookery on east side of the Yakima River.





**Photo S.** View down of frog egg masses in Wetland TW04.



**Photo T.** View down of dead vole (living voles were abundant throughout the site).

## **APPENDIX E: ECOLOGY RATING FORMS**





Wetland name or number TW01

## RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): TW01 Date of site visit: 4/4/17  
 Rated by N. Evan Dulin Trained by Ecology? ☒ Yes ☐ No Date of training 3/29/17  
 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 II (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  
☐ 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	7	6	6	19

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	<input checked="" type="checkbox"/>

Wetland name or number Two1

## 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 ( <i>can be added to map of hydroperiods</i> )	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland ( <i>can be added to another figure</i> )	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	1
Hydroperiods	H 1.2, H 1.3	1
Ponded depressions <i>-None</i>	R 1.1	1
Boundary of area within 150 ft of the wetland ( <i>can be added to another figure</i> )	R 2.4	1
Map of the contributing basin	R 2.2, R 2.3, R 5.2	5
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	1
Width of wetland vs. width of stream ( <i>can be added to another figure</i> )	R 4.1	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	2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	3
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	4

## 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 ( <i>can be added to another figure</i> )	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 <b>dense</b> trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of <b>dense, rigid</b> trees, shrubs, and herbaceous plants ( <i>can be added to figure above</i> )	S 4.1	
Boundary of area within 150 ft of the wetland ( <i>can be added to another figure</i> )	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	



## HGM Classification of Wetland in Eastern Washington

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

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

1. Does the entire unit **meet both** of the following criteria?

☐ The vegetated part of the wetland is on the water side of the Ordinary High Water Mark of a body of permanent open water (without any plants on the surface) that is at least 20 ac (8 ha) in size  
☐ At least 30% of the open water area is deeper than 10 ft (3 m)

NO - go to 2

YES - The wetland class is **Lake Fringe** (Lacustrine Fringe)

2. Does the entire wetland unit **meet all** of the following criteria?

☒ The wetland is on a slope (*slope can be very gradual*),  
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks;  
☒ The water leaves the wetland **without being impounded**.

NO - go to 3

YES - The wetland class is **Slope**

**NOTE:** Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).

3. Does the entire wetland unit **meet all** of the following criteria?

☒ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river;  
☒ The overbank flooding occurs at least once every 10 years.

NO - go to 4

YES - The wetland class is **Riverine**

**NOTE:** The Riverine wetland can contain depressions that are filled with water when the river is not flooding.

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

NO - go to 5

YES - The wetland class is **Depressional**

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



Wetland name or number Two1

**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 TW01

RIVERINE WETLANDS		Points (only 1 score per box)
<b>Water Quality Functions</b> - Indicators that the site functions to improve water quality		
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 $> \frac{1}{3}$ area of wetland	points = 6	0
Depressions cover $> \frac{1}{10}$ area of wetland	points = 3	
Depressions present but cover $< \frac{1}{10}$ area of wetland	points = 1	
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with $> 90\%$ cover at person height; not Cowardin classes):		
Forest or shrub $> \frac{2}{3}$ the area of the wetland	points = 10	10
Forest or shrub $\frac{1}{3} - \frac{2}{3}$ area of the wetland	points = 5	
Ungrazed, herbaceous plants $> \frac{2}{3}$ area of wetland	points = 5	
Ungrazed herbaceous plants $\frac{1}{3} - \frac{2}{3}$ area of wetland	points = 2	
Forest, shrub, and ungrazed herbaceous $< \frac{1}{3}$ area of wetland	points = 0	
Total for R 1	Add the points in the boxes above	10

**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	1
R 2.4. Is $> 10\%$ of the area within 150 ft of wetland in land uses that generate pollutants	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1-R 2.4? Source _____	Yes = 1 No = 0	0
Total for R 2	Add the points in the boxes above	2

**Rating of Landscape Potential** If score is: 3-6 = H ✓ 1 or 2 = M 0 = L

Record the rating on the first page

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

**Rating of Value** If score is: ✓ 2-4 = H 1 = M 0 = L

Record the rating on the first page

Wetland name or number Two1

RIVERINE WETLANDS		Points (only 1 score per box)
<b>Hydrologic Functions</b> - Indicators that site functions to reduce flooding and stream erosion		
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: <i>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).</i> If the ratio is more than 2 points = 10 If the ratio is 1-2 points = 8 If the ratio is 1/2-1 points = 4 If the ratio is 1/4-1/2 points = 2 If the ratio is < 1/4 points = 1  R 4.2. Characteristics of plants that slow down water velocities during floods: <i>Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have &gt; 90% cover at person height. These are NOT Cowardin classes).</i> 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	~ 90' / 175' = > 1/2  ~ 80%	4  6
Total for R 5		Add the points in the boxes above

**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	0
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	0
Total for R 5		Add the points in the boxes above


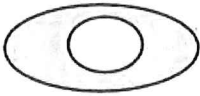
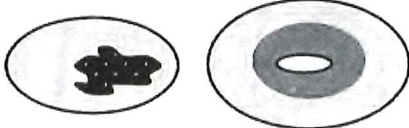
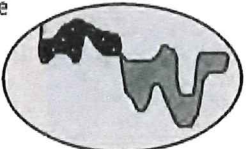

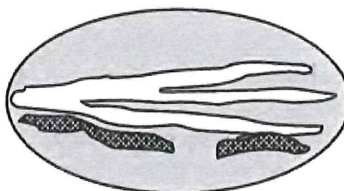
**Rating of Landscape Potential** If score is: 3 = H 1 or 2 = M ✓ 0 = L Record the rating on the first page

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? <i>Choose the description that best fits the site.</i> The sub-basin immediately down-gradient of site has surface flooding problems that result in damage to human or natural resources points = 2 Surface flooding problems are in a basin farther down-gradient points = 1 No flooding problems anywhere downstream points = 0	2	
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 (No = 0)	0	
Total for R 6		Add the points in the boxes above

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



Wetland name or number TW01

These questions apply to wetlands of all HGM classes.		(only 1 score per box)
HABITAT FUNCTIONS - Indicators that site functions to provide important habitat		
H 1.0. Does the wetland have the potential to provide habitat for many species?		
<p>H 1.1. Structure of the plant community:</p> <p>Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is <math>\geq \frac{1}{4}</math> ac or <math>\geq 10\%</math> of the wetland if wetland is <math>&lt; 2.5</math> ac.</p> <p><input type="checkbox"/> Aquatic bed</p> <p><input type="checkbox"/> Emergent plants 0-12 in (0-30 cm) high are the highest layer and have <math>&gt; 30\%</math> cover</p> <p><input type="checkbox"/> Emergent plants &gt;12-40 in (&gt;30-100 cm) high are the highest layer with <math>&gt; 30\%</math> cover</p> <p><input type="checkbox"/> Emergent plants &gt; 40 in (&gt; 100 cm) high are the highest layer with <math>&gt; 30\%</math> cover</p> <p><input checked="" type="checkbox"/> Scrub-shrub (areas where shrubs have <math>&gt; 30\%</math> cover)</p> <p><input type="checkbox"/> Forested (areas where trees have <math>&gt; 30\%</math> cover)</p> <p style="text-align: right;">4 or more checks: points = 3 3 checks: points = 2 2 checks: points = 1 1 check: points = 0</p> <p style="text-align: right;">(&lt;30% cover) lots of bare ground</p>	0	
H 1.2. Is one of the vegetation types Aquatic Bed?	Yes = 1 No = 0	0
H 1.3. <u>Surface water</u>		
<p>H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least <math>\frac{1}{4}</math> 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 &amp; go to H 1.4 No = go to H 1.3.2</p> <p>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 <math>\frac{1}{4}</math> ac or 10% of its area? Answer yes only if H 1.3.1 is No.</p> <p style="text-align: right;">Yes = 3 No = 0</p>		3
<p>H 1.4. <u>Richness of plant species</u></p> <p>Count the number of plant species in the wetland that cover at least 10 ft<sup>2</sup>. Different patches of the same species can be combined to meet the size threshold. You do not have to name the species.</p> <p>Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Russian olive, Phragmites, Canadian thistle, yellow-flag iris, and saltcedar (Tamarisk)</p> <p># of species <u>5</u></p> <p style="text-align: right;">Scoring: &gt; 9 species: points = 2 4-9 species: points = 1 &lt; 4 species: points = 0</p>		1
<p>H 1.5. <u>Interspersion of habitats</u></p> <p>Decide from the diagrams below whether interspersions among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none.</p> <p>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.</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>None = 0 points</p> </div> <div style="text-align: center;">  <p>Low = 1 point</p> </div> <div style="text-align: center;">  <p>Moderate = 2 points</p> </div> </div> <p>All three diagrams in this row are High = 3 points</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;">    </div> <p style="text-align: right;">Riparian braided channels with 2 classes</p>		<p>Figure__</p> <p>1</p>

Wetland name or number 7W01

<b>H 1.6. Special habitat features</b> Check the habitat features that are present in the wetland. The number of checks is the number of points. <input type="checkbox"/> Loose rocks larger than 4 in OR large, downed, woody debris (> 4 in diameter) within the area of surface ponding or in stream. <input type="checkbox"/> Cattails or bulrushes are present within the wetland. <input type="checkbox"/> Standing snags (diameter at the bottom > 4 in) in the wetland or within 30 m (100 ft) of the edge. <input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <input type="checkbox"/> 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 <input checked="" type="checkbox"/> 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	6

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

<b>H 2.0. Does the landscape have the potential to support habitat functions of the site?</b>		
<b>H 2.1. Accessible habitat (only area of habitat abutting wetland). If total accessible habitat is:</b> Calculate: % undisturbed habitat <u>19</u> + [(% moderate and low intensity land uses)/2] <u>4.5</u> = <u>23.5</u> % > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1km Polygon <u>1 km poly ≈ 812 ac</u> points = 2 10-19% of 1km Polygon <u>Accessible mod = 157 ac ≈ 19%</u> points = 1 <10% of 1km Polygon <u>mid-intensity = 74 ≈ 9%</u> points = 0		2
<b>H 2.2. Undisturbed habitat in 1 km Polygon around wetland.</b> Calculate: % undisturbed habitat <u>19</u> + [(% moderate and low intensity land uses)/2] <u>13</u> = <u>32</u> % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches <u>Mid-intensity = 74 + 136/812 = 26%</u> points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of Polygon <u>2 patches</u> points = 0		2
<b>H 2.3. Land use intensity in 1 km Polygon:</b> <input type="checkbox"/> > 50% of Polygon is high intensity land use <u>High intensity = 445/812 = 55%</u> points = (-2) Does not meet criterion above points = 0		-2
<b>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</b> Yes = 3 (No = 0)		0
Total for H 2	Add the points in the boxes above	2

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

<b>H 3.0. Is the habitat provided by the site valuable to society?</b>		
<b>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</b> Site meets ANY of the following criteria: points = 2 <input checked="" type="checkbox"/> It has 3 or more priority habitats within 100 m (see Appendix B) <input type="checkbox"/> It provides habitat for Threatened or Endangered species (any plant or animal on state or federal lists) <input type="checkbox"/> It is mapped as a location for an individual WDFW species <input type="checkbox"/> It is a Wetland of High Conservation Value as determined by the Department of Natural Resources <input type="checkbox"/> 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



# 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.



TW01

Figure 1

Legend

- Scrub-shrub
- TW01
- Width





TW01

Figure 2



April 24, 2017

TW01 - Figure 3



**Assessed Waters/Sediment**

**Water**

-  Category 5 - 303d
-  Category 4C
-  Category 4B
-  Category 4A
-  Category 2
-  Category 1

**Sediment**


-  Category 5 - 303d
-  Category 4C
-  Category 4B
-  Category 4A
-  Category 2
-  Category 1

Image courtesy of USGS Earthstar Geographics SIO © 2017 Microsoft Corporation © 2017 HERE © AND

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Home

Water Quality & Supply

Waste & Toxics

Air & Climate

Cleanup & Spills

## Water Quality Improvement Projects (TMDLs)

### WATER QUALITY IMPROVEMENT PROJECTS (TMDLs)

Overview of the process

Project Catalog

by **WRIA**  
by **County**

Funding Opportunities

Project Development  
Priority Lists

Related Information

TMDL Contacts

### RELATED ECOLOGY PROGRAMS

Water Quality

[Water Quality Improvement](#) > [Water Quality Improvement Projects by WRIA](#) > WRIA 39: Upper Yakima

### WRIA 39: Upper Yakima

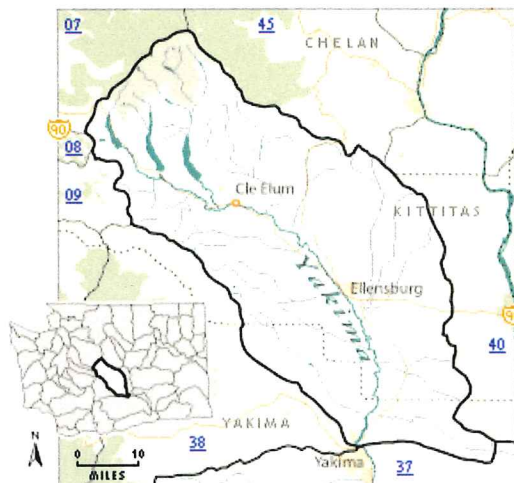
The following table lists overview information and links to specific water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area (WRIA). Please use links (where available) for more information on a project.

#### Yakima River basin project index:

[www.ecy.wa.gov/programs/wq/tmdl/yakima\\_wq/index.html](http://www.ecy.wa.gov/programs/wq/tmdl/yakima_wq/index.html)

#### Counties

- [Kittitas](#)
- [Yakima](#)



Project Name	Pollutants	Status**	TMDL Lead
<a href="#">Crystal Creek</a>	Ammonia-N BOD (5-day) Chlorine Fecal Coliform	EPA approved	<a href="#">Jane Creech</a> 509-454-7860
<a href="#">Selah Ditch</a>	Fecal Coliform Temperature	EPA approved	<a href="#">Greg Bohn</a> 509-454-4174
<a href="#">Teanaway River</a> segments: <ul style="list-style-type: none"> <li>• Upper West Fork Teanaway River</li> <li>• Upper Middle Fork Teanaway River</li> <li>• Upper North Fork Teanaway River</li> <li>• Stafford Creek</li> <li>• Lower West Fork Teanaway River</li> <li>• Lower Middle Fork Teanaway River</li> <li>• Lower North Fork Teanaway River</li> <li>• Mainstem Teanaway River</li> </ul>	Temperature	EPA approved	<a href="#">Jane Creech</a> 509-454-7860
<a href="#">Wilson/Cooke Creek</a> Tributaries: <ul style="list-style-type: none"> <li>• Badger Creek</li> <li>• Bull Ditch</li> <li>• Caribou Creek</li> <li>• Cherry Creek</li> <li>• CID Canal</li> <li>• Coleman Creek</li> <li>• Cook Creek</li> <li>• EWC Canal</li> <li>• Johnson Drain</li> <li>• KRD Canal</li> </ul>	Fecal Coliform	EPA approved Has an implementation plan Post-TMDL monitoring report	<a href="#">Jane Creech</a> 509-454-7860 <a href="#">Greg Bohn</a> 509-454-4174

<div> Mercer Creek <ul style="list-style-type: none"> <li>Naneum Creek</li> <li>Parke Creek</li> <li>Whiskey Creek</li> <li>Wilson Creek</li> <li>Wipple Wasteway</li> </ul> </div>			
<a href="#">Yakima River, Upper</a>	<div> Dieldrin DDT Suspended Sediments Turbidity </div>	EPA approved	<a href="#">Jane Creech</a> 509-454-7860
	<div> Temperature </div>	EPA approved Has an implementation plan	<a href="#">Jane Creech</a> 509-454-7860
<a href="#">Yakima River</a>	Toxics	Under development	<a href="#">Jane Creech</a> 509-454-7860

**\*\* Status** will be listed as one of the following: *Approved by EPA, Under Development or Implementation. No status means project work has not yet started.*

- For more information about WRIA 39:**
- [Waterbodies in WRIA 39](#) - using the Water Quality Assessment Query Tool
  - [Watershed Information for WRIA 39](#)

\* The Department of Ecology and other state resource agencies frequently use a system of 62 "Water Resource Inventory Areas" or "WRIAs" to refer to the state's major watershed basins.

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Wetland name or number Two2

## RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): Two2 Date of site visit: 4/4/17  
 Rated by N. Evan Dulich Trained by Ecology? ☒ Yes ☐ No Date of training 3/24/17  
 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 II (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  
☐ 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 <u>(M)</u> L	H <u>(M)</u> L	H M <u>(L)</u>	
Landscape Potential	H <u>(M)</u> L	H <u>(M)</u> L	H <u>(M)</u> L	
Value	H <u>(M)</u> L	<u>(H)</u> M L	<u>(H)</u> M L	TOTAL
Score Based on Ratings	<u>6</u>	<u>7</u>	<u>6</u>	<u>19</u>

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	<input checked="" type="checkbox"/>



Wetland name or number Th02

## 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 ( <i>can be added to map of hydroperiods</i> )	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland ( <i>can be added to another figure</i> )	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	1
Hydroperiods	H 1.2, H 1.3	1
Ponded depressions	R 1.1	1
Boundary of area within 150 ft of the wetland ( <i>can be added to another figure</i> )	R 2.4	1
Map of the contributing basin	R 2.2, R 2.3, R 5.2	2
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	1
Width of wetland vs. width of stream ( <i>can be added to another figure</i> )	R 4.1	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	3
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	4
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	5

## 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 ( <i>can be added to another figure</i> )	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 <b>dense</b> trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of <b>dense, rigid</b> trees, shrubs, and herbaceous plants ( <i>can be added to figure above</i> )	S 4.1	
Boundary of area within 150 ft of the wetland ( <i>can be added to another figure</i> )	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	



## HGM Classification of Wetland in Eastern Washington

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

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

1. Does the entire unit **meet both** of the following criteria?

☐ The vegetated part of the wetland is on the water side of the Ordinary High Water Mark of a body of permanent open water (without any plants on the surface) that is at least 20 ac (8 ha) in size  
☐ At least 30% of the open water area is deeper than 10 ft (3 m)

NO - go to 2

YES - The wetland class is **Lake Fringe** (Lacustrine Fringe)

2. Does the entire wetland unit **meet all** of the following criteria?

☒ The wetland is on a slope (*slope can be very gradual*),  
☒ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks;  
☐ The water leaves the wetland **without being impounded**.

NO - go to 3

YES - The wetland class is **Slope**

**NOTE:** Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).

3. Does the entire wetland unit **meet all** of the following criteria?

☒ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river;  
☒ The overbank flooding occurs at least once every 10 years.

NO - go to 4

YES - The wetland class is Riverine

**NOTE:** The Riverine wetland can contain depressions that are filled with water when the river is not flooding.

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

NO - go to 5

YES - The wetland class is **Depressional**

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

Wetland name or number Two2

**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 Two2

RIVERINE WETLANDS		Points (only 1 score per box)
<b>Water Quality Functions - Indicators that the site functions to improve water quality</b>		
R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depression's within the Riverine wetland that can trap sediments during a flooding event:		
Depressions cover $> \frac{1}{3}$ area of wetland	points = 6	6
Depressions cover $> \frac{1}{10}$ area of wetland	points = 3	
Depressions present but cover $< \frac{1}{10}$ area of wetland	points = 1	
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with $>90\%$ cover at person height; not Cowardin classes):		
Forest or shrub $> \frac{2}{3}$ the area of the wetland	points = 10	0
Forest or shrub $\frac{1}{3} - \frac{2}{3}$ area of the wetland	points = 5	
Ungrazed, herbaceous plants $> \frac{2}{3}$ area of wetland	points = 5	
Ungrazed herbaceous plants $\frac{1}{3} - \frac{2}{3}$ area of wetland	points = 2	
Forest, shrub, and ungrazed herbaceous $< \frac{1}{3}$ area of wetland	points = 0	
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	1
R 2.4. Is $> 10\%$ of the area within 150 ft of wetland in land uses that generate pollutants	(Yes = 1) No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1-R 2.4? Source _____	Yes = 1 (No = 0)	0
Total for R 2	Add the points in the boxes above	2

**Rating of Landscape Potential** If score is: 3-6 = H ✓1 or 2 = M 0 = L

Record the rating on the first page

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	(Yes = 1) No = 0	1
R 3.2. Does the river or stream have TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 (No = 0)	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	1

**Rating of Value** If score is: 2-4 = H ✓1 = M 0 = L

Record the rating on the first page

Wetland name or number TW02

RIVERINE WETLANDS		Points (only 1 score per box)
<b>Hydrologic Functions</b> - Indicators that site functions to reduce flooding and stream erosion		
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: <i>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).</i> If the ratio is more than 2 If the ratio is 1-2 If the ratio is $\frac{1}{2}$ -<1 If the ratio is $\frac{1}{4}$ -< $\frac{1}{2}$ If the ratio is < $\frac{1}{4}$	points = 10 points = 8 points = 4 points = 2 points = 1	4
R 4.2. Characteristics of plants that slow down water velocities during floods: <i>Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have &gt; 90% cover at person height. These are NOT Cowardin classes).</i> Forest or shrub for more than $\frac{2}{3}$ the area of the wetland Forest or shrub for $>\frac{1}{3}$ area OR emergent plants $>\frac{2}{3}$ area Forest or shrub for $>\frac{1}{10}$ area OR emergent plants $>\frac{1}{3}$ area Plants do not meet above criteria	points = 6 points = 4 points = 2 points = 0	4
Total for R 5		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		2

**Rating of Landscape Potential** If score is: 3 = H 1 or 2 = M 0 = L

Record the rating on the first page




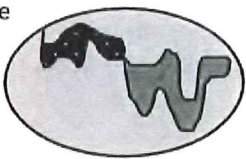

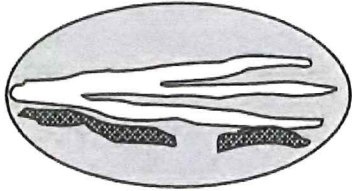
R 6.0. Are the hydrologic functions provided by the site valuable to society?		
R 6.1. Distance to the nearest areas downstream that have flooding problems? <i>Choose the description that best fits the site.</i> The sub-basin immediately down-gradient of site has surface flooding problems that result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

**Rating of Value** If score is: 2-4 = H 1 = M 0 = L

Record the rating on the first page



Wetland name or number Two2

These questions apply to wetlands of all HGM classes.		(only 1 score per box)
HABITAT FUNCTIONS - Indicators that site functions to provide important habitat		
H 1.0. Does the wetland have the potential to provide habitat for many species?		
<p>H 1.1. Structure of the plant community:</p> <p>Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is <math>\geq \frac{1}{4}</math> ac or <math>\geq 10\%</math> of the wetland if wetland is <math>&lt; 2.5</math> ac.</p> <p><input type="checkbox"/> Aquatic bed</p> <p><input checked="" type="checkbox"/> Emergent plants 0-12 in (0-30 cm) high are the highest layer and have <math>&gt; 30\%</math> cover</p> <p><input type="checkbox"/> Emergent plants <math>&gt; 12-40</math> in (<math>&gt; 30-100</math> cm) high are the highest layer with <math>&gt; 30\%</math> cover</p> <p><input type="checkbox"/> Emergent plants <math>&gt; 40</math> in (<math>&gt; 100</math> cm) high are the highest layer with <math>&gt; 30\%</math> cover <i>&lt; 10% of wetland</i></p> <p><input type="checkbox"/> Scrub-shrub (areas where shrubs have <math>&gt; 30\%</math> cover) <i>&lt; 10% of wetland</i></p> <p><input type="checkbox"/> Forested (areas where trees have <math>&gt; 30\%</math> cover)</p> <p>4 or more checks: points = 3 3 checks: points = 2 2 checks: points = 1 1 check: points = 0</p>	0	
H 1.2. Is one of the vegetation types Aquatic Bed?	Yes = 1 No = 0	0
H 1.3. Surface water		
<p>H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least <math>\frac{1}{4}</math> 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 &amp; go to H 1.4 No = go to H 1.3.2</p> <p>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 <math>\frac{1}{4}</math> ac or 10% of its area? Answer yes only if H 1.3.1 is No. Yes = 3 No = 0</p>		0
H 1.4. Richness of plant species		
<p>Count the number of plant species in the wetland that cover at least <math>10 \text{ ft}^2</math>. Different 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)</p> <p># of species <u>          </u></p> <p>Scoring: <math>&gt; 9</math> species: points = 2 4-9 species: points = 1 <math>&lt; 4</math> species: points = 0</p>		0
<p>H 1.5. Interspersion of habitats</p> <p>Decide from the diagrams below whether interspersions among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none.</p> <p>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.</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>None = 0 points</p> </div> <div style="text-align: center;">  <p>Low = 1 point</p> </div> <div style="text-align: center;">  <p>Moderate = 2 points</p> </div> </div> <p>All three diagrams in this row are High = 3 points</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;">    </div> <p>Riparian braided channels with 2 classes</p>		<p>Figure__</p> <p>1</p>



Wetland name or number Two2

<b>H 1.6. Special habitat features</b> Check the habitat features that are present in the wetland. The number of checks is the number of points. <input checked="" type="checkbox"/> Loose rocks larger than 4 in OR large, downed, woody debris (> 4 in diameter) within the area of surface ponding or in stream. <input checked="" type="checkbox"/> Cattails or bulrushes are present within the wetland. <input type="checkbox"/> Standing snags (diameter at the bottom > 4 in) in the wetland or within 30 m (100 ft) of the edge. <input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <input type="checkbox"/> 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 <input checked="" type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (canopy, sub-canopy, shrubs, herbaceous, moss/ground cover)		3
Total for H 1	Add the points in the boxes above	4

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

<b>H 2.0. Does the landscape have the potential to support habitat functions of the site?</b>		
<b>H 2.1. Accessible habitat (only area of habitat abutting wetland). If total accessible habitat is:</b> Calculate: % undisturbed habitat <u>16</u> + [(% moderate and low intensity land uses)/2] <u>7</u> = <u>23</u> % > 1/3 (33.3%) of 1 km Polygon <u>undisturbed: 158 ac ~ 16%</u> <u>mid-intensity: 131 ac ~ 14%</u> points = 3 <input checked="" type="checkbox"/> 20-33% of 1km Polygon <u>1 km Poly: 960 ac</u> <u>460</u> points = 2 <input type="checkbox"/> 10-19% of 1km Polygon points = 1 <input type="checkbox"/> <10% of 1km Polygon points = 0		2
<b>H 2.2. Undisturbed habitat in 1 km Polygon around wetland.</b> Calculate: % undisturbed habitat <u>16</u> + [(% moderate and low intensity land uses)/2] <u>14</u> = <u>30</u> % Undisturbed habitat > 50% of Polygon points = 3 <input checked="" type="checkbox"/> Undisturbed habitat 10 - 50% and in 1-3 patches <u>mid-intensity: 273 ac ~ 28%</u> points = 2 <input type="checkbox"/> Undisturbed habitat 10 - 50% and > 3 patches <u>960</u> <u>3 patches</u> points = 1 <input type="checkbox"/> Undisturbed habitat < 10% of Polygon points = 0		2
<b>H 2.3. Land use intensity in 1 km Polygon:</b> <input checked="" type="checkbox"/> > 50% of Polygon is high intensity land use <u>529</u> <u>960 = 55%</u> points = (-2) <input type="checkbox"/> Does not meet criterion above points = 0		-2
<b>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</b> Yes = 3 (No = 0)		0
Total for H 2	Add the points in the boxes above	2

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

<b>H 3.0. Is the habitat provided by the site valuable to society?</b>		
<b>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</b> Site meets ANY of the following criteria: points = 2 <input checked="" type="checkbox"/> It has 3 or more priority habitats within 100 m (see Appendix B) <input type="checkbox"/> It provides habitat for Threatened or Endangered species (any plant or animal on state or federal lists) <input type="checkbox"/> It is mapped as a location for an individual WDFW species <input type="checkbox"/> It is a Wetland of High Conservation Value as determined by the Department of Natural Resources <input type="checkbox"/> 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

## 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.

Wetland Rating System for Eastern WA: 2014 Update

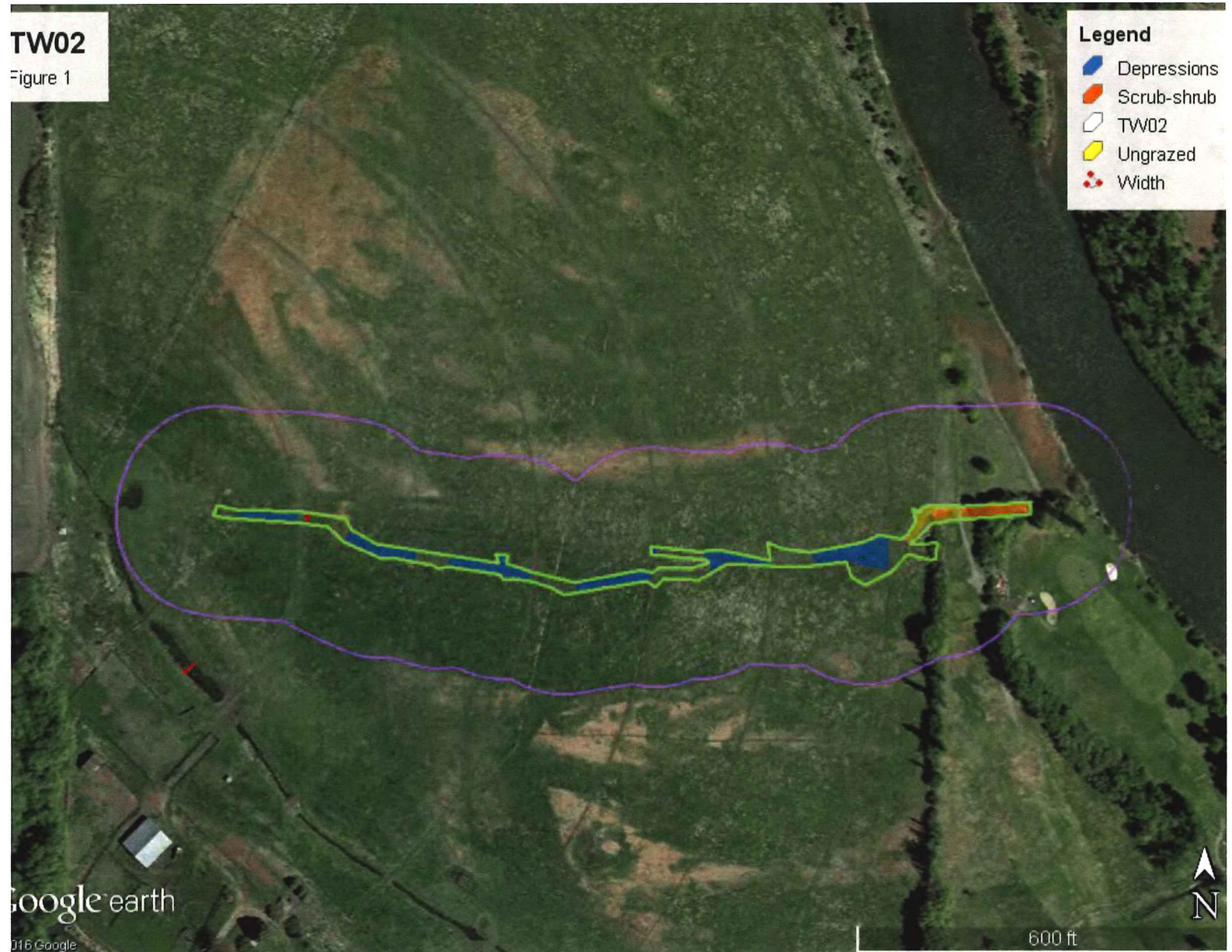
Effective January 1, 2015

Appendix B



TW02

Figure 1





**TW02**  
Figure 2

**Legend**

- Contributing Basin
- TW02





TW02

Figure 3

**Legend**

- Mid-intensity
- TW02
- Undisturbed



April 25, 2017

TW02 - Figure 4



Image courtesy of USGS Earthstar Geographics SIO © 2017 Microsoft Corporation © 2010 NAVTEQ © AND

Miles  
0 0.125 0.25 0.5

#### Assessed Waters/Sediment

##### Water

-  Category 5 - 303d
-  Category 4C
-  Category 4B
-  Category 4A
-  Category 2
-  Category 1

##### Sediment

-  Category 5 - 303d
-  Category 4C
-  Category 4B
-  Category 4A
-  Category 2
-  Category 1





Home

Water Quality & Supply

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## Water Quality Improvement Projects (TMDLs)

### WATER QUALITY IMPROVEMENT PROJECTS (TMDLs)

Overview of the process

Project Catalog

by **WRIA**  
by **County**

Funding Opportunities

Project Development  
Priority Lists

Related Information

TMDL Contacts

### RELATED ECOLOGY PROGRAMS

Water Quality

[Water Quality Improvement](#) > [Water Quality Improvement Projects by WRIA](#) > WRIA 39: Upper Yakima

### WRIA 39: Upper Yakima

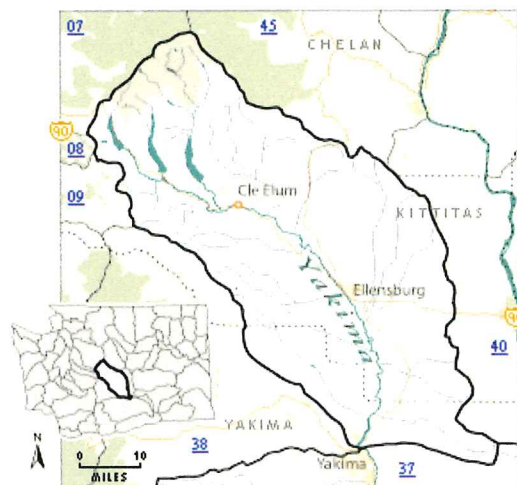
The following table lists overview information and links to specific water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area ([WRIA](#)). Please use links (where available) for more information on a project.

#### Yakima River basin project index:

[www.ecy.wa.gov/programs/wq/tmdl/yakima\\_wq/index.html](http://www.ecy.wa.gov/programs/wq/tmdl/yakima_wq/index.html)

#### Counties

- [Kittitas](#)
- [Yakima](#)



Project Name	Pollutants	Status**	TMDL Lead
<a href="#">Crystal Creek</a>	Ammonia-N BOD (5-day) Chlorine Fecal Coliform	EPA approved	<a href="#">Jane Creech</a> 509-454-7860
<a href="#">Selah Ditch</a>	Fecal Coliform Temperature	EPA approved	<a href="#">Greg Bohn</a> 509-454-4174
<a href="#">Teanaway River</a> segments: <ul style="list-style-type: none"> <li>• Upper West Fork Teanaway River</li> <li>• Upper Middle Fork Teanaway River</li> <li>• Upper North Fork Teanaway River</li> <li>• Stafford Creek</li> <li>• Lower West Fork Teanaway River</li> <li>• Lower Middle Fork Teanaway River</li> <li>• Lower North Fork Teanaway River</li> <li>• Mainstem Teanaway River</li> </ul>	Temperature	EPA approved	<a href="#">Jane Creech</a> 509-454-7860
<a href="#">Wilson/Cooke Creek</a> Tributaries: <ul style="list-style-type: none"> <li>• Badger Creek</li> <li>• Bull Ditch</li> <li>• Caribou Creek</li> <li>• Cherry Creek</li> <li>• CID Canal</li> <li>• Coleman Creek</li> <li>• Cook Creek</li> <li>• EWC Canal</li> <li>• Johnson Drain</li> <li>• KRD Canal</li> </ul>	Fecal Coliform	EPA approved Has an implementation plan Post-TMDL monitoring report	<a href="#">Jane Creech</a> 509-454-7860 <a href="#">Greg Bohn</a> 509-454-4174

<div> Mercer Creek <ul style="list-style-type: none"> <li>Naneum Creek</li> <li>Parke Creek</li> <li>Whiskey Creek</li> <li>Wilson Creek</li> <li>Wipple Wasteway</li> </ul> </div>			
<a href="#">Yakima River, Upper</a>	<div> Dieldrin DDT Suspended Sediments Turbidity </div>	EPA approved	<a href="#">Jane Creech</a> 509-454-7860
	<div> Temperature </div>	EPA approved Has an implementation plan	<a href="#">Jane Creech</a> 509-454-7860
<a href="#">Yakima River</a>	Toxics	Under development	<a href="#">Jane Creech</a> 509-454-7860

**\*\* Status** will be listed as one of the following: *Approved by EPA, Under Development or Implementation. No status means project work has not yet started.*

- For more information about WRIA 39:**
- [Waterbodies in WRIA 39](#) - using the Water Quality Assessment Query Tool
  - [Watershed Information for WRIA 39](#)

\* The Department of Ecology and other state resource agencies frequently use a system of 62 "Water Resource Inventory Areas" or "WRIAs" to refer to the state's major watershed basins.

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last updated December 2016

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Wetland name or number TW03

## RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): TW03 Date of site visit: 4/4/17  
 Rated by N. Evan Dulin Trained by Ecology? ☒ Yes ☐ No Date of training 3/21/17  
 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 II (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  
☐ 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 <u>M</u> L	<u>H</u> M L	H <u>M</u> L	
Landscape Potential	H <u>M</u> L	H <u>M</u> L	H <u>M</u> L	
Value	H <u>M</u> L	<u>H</u> M L	H <u>M</u> L	TOTAL
Score Based on Ratings	6	8	6	20

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

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

### 2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY Circle the appropriate category
Vernal Pools	<input checked="" type="checkbox"/> II <input type="checkbox"/> III
Alkali	<input type="checkbox"/> I
Wetland of High Conservation Value	<input type="checkbox"/> I
Bog and Calcareous Fens	<input type="checkbox"/> I
Old Growth or Mature Forest – slow growing	<input type="checkbox"/> I
Aspen Forest	<input type="checkbox"/> I
Old Growth or Mature Forest – fast growing	<input type="checkbox"/> II
Floodplain forest	<input type="checkbox"/> II
None of the above	<input checked="" type="checkbox"/>



Wetland name or number TW03

## 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 ( <i>can be added to map of hydroperiods</i> )	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland ( <i>can be added to another figure</i> )	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	1
Hydroperiods	H 1.2, H 1.3	1
Ponded depressions	R 1.1	1
Boundary of area within 150 ft of the wetland ( <i>can be added to another figure</i> )	R 2.4	1
Map of the contributing basin	R 2.2, R 2.3, R 5.2	2
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	1
Width of wetland vs. width of stream ( <i>can be added to another figure</i> )	R 4.1	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	3
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	4
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	5

## 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 ( <i>can be added to another figure</i> )	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 <b>dense</b> trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of <b>dense, rigid</b> trees, shrubs, and herbaceous plants ( <i>can be added to figure above</i> )	S 4.1	
Boundary of area within 150 ft of the wetland ( <i>can be added to another figure</i> )	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	



## HGM Classification of Wetland in Eastern Washington

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

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

1. Does the entire unit **meet both** of the following criteria?

☐ The vegetated part of the wetland is on the water side of the Ordinary High Water Mark of a body of permanent open water (without any plants on the surface) that is at least 20 ac (8 ha) in size  
☐ At least 30% of the open water area is deeper than 10 ft (3 m)

NO - go to 2

YES - The wetland class is **Lake Fringe** (Lacustrine Fringe)

2. Does the entire wetland unit **meet all** of the following criteria?

☐ The wetland is on a slope (*slope can be very gradual*),  
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks;  
☐ The water leaves the wetland **without being impounded**.

NO - go to 3

YES - The wetland class is **Slope**

**NOTE:** Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).

3. Does the entire wetland unit **meet all** of the following criteria?

☒ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river;  
☒ The overbank flooding occurs at least once every 10 years.

NO - go to 4

YES - The wetland class is **Riverine**

**NOTE:** The Riverine wetland can contain depressions that are filled with water when the river is not flooding.

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

NO - go to 5

YES - The wetland class is **Depressional**

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

Wetland name or number Two3

**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 TW02

RIVERINE WETLANDS		Points (only 1 score per box)
<b>Water Quality Functions</b> - Indicators that the site functions to improve water quality		
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 $> \frac{1}{3}$ area of wetland	points = 6	6
Depressions cover $> \frac{1}{10}$ area of wetland	points = 3	
Depressions present but cover $< \frac{1}{10}$ area of wetland	points = 1	
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with $> 90\%$ cover at person height; not Cowardin classes):		
Forest or shrub $> \frac{2}{3}$ the area of the wetland	points = 10	2
Forest or shrub $\frac{1}{3} - \frac{2}{3}$ area of the wetland	points = 5	
Ungrazed, herbaceous plants $> \frac{2}{3}$ area of wetland	points = 5	
Ungrazed herbaceous plants $\frac{1}{3} - \frac{2}{3}$ area of wetland	points = 2	
Forest, shrub, and ungrazed herbaceous $< \frac{1}{3}$ area of wetland	points = 0	
Total for R 1	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 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	1
R 2.4. Is $> 10\%$ of the area within 150 ft of wetland in land uses that generate pollutants	(Yes = 1) No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions		0
R 2.1-R 2.4? Source _____	Yes = 1 (No = 0)	0
Total for R 2	Add the points in the boxes above	2

**Rating of Landscape Potential** If score is: 3-6 = H 1 or 2 = M 0 = L

Record the rating on the first page

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	(Yes = 1) No = 0	1
R 3.2. Does the river or stream have TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 (No = 0)	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	1

**Rating of Value** If score is: 2-4 = H 1 = M 0 = L

Record the rating on the first page

Wetland name or number TW03

RIVERINE WETLANDS		Points (only 1 score per box)
<b>Hydrologic Functions</b> - Indicators that site functions to reduce flooding and stream erosion		
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: <i>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).</i> — If the ratio is more than 2 points = 10 If the ratio is 1-2 points = 8 If the ratio is $\frac{1}{2}$ -<1 points = 4 If the ratio is $\frac{1}{4}$ -< $\frac{1}{2}$ points = 2 If the ratio is < $\frac{1}{4}$ points = 1	<i>50' wetland 8' stream</i>	10
R 4.2. Characteristics of plants that slow down water velocities during floods: <i>Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have &gt; 90% cover at person height. These are NOT Cowardin classes).</i> Forest or shrub for more than $\frac{2}{3}$ the area of the wetland points = 6 Forest or shrub for $>\frac{1}{3}$ area OR emergent plants $>\frac{2}{3}$ area points = 4 — Forest or shrub for $>\frac{1}{10}$ area OR emergent plants $>\frac{1}{3}$ area points = 2 Plants do not meet above criteria points = 0		2
Total for R 5	Add the points in the boxes above	12

**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




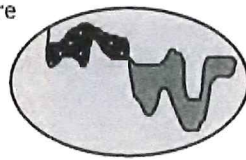

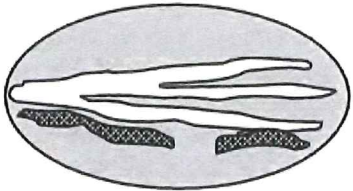
Record the rating on the first page

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? <i>Choose the description that best fits the site.</i> — The sub-basin immediately down-gradient of site has surface flooding problems that result in damage to human or natural resources points = 2 Surface flooding problems are in a basin farther down-gradient points = 1 No flooding problems anywhere downstream points = 0		2
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 (No = 0)		0
Total for R 6	Add the points in the boxes above	2

**Rating of Value** If score is: ☒ 2-4 = H ☐ 1 = M ☐ 0 = L

Record the rating on the first page



These questions apply to wetlands of all HGM classes.		(only 1 score per box)
HABITAT FUNCTIONS - Indicators that site functions to provide important habitat		
H 1.0. Does the wetland have the potential to provide habitat for many species?		
<p>H 1.1. Structure of the plant community:</p> <p>Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is <math>\geq \frac{1}{4}</math> ac or <math>\geq 10\%</math> of the wetland if wetland is <math>&lt; 2.5</math> ac.</p> <p><input checked="" type="checkbox"/> Aquatic bed 0.21 ac</p> <p><input checked="" type="checkbox"/> Emergent plants 0-12 in (0-30 cm) high are the highest layer and have <math>&gt; 30\%</math> cover</p> <p><input checked="" type="checkbox"/> Emergent plants &gt;12-40 in (&gt;30-100 cm) high are the highest layer with <math>&gt; 30\%</math> cover</p> <p><input checked="" type="checkbox"/> Emergent plants &gt; 40 in (&gt; 100 cm) high are the highest layer with <math>&gt; 30\%</math> cover</p> <p><input checked="" type="checkbox"/> Scrub-shrub (areas where shrubs have <math>&gt; 30\%</math> cover) ~14%</p> <p><input type="checkbox"/> Forested (areas where trees have <math>&gt; 30\%</math> cover)</p> <p>4 or more checks: points = 3 3 checks: points = 2 2 checks: points = 1 1 check: points = 0</p>	3	
H 1.2. Is one of the vegetation types Aquatic Bed?	Yes = 1 No = 0	1
H 1.3. Surface water		
<p>H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least <math>\frac{1}{4}</math> 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 &amp; go to H 1.4 No = go to H 1.3.2</p> <p>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 <math>\frac{1}{4}</math> ac or 10% of its area? Answer yes only if H 1.3.1 is No. Yes = 3 No = 0</p>		3
H 1.4. Richness of plant species		
<p>Count the number of plant species in the wetland that cover at least 10 ft<sup>2</sup>. Different 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)</p> <p># of species _____</p> <p>Scoring: <math>&gt; 9</math> species: points = 2 4-9 species: points = 1 <math>&lt; 4</math> species: points = 0</p>		1
H 1.5. Interspersion of habitats		
<p>Decide from the diagrams below whether interspersions among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none.</p> <p>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.</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>None = 0 points</p> </div> <div style="text-align: center;">  <p>Low = 1 point</p> </div> <div style="text-align: center;">  <p>Moderate = 2 points</p> </div> </div> <p>All three diagrams in this row are High = 3 points</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;">    </div> <p style="text-align: right;">Riparian braided channels with 2 classes</p>		Figure 2



Wetland name or number TW03

<b>H 1.6. Special habitat features</b> <i>Check the habitat features that are present in the wetland. The number of checks is the number of points.</i>		
<input checked="" type="checkbox"/> Loose rocks larger than 4 in OR large, downed, woody debris (> 4 in diameter) within the area of surface ponding or in stream. <input checked="" type="checkbox"/> Cattails or bulrushes are present within the wetland. <input type="checkbox"/> Standing snags (diameter at the bottom > 4 in) in the wetland or within 30 m (100 ft) of the edge. <input checked="" type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <input type="checkbox"/> 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 <input type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (canopy, sub-canopy, shrubs, herbaceous, moss/ground cover)		3
Total for H 1	Add the points in the boxes above	13

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

<b>H 2.0. Does the landscape have the potential to support habitat functions of the site?</b>		
<b>H 2.1. Accessible habitat (only area of habitat abutting wetland). If total accessible habitat is:</b> <i>Calculate: % undisturbed habitat</i> <u>15</u> + [(% moderate and low intensity land uses)/2] <u>6.5</u> = <u>21.5</u> % > 1/3 (33.3%) of 1 km Polygon <i>undisturbed</i> <u>176</u> <u>1150 ac</u> = <u>15%</u> <i>mid</i> <u>159</u> <u>1150</u> = <u>13%</u> — 20-33% of 1km Polygon points = 3 10-19% of 1km Polygon points = 2 <10% of 1km Polygon points = 1		2
<b>H 2.2. Undisturbed habitat in 1 km Polygon around wetland.</b> <i>Calculate: % undisturbed habitat</i> <u>15</u> + [(% moderate and low intensity land uses)/2] <u>23.5</u> = <u>38.5</u> % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches <i>mid</i> <u>305</u> <u>1150</u> = <u>27%</u> <u>4 patches</u> points = 2 — Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of Polygon points = 0		1
<b>H 2.3. Land use intensity in 1 km Polygon:</b> — > 50% of Polygon is high intensity land use <u>58%</u> points = (-2) Does not meet criterion above points = 0		-2
<b>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</b> Yes = 3 No = 0		
Total for H 2	Add the points in the boxes above	1

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

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

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

## Appendix B: WDFW Priority Habitats in Eastern Washington

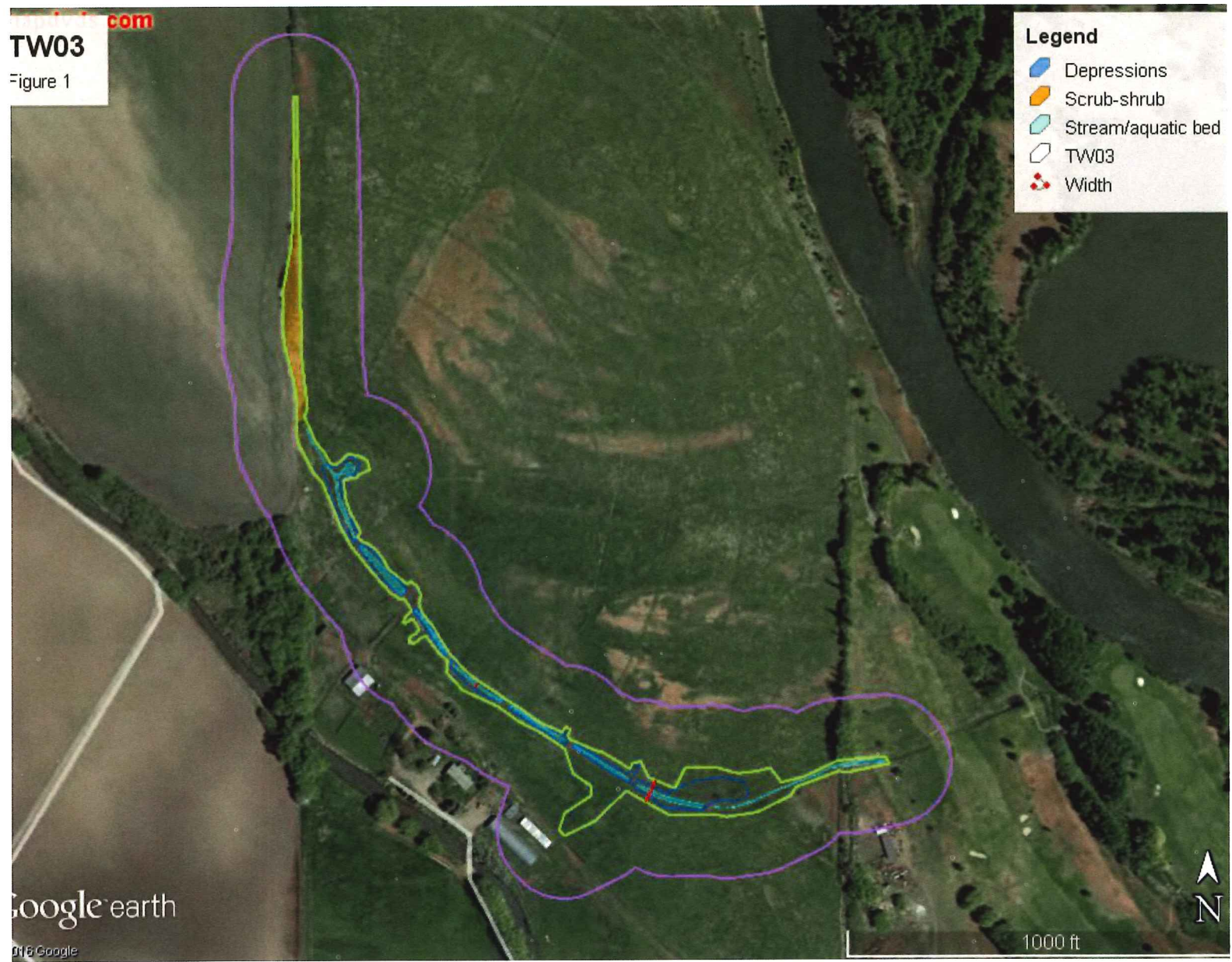
Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf>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















April 25, 2017

TW03 - Figure 4



**Assessed Waters/Sediment**

**Water**

-  Category 5 - 303d
-  Category 4C
-  Category 4B
-  Category 4A
-  Category 2
-  Category 1

**Sediment**



-  Category 5 - 303d
-  Category 4C
-  Category 4B
-  Category 4A
-  Category 2
-  Category 1

Image courtesy of USGS Earthstar Geographics SIO © 2017 Microsoft Corporation © 2010 NAVTEQ © AND

Miles  
0 0.125 0.25 0.5



Home

Water Quality & Supply

Waste & Toxics

Air & Climate

Cleanup & Spills

## Water Quality Improvement Projects (TMDLs)

### WATER QUALITY IMPROVEMENT PROJECTS (TMDLs)

Overview of the process

Project Catalog

by **WRIA**  
by **County**

Funding Opportunities

Project Development  
Priority Lists

Related Information

TMDL Contacts

### RELATED ECOLOGY PROGRAMS

Water Quality

[Water Quality Improvement](#) > [Water Quality Improvement Projects by WRIA](#) > WRIA 39: Upper Yakima

### WRIA 39: Upper Yakima

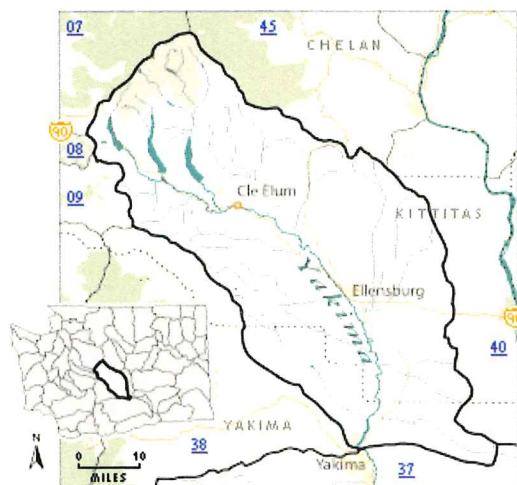
The following table lists overview information and links to specific water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area ([WRIA](#)). Please use links (where available) for more information on a project.

#### Yakima River basin project index:

[www.ecy.wa.gov/programs/wq/tmdl/yakima\\_wq/index.html](http://www.ecy.wa.gov/programs/wq/tmdl/yakima_wq/index.html)

#### Counties

- [Kittitas](#)
- [Yakima](#)



Project Name	Pollutants	Status**	TMDL Lead
<a href="#">Crystal Creek</a>	Ammonia-N BOD (5-day) Chlorine Fecal Coliform	EPA approved	<a href="#">Jane Creech</a> 509-454-7860
<a href="#">Selah Ditch</a>	Fecal Coliform Temperature	EPA approved	<a href="#">Greg Bohn</a> 509-454-4174
<a href="#">Teanaway River</a> segments: <ul style="list-style-type: none"> <li>• Upper West Fork Teanaway River</li> <li>• Upper Middle Fork Teanaway River</li> <li>• Upper North Fork Teanaway River</li> <li>• Stafford Creek</li> <li>• Lower West Fork Teanaway River</li> <li>• Lower Middle Fork Teanaway River</li> <li>• Lower North Fork Teanaway River</li> <li>• Mainstem Teanaway River</li> </ul>	Temperature	EPA approved	<a href="#">Jane Creech</a> 509-454-7860
<a href="#">Wilson/Cooke Creek</a> Tributaries: <ul style="list-style-type: none"> <li>• Badger Creek</li> <li>• Bull Ditch</li> <li>• Caribou Creek</li> <li>• Cherry Creek</li> <li>• CID Canal</li> <li>• Coleman Creek</li> <li>• Cook Creek</li> <li>• EWC Canal</li> <li>• Johnson Drain</li> <li>• KRD Canal</li> </ul>	Fecal Coliform	EPA approved Has an implementation plan Post-TMDL monitoring report	<a href="#">Jane Creech</a> 509-454-7860 <a href="#">Greg Bohn</a> 509-454-4174



<div> <div>Mercer Creek</div> <ul style="list-style-type: none"> <li>Naneum Creek</li> <li>Parke Creek</li> <li>Whiskey Creek</li> <li>Wilson Creek</li> <li>Wipple Wasteway</li> </ul> </div>			
<a href="#">Yakima River, Upper</a>	<div> <div>Dieldrin</div> <div>DDT</div> <div>Suspended Sediments</div> <div>Turbidity</div> </div>	EPA approved	<a href="#">Jane Creech</a> 509-454-7860
	<div> <div>Temperature</div> </div>	EPA approved Has an implementation plan	<a href="#">Jane Creech</a> 509-454-7860
<a href="#">Yakima River</a>	<div> <div>Toxics</div> </div>	Under development	<a href="#">Jane Creech</a> 509-454-7860

**\*\* Status** will be listed as one of the following: *Approved by EPA, Under Development or Implementation. No status means project work has not yet started.*

**For more information about WRIA 39:**

- [Waterbodies in WRIA 39](#) - using the Water Quality Assessment Query Tool
- [Watershed Information for WRIA 39](#)

\* The Department of Ecology and other state resource agencies frequently use a system of 62 "Water Resource Inventory Areas" or "WRIAs" to refer to the state's major watershed basins.

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Wetland name or number TW04

## RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): TW04 Date of site visit: 4/4/17  
 Rated by M. Evan Dula Trained by Ecology? ☒ Yes ☐ No Date of training 3/24/17  
 HGM Class used for rating Depressional 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  
☒ 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 <u>(M)</u> L	<u>(H)</u> M L	H <u>(M)</u> L	
Landscape Potential	H <u>(M)</u> L	H M <u>(L)</u>	H <u>(M)</u> L	
Value	H <u>(M)</u> L	H <u>(M)</u> L	H <u>(M)</u> L	TOTAL
Score Based on Ratings	<u>6</u>	<u>6</u>	<u>6</u>	<u>18</u>

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	<input checked="" type="checkbox"/>



Wetland name or number Two4

## 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	1
Hydroperiods (including area of open water for H 1.3)	D 1.4, H 1.2, H 1.3	1
Location of outlet ( <i>can be added to map of hydroperiods</i> )	D 1.1, D 4.1	1
Boundary of area within 150 ft of the wetland ( <i>can be added to another figure</i> )	D 2.2, D 5.2	1
Map of the contributing basin	D 5.3	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	3
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	4
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	D 3.3	5

## 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 ( <i>can be added to another figure</i> )	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 ( <i>can be added to another figure</i> )	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 ( <i>can be added to another figure</i> )	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 <b>dense</b> trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of <b>dense, rigid</b> trees, shrubs, and herbaceous plants ( <i>can be added to figure above</i> )	S 4.1	
Boundary of area within 150 ft of the wetland ( <i>can be added to another figure</i> )	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	



## 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*

**NO - go to 4**

**YES - The wetland class is Riverine**

**NOTE:** The Riverine wetland can contain depressions that are filled with water when the river is not flooding.

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

**NO - go to 5**

**YES - The wetland class is Depressional**

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



Wetland name or number Two4

**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 Two

<b>DEPRESSIONAL WETLANDS</b>		Points (only 1 score per box)
<b>Water Quality Functions - Indicators that the site functions to improve water quality</b>		
<b>D 1.0. Does the site have the potential to improve water quality?</b>		
<b>D 1.1. Characteristics of surface water outflows from the wetland:</b> — Wetland has no surface water outlet — Wetland has an intermittently flowing outlet — Wetland has a highly constricted permanently flowing outlet — Wetland has a permanently flowing, unconfined, surface outlet	points = 5 points = 3 points = 3 points = 1	5
<b>D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (use NRCS definitions of soils)</b> YES = 3 (NO = 0)		0
<b>D 1.3. Characteristics of persistent vegetation (Emergent, Scrub-shrub, and/or Forested Cowardin classes)</b> — Wetland has persistent, ungrazed, vegetation for $> \frac{2}{3}$ of area — Wetland has persistent, ungrazed, vegetation from $\frac{1}{3}$ to $\frac{2}{3}$ of area — Wetland has persistent, ungrazed vegetation from $\frac{1}{10}$ to $< \frac{1}{3}$ of area — Wetland has persistent, ungrazed vegetation $< \frac{1}{10}$ of area	points = 5 points = 3 points = 1 points = 0	1
<b>D 1.4. Characteristics of seasonal ponding or inundation:</b> <i>This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.</i> — Area seasonally ponded is $> \frac{1}{2}$ total area of wetland — Area seasonally ponded is $\frac{1}{4}$ - $\frac{1}{2}$ total area of wetland — Area seasonally ponded is $< \frac{1}{4}$ total area of wetland	points = 3 points = 1 points = 0	1
<b>Total for D 1</b>	<b>Add the points in the boxes above</b>	7

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

<b>D 2.0. Does the landscape have the potential to support the water quality function of the site?</b>		
<b>D 2.1. Does the wetland receive stormwater discharges?</b>	Yes = 1 (No = 0)	0
<b>D 2.2. Is <math>&gt; 10\%</math> of the area within 150 ft of the wetland in land uses that generate pollutants?</b>	(Yes = 1) No = 0	1
<b>D 2.3. Are there septic systems within 250 ft of the wetland?</b>	(Yes = 1) No = 0	1
<b>D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1- D 2.3? Source</b>	Yes = 1 (No = 0)	0
<b>Total for D 2</b>	<b>Add the points in the boxes above</b>	2

**Rating of Landscape Potential** If score is: 3 or 4 = H 1 or 2 = M 0 = L Record the rating on the first page

<b>D 3.0. Is the water quality improvement provided by the site valuable to society?</b>		
<b>D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, or lake that is on the 303(d) list?</b>	Yes = 1 (No = 0)	0
<b>D 3.2. Is the wetland in a basin or sub-basin where water quality is an issue in some aquatic resource [303(d) list, eutrophic lakes, problems with nuisance and toxic algae]?</b>	(Yes = 1) No = 0	1
<b>D 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 the wetland is found)?</b>	Yes = 2 (No = 0)	0
<b>Total for D 3</b>	<b>Add the points in the boxes above</b>	1

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



Wetland name or number Two4

<b>DEPRESSIONAL WETLANDS</b>		Points (only 1 score per box)
<b>Hydrologic Functions</b> - Indicators that the site functions to reduce flooding and erosion.		
<b>D 4.0. Does the site have the potential to reduce flooding and erosion?</b>		
<b>D 4.1. Characteristics of surface water outflows from the wetland:</b> <input type="checkbox"/> Wetland has no surface water outlet <input type="checkbox"/> Wetland has an intermittently flowing outlet <input type="checkbox"/> Wetland has a highly constricted permanently flowing outlet <input type="checkbox"/> Wetland has a permanently flowing unconfined surface outlet <i>(If outlet is a ditch and not permanently flowing treat wetland as "intermittently flowing")</i>	points = 8 points = 4 points = 4 points = 0	8
<b>D 4.2. Depth of storage during wet periods:</b> Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or deepest part (if dry). <input type="checkbox"/> Seasonal ponding: > 3 ft above the lowest point in wetland or the surface of permanent ponding <input checked="" type="checkbox"/> Seasonal ponding: 2 ft - < 3 ft above the lowest point in wetland or the surface of permanent ponding <input type="checkbox"/> The wetland is a headwater wetland <input type="checkbox"/> Seasonal ponding: 1 ft - < 2 ft <input type="checkbox"/> Seasonal ponding: 6 in - < 1 ft <input type="checkbox"/> Seasonal ponding: < 6 in or wetland has only saturated soils	points = 8 points = 6 points = 4 points = 4 points = 2 points = 0	6
Total for D 4		14

**Rating of Site Potential** If score is: 12-16 = H 6-11 = M 0-5 = L

Record the rating on the first page

<b>D 5.0. Does the landscape have the potential to support the hydrologic functions of the site?</b>		
<b>D 5.1. Does the wetland receive stormwater discharges?</b>	Yes = 1 (No = 0)	0
<b>D 5.2. Is &gt; 10% of the area within 150 ft of the wetland in a land use that generates runoff?</b>	Yes = 1 (No = 0)	0
<b>D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses?</b>	Yes = 1 (No = 0)	0
Total for D 5		0

**Rating of Landscape Potential** If score is: 3 = H 1 or 2 = M 0 = L

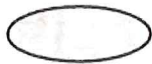


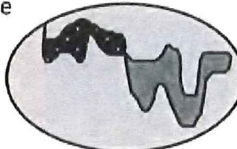

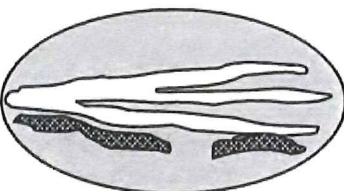
Record the rating on the first page

<b>D 6.0. Are the hydrologic functions provided by the site valuable to society?</b>		
<b>D 6.1. The wetland is in a landscape that has flooding problems.</b> Choose the description that best matches conditions around the wetland being rated. Do not add points. Choose the highest score if more than one condition is met. The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds), AND <input type="checkbox"/> Flooding occurs in sub-basin that is immediately down-gradient of wetland <input checked="" type="checkbox"/> Surface flooding problems are in a sub-basin farther down-gradient The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why _____ There are no problems with flooding downstream of the wetland		points = 2 points = 1 points = 0 points = 0
<b>D 6.2. Has the site has been identified as important for flood storage or flood conveyance in a regional flood control plan?</b>		Yes = 2 (No = 0)
Total for D 6		1

**Rating of Value** If score is: 2-4 = H 1 = M 0 = L

Record the rating on the first page

Wetland name or number Two4

These questions apply to wetlands of all HGM classes.		(only 1 score per box)
HABITAT FUNCTIONS - Indicators that site functions to provide important habitat		
H 1.0. Does the wetland have the potential to provide habitat for many species?		
<p>H 1.1. Structure of the plant community:</p> <p>Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is <math>\geq \frac{1}{4}</math> ac or <math>\geq 10\%</math> of the wetland if wetland is <math>&lt; 2.5</math> ac.</p> <p><input checked="" type="checkbox"/> Aquatic bed <u>12%</u></p> <p><input checked="" type="checkbox"/> Emergent plants 0-12 in (0-30 cm) high are the highest layer and have <math>&gt; 30\%</math> cover</p> <p><input type="checkbox"/> Emergent plants <math>&gt; 12-40</math> in (<math>&gt; 30-100</math> cm) high are the highest layer with <math>&gt; 30\%</math> cover</p> <p><input checked="" type="checkbox"/> Emergent plants <math>&gt; 40</math> in (<math>&gt; 100</math> cm) high are the highest layer with <math>&gt; 30\%</math> cover <u>12%</u></p> <p><input type="checkbox"/> Scrub-shrub (areas where shrubs have <math>&gt; 30\%</math> cover) 4 or more checks: points = 3</p> <p><input type="checkbox"/> Forested (areas where trees have <math>&gt; 30\%</math> cover) 3 checks: points = 2</p> <p>2 checks: points = 1</p> <p>1 check: points = 0</p>	2	
H 1.2. Is one of the vegetation types Aquatic Bed?	Yes = 1 No = 0	1
H 1.3. Surface water		
<p>H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least <math>\frac{1}{4}</math> 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 &amp; go to H 1.4 No = go to H 1.3.2</p> <p>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 <math>\frac{1}{4}</math> ac or 10% of its area? Answer yes only if H 1.3.1 is No. Yes = 3 No = 0</p>		3
H 1.4. Richness of plant species		
<p>Count the number of plant species in the wetland that cover at least <math>10 \text{ ft}^2</math>. Different 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)</p> <p># of species <u>3</u></p> <p>Scoring: <math>&gt; 9</math> species: points = 2 4-9 species: points = 1 <math>&lt; 4</math> species: points = 0</p>		0
H 1.5. Interspersion of habitats		
<p>Decide from the diagrams below whether interspersions among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none.</p> <p>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.</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>None = 0 points</p> </div> <div style="text-align: center;">  <p>Low = 1 point</p> </div> <div style="text-align: center;">  <p>Moderate = 2 points</p> </div> </div> <p>All three diagrams in this row are High = 3 points</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;">    </div> <p style="text-align: center;">Riparian braided channels with 2 classes</p>		Figure__  1



Wetland name or number Two 4

<b>H 1.6. Special habitat features</b> <i>Check the habitat features that are present in the wetland. The number of checks is the number of points.</i>		
<input checked="" type="checkbox"/> Loose rocks larger than 4 in OR large, downed, woody debris (> 4 in diameter) within the area of surface ponding or in stream. <input checked="" type="checkbox"/> Cattails or bulrushes are present within the wetland. <input type="checkbox"/> Standing snags (diameter at the bottom > 4 in) in the wetland or within 30 m (100 ft) of the edge. <input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <input type="checkbox"/> 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 <input checked="" type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (canopy, sub-canopy, shrubs, herbaceous, moss/ground cover)		3
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

<b>H 2.0. Does the landscape have the potential to support habitat functions of the site?</b>		
<b>H 2.1. Accessible habitat (only area of habitat abutting wetland). If total accessible habitat is:</b> <i>Calculate: % undisturbed habitat</i> <u>17</u> + [(% moderate and low intensity land uses)/2] <u>9</u> = <u>26</u> % > 1/3 (33.3%) of 1 km Polygon <u>whole</u> <u>mid</u> <u>points = 3</u> — 20-33% of 1km Polygon <u>135</u> <u>139</u> <u>points = 2</u> 10-19% of 1km Polygon <u>765</u> <u>785</u> <u>points = 1</u> <10% of 1km Polygon <u>1700</u> <u>18%</u> <u>points = 0</u>		2
<b>H 2.2. Undisturbed habitat in 1 km Polygon around wetland.</b> <i>Calculate: % undisturbed habitat</i> <u>17</u> + [(% moderate and low intensity land uses)/2] <u>13.5</u> = <u>30.5</u> % Undisturbed habitat > 50% of Polygon <u>mid</u> <u>points = 3</u> — Undisturbed habitat 10 - 50% and in 1-3 patches <u>212</u> <u>27</u> <u>points = 2</u> Undisturbed habitat 10 - 50% and > 3 patches <u>765</u> <u>(3 patches)</u> <u>points = 1</u> Undisturbed habitat < 10% of Polygon <u>points = 0</u>		2
<b>H 2.3. Land use intensity in 1 km Polygon:</b> > 50% of Polygon is high intensity land use <u>56%</u> <u>points = (- 2)</u> Does not meet criterion above <u>points = 0</u>		-2
<b>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</b> Yes = 3 (No = 0)		0
Total for H 2	Add the points in the boxes above	2

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

<b>H 3.0. Is the habitat provided by the site valuable to society?</b>		
<b>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</b> Site meets ANY of the following criteria: <u>points = 2</u> — 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 <input checked="" type="checkbox"/> Site has 1 or 2 priority habitats within 100 m (see Appendix B) <u>points = 1</u> Site does not meet any of the criteria above <u>points = 0</u>		1

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

## 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.*

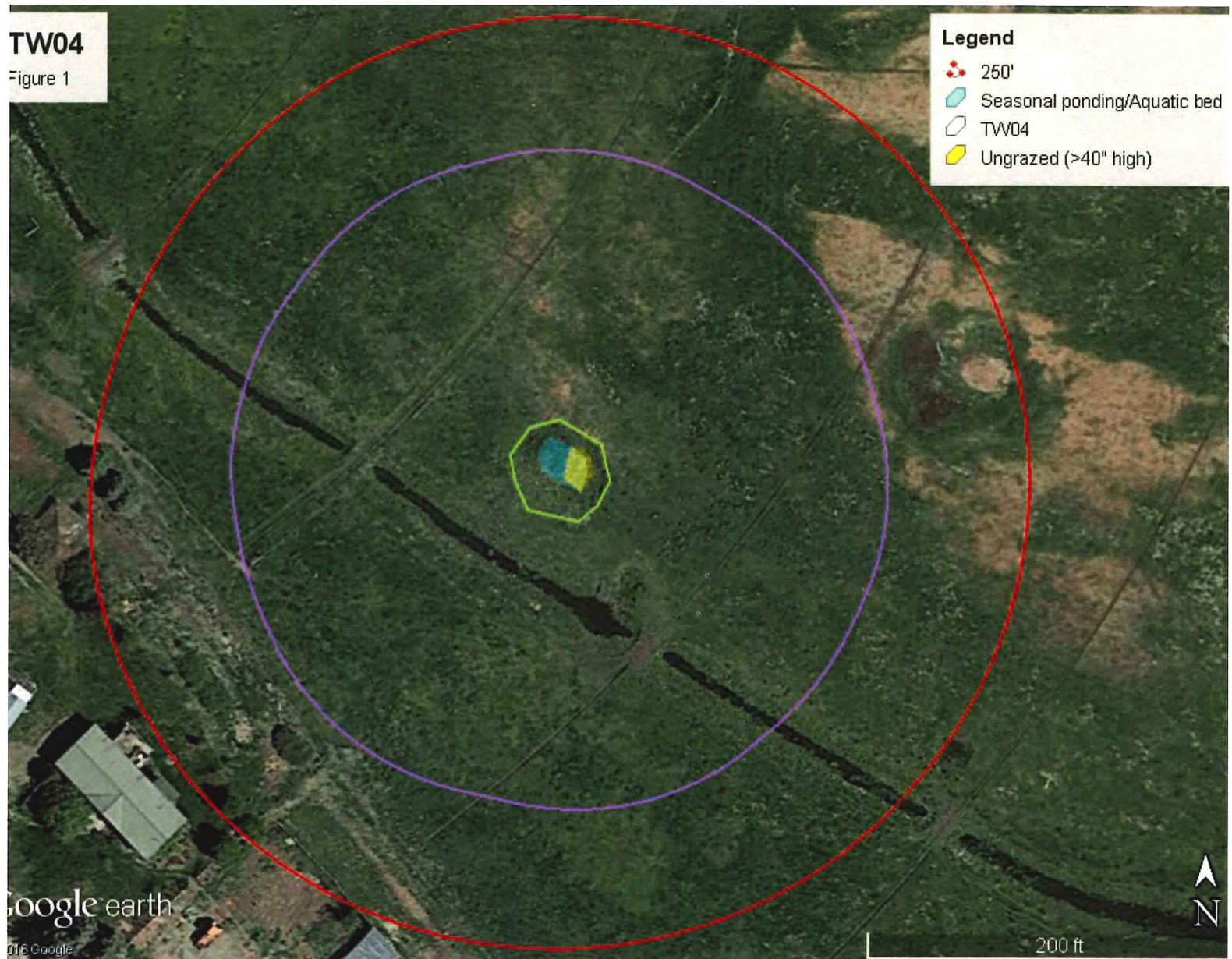
- **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- **Old-growth/Mature forests:** Old-growth east 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.



TW04

Figure 1





TW04

Figure 2

Legend

- Contributing Basin
- TW04



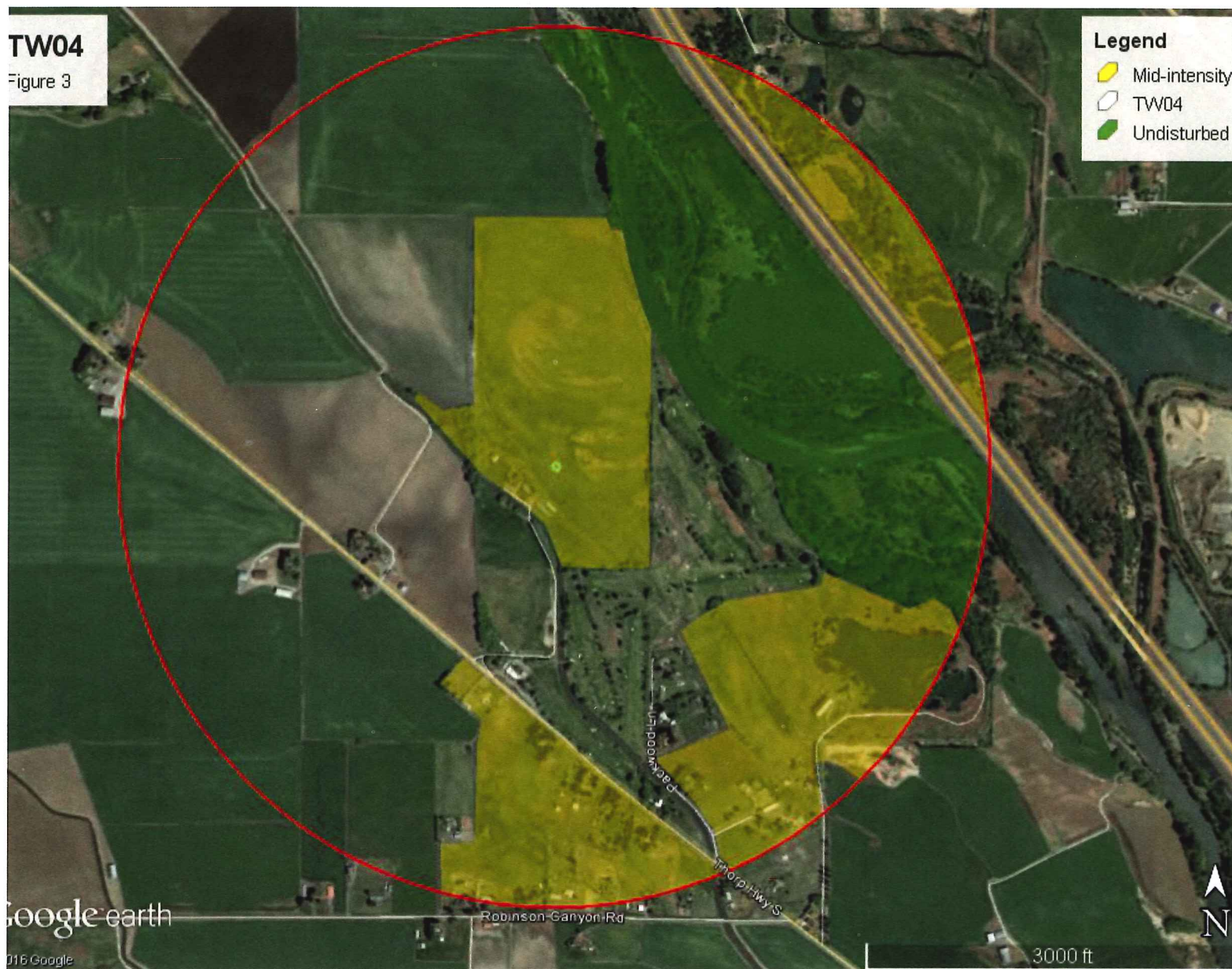


TW04

Figure 3

**Legend**

- Mid-intensity
- TW04
- Undisturbed



April 25, 2017

TW04 - Figure 4




Image courtesy of USGS Earthstar Geographics SIO © 2017 Microsoft Corporation © 2010 NAVTEQ © AND

Miles  
0 0.125 0.25 0.5

**Assessed Waters/Sediment**

Water

-  Category 5 - 303d
-  Category 4C
-  Category 4B
-  Category 4A
-  Category 2
-  Category 1

Sediment

-  Category 5 - 303d
-  Category 4C
-  Category 4B
-  Category 4A
-  Category 2
-  Category 1



## Water Quality Improvement Projects (TMDLs)

### WATER QUALITY IMPROVEMENT PROJECTS (TMDLs)

Overview of the process

Project Catalog

by **WRIA**  
by **County**

Funding Opportunities

Project Development  
Priority Lists

Related Information

TMDL Contacts

### RELATED ECOLOGY PROGRAMS

Water Quality

[Water Quality Improvement](#) > [Water Quality Improvement Projects by WRIA](#) > WRIA 39: Upper Yakima

### WRIA 39: Upper Yakima

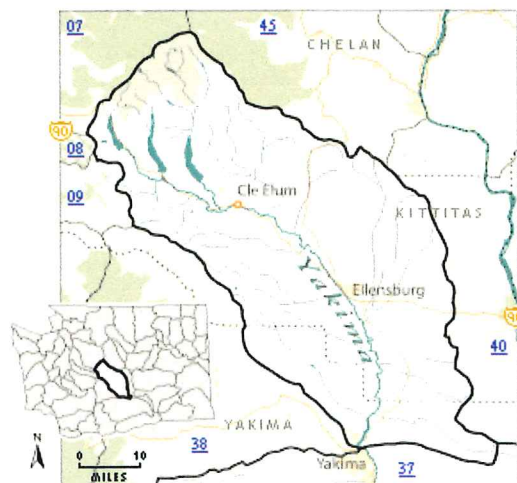
The following table lists overview information and links to specific water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area ([WRIA](#)). Please use links (where available) for more information on a project.

#### Yakima River basin project index:

[www.ecy.wa.gov/programs/wq/tmdl/yakima\\_wq/index.html](http://www.ecy.wa.gov/programs/wq/tmdl/yakima_wq/index.html)

#### Counties

- [Kittitas](#)
- [Yakima](#)



Project Name	Pollutants	Status**	TMDL Lead
<a href="#">Crystal Creek</a>	Ammonia-N BOD (5-day) Chlorine Fecal Coliform	EPA approved	<a href="#">Jane Creech</a> 509-454-7860
<a href="#">Selah Ditch</a>	Fecal Coliform Temperature	EPA approved	<a href="#">Greg Bohn</a> 509-454-4174
<a href="#">Teanaway River</a> segments: <ul style="list-style-type: none"> <li>• Upper West Fork Teanaway River</li> <li>• Upper Middle Fork Teanaway River</li> <li>• Upper North Fork Teanaway River</li> <li>• Stafford Creek</li> <li>• Lower West Fork Teanaway River</li> <li>• Lower Middle Fork Teanaway River</li> <li>• Lower North Fork Teanaway River</li> <li>• Mainstem Teanaway River</li> </ul>	Temperature	EPA approved	<a href="#">Jane Creech</a> 509-454-7860
<a href="#">Wilson/Cooke Creek</a> Tributaries: <ul style="list-style-type: none"> <li>• Badger Creek</li> <li>• Bull Ditch</li> <li>• Caribou Creek</li> <li>• Cherry Creek</li> <li>• CID Canal</li> <li>• Coleman Creek</li> <li>• Cook Creek</li> <li>• EWC Canal</li> <li>• Johnson Drain</li> <li>• KRD Canal</li> </ul>	Fecal Coliform	EPA approved Has an implementation plan Post-TMDL monitoring report	<a href="#">Jane Creech</a> 509-454-7860 <a href="#">Greg Bohn</a> 509-454-4174

<ul style="list-style-type: none"> <li>Mercer Creek</li> <li>Naneum Creek</li> <li>Parke Creek</li> <li>Whiskey Creek</li> <li>Wilson Creek</li> <li>Wipple Wasteway</li> </ul>			
<a href="#">Yakima River, Upper</a>	Dieldrin DDT Suspended Sediments Turbidity	EPA approved	<a href="#">Jane Creech</a> 509-454-7860
	Temperature	EPA approved Has an implementation plan	<a href="#">Jane Creech</a> 509-454-7860
<a href="#">Yakima River</a>	Toxics	Under development	<a href="#">Jane Creech</a> 509-454-7860

**\*\* Status** will be listed as one of the following: *Approved by EPA, Under Development or Implementation. No status means project work has not yet started.*

- For more information about WRIA 39:**
- [Waterbodies in WRIA 39](#) - using the Water Quality Assessment Query Tool
  - [Watershed Information for WRIA 39](#)

\* The Department of Ecology and other state resource agencies frequently use a system of 62 "Water Resource Inventory Areas" or "WRIAs" to refer to the state's major watershed basins.

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Last updated December 2016

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Wetland name or number Twos

## RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): Twos Date of site visit: 4/12/17  
 Rated by N. Evan Daulton Trained by Ecology? ☒ Yes ☐ No Date of training 3/24/17  
 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  
☒ 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	7	4	16

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	<input checked="" type="checkbox"/>

Wetland name or number Two 5

## 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 ( <i>can be added to map of hydroperiods</i> )	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland ( <i>can be added to another figure</i> )	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	1
Hydroperiods	H 1.2, H 1.3	1
Ponded depressions	R 1.1	1
Boundary of area within 150 ft of the wetland ( <i>can be added to another figure</i> )	R 2.4	1
Map of the contributing basin	R 2.2, R 2.3, R 5.2	2
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	1
Width of wetland vs. width of stream ( <i>can be added to another figure</i> )	R 4.1	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	3
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	4
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	5

## 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 ( <i>can be added to another figure</i> )	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 <b>dense</b> trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of <b>dense, rigid</b> trees, shrubs, and herbaceous plants ( <i>can be added to figure above</i> )	S 4.1	
Boundary of area within 150 ft of the wetland ( <i>can be added to another figure</i> )	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	



## HGM Classification of Wetland in Eastern Washington

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

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

1. Does the entire unit **meet both** of the following criteria?

☐ The vegetated part of the wetland is on the water side of the Ordinary High Water Mark of a body of permanent open water (without any plants on the surface) that is at least 20 ac (8 ha) in size  
☐ At least 30% of the open water area is deeper than 10 ft (3 m)

NO - go to 2

YES - The wetland class is **Lake Fringe** (Lacustrine Fringe)

2. Does the entire wetland unit **meet all** of the following criteria?

☐ The wetland is on a slope (*slope can be very gradual*),  
☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks;  
☐ The water leaves the wetland **without being impounded**.

NO - go to 3

YES - The wetland class is **Slope**

**NOTE:** Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).

3. Does the entire wetland unit **meet all** of the following criteria?

☒ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river;  
☒ The overbank flooding occurs at least once every 10 years.

NO - go to 4

YES - The wetland class is **Riverine**

**NOTE:** The Riverine wetland can contain depressions that are filled with water when the river is not flooding.

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

NO - go to 5

YES - The wetland class is **Depressional**

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

Wetland name or number TW05

**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 Two 5

RIVERINE WETLANDS		Points (only 1 score per box)
<b>Water Quality Functions</b> - Indicators that the site functions to improve water quality		
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 $> \frac{1}{3}$ area of wetland	points = 6	6
Depressions cover $> \frac{1}{10}$ area of wetland	points = 3	
Depressions present but cover $< \frac{1}{10}$ area of wetland	points = 1	
No depressions present	points = 0	
R 1.2. Structure of plants in the wetland (areas with $> 90\%$ cover at person height; not Cowardin classes):		
Forest or shrub $> \frac{2}{3}$ the area of the wetland	points = 10	5
Forest or shrub $\frac{1}{3} - \frac{2}{3}$ area of the wetland	points = 5	
Ungrazed, herbaceous plants $> \frac{2}{3}$ area of wetland	points = 5	
Ungrazed herbaceous plants $\frac{1}{3} - \frac{2}{3}$ area of wetland	points = 2	
Forest, shrub, and ungrazed herbaceous $< \frac{1}{3}$ area of wetland	points = 0	
Total for R 1	Add the points in the boxes above	11

**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)	1
R 2.4. Is $> 10\%$ of the area within 150 ft of wetland in land uses that generate pollutants	(Yes = 1) No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1-R 2.4? Source _____	Yes = 1 (No = 0)	0
Total for R 2	Add the points in the boxes above	2

**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?	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 TWDS

<b>RIVERINE WETLANDS</b>		Points (only 1 score per box)
<b>Hydrologic Functions</b> - Indicators that site functions to reduce flooding and stream erosion		
<b>R 4.0. Does the site have the potential to reduce flooding and erosion?</b>		
<b>R 4.1. Characteristics of the overbank storage the wetland provides:</b> <i>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).</i> If the ratio is more than 2 points = 10 If the ratio is 1-2 points = 8 If the ratio is 1/2-1 points = 4 If the ratio is 1/4-1/2 points = 2 If the ratio is < 1/4 points = 1	$\frac{75'}{40'} = 1.9$	8
<b>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 &gt; 90% cover at person height. These are NOT Cowardin classes).</b> 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	66%	4
Total for R 5		12

**Rating of Site Potential** If score is: ☒ 12-16 = H ☐ 6-11 = M ☐ 0-5 = L

Record the rating on the first page

<b>R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?</b>		
R 5.1. Is the stream or river adjacent to the wetland downcut?	(Yes = 0) No = 1	0
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	0
Total for R 5		0

**Rating of Landscape Potential** If score is: ☐ 3 = H ☐ 1 or 2 = M ☒ 0 = L

Record the rating on the first page


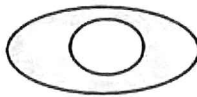

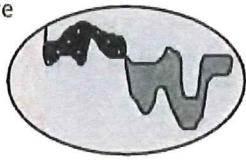
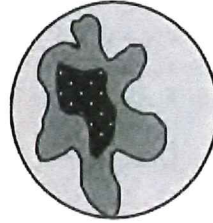
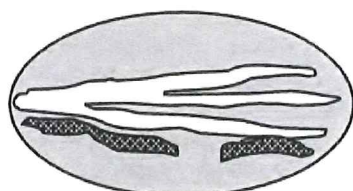
<b>R 6.0. Are the hydrologic functions provided by the site valuable to society?</b>		
<b>R 6.1. Distance to the nearest areas downstream that have flooding problems? Choose the description that best fits the site.</b> The sub-basin immediately down-gradient of site has surface flooding problems that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

**Rating of Value** If score is: ☒ 2-4 = H ☐ 1 = M ☐ 0 = L

Record the rating on the first page



Wetland name or number TW05

These questions apply to wetlands of all HGM classes.		(only 1 score per box)
HABITAT FUNCTIONS - Indicators that site functions to provide important habitat		
H 1.0. Does the wetland have the potential to provide habitat for many species?		
<p>H 1.1. Structure of the plant community:</p> <p>Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is <math>\geq \frac{1}{4}</math> ac or <math>\geq 10\%</math> of the wetland if wetland is <math>&lt; 2.5</math> ac.</p> <p><input type="checkbox"/> Aquatic bed</p> <p><input checked="" type="checkbox"/> Emergent plants 0-12 in (0-30 cm) high are the highest layer and have <math>&gt; 30\%</math> cover <u>20%</u></p> <p><input type="checkbox"/> Emergent plants &gt;12-40 in (&gt;30-100 cm) high are the highest layer with <math>&gt; 30\%</math> cover</p> <p><input checked="" type="checkbox"/> Emergent plants <math>&gt; 40</math> in (&gt; 100 cm) high are the highest layer with <math>&gt; 30\%</math> cover <u>60%</u></p> <p><input type="checkbox"/> Scrub-shrub (areas where shrubs have <math>&gt; 30\%</math> cover) <u>80%</u></p> <p><input type="checkbox"/> Forested (areas where trees have <math>&gt; 30\%</math> cover)</p> <p>4 or more checks: points = 3 3 checks: points = 2 2 checks: points = 1 1 check: points = 0</p>	1	
H 1.2. Is one of the vegetation types Aquatic Bed? Yes = 1 No = 0		0
<p>H 1.3. <u>Surface water</u></p> <p>H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least <math>\frac{1}{4}</math> 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 &amp; go to H 1.4 No = go to H 1.3.2</p> <p>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 <math>\frac{1}{4}</math> ac or 10% of its area? Answer yes only if H 1.3.1 is No. Yes = 3 No = 0</p>		0
<p>H 1.4. <u>Richness of plant species</u></p> <p>Count the number of plant species in the wetland that cover at least 10 ft<sup>2</sup>. Different 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)</p> <p># of species <u>111</u></p> <p>Scoring: <math>&gt; 9</math> species: points = 2 4-9 species: points = 1 <math>&lt; 4</math> species: points = 0</p>		0
<p>H 1.5. <u>Interspersion of habitats</u></p> <p>Decide from the diagrams below whether interspersions among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none.</p> <p>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.</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>None = 0 points</p> </div> <div style="text-align: center;">  <p>Low = 1 point</p> </div> <div style="text-align: center;">  <p>Moderate = 2 points</p> </div> </div> <p>All three diagrams in this row are High = 3 points</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;">    </div> <p style="text-align: right;">Riparian braided channels with 2 classes</p>		Figure 1

Wetland name or number TWOS

<b>H 1.6. Special habitat features</b> <i>Check the habitat features that are present in the wetland. The number of checks is the number of points.</i>		
<input type="checkbox"/> Loose rocks larger than 4 in OR large, downed, woody debris (> 4 in diameter) within the area of surface ponding or in stream. <input checked="" type="checkbox"/> Cattails or bulrushes are present within the wetland. <input type="checkbox"/> Standing snags (diameter at the bottom > 4 in) in the wetland or within 30 m (100 ft) of the edge. <input type="checkbox"/> Emergent or shrub vegetation in areas that are permanently inundated/ponded. <input type="checkbox"/> 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 <input type="checkbox"/> Invasive species cover less than 20% in each stratum of vegetation (canopy, sub-canopy, shrubs, herbaceous, moss/ground cover)		1
<b>Total for H 1</b>		3

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

<b>H 2.0. Does the landscape have the potential to support habitat functions of the site?</b>		
<b>H 2.1. Accessible habitat (only area of habitat abutting wetland). If total accessible habitat is:</b> <i>Calculate: % undisturbed habitat <math>\frac{0}{830} + [(\% \text{ moderate and low intensity land uses})/2] \frac{0}{830} = \frac{0}{830} \%</math></i> $\frac{0}{830} = 0\%$ $\frac{0}{830} = 0\%$ > 1/3 (33.3%) of 1 km Polygon <i>undis</i> points = 3 20-33% of 1km Polygon <i>mid</i> points = 2 10-19% of 1km Polygon points = 1 <10% of 1km Polygon points = 0		
<b>H 2.2. Undisturbed habitat in 1 km Polygon around wetland.</b> <i>Calculate: % undisturbed habitat <math>\frac{12}{830} + [(\% \text{ moderate and low intensity land uses})/2] \frac{12.5}{830} = \frac{24.5}{830} \%</math></i> $\frac{12}{830} = 1.4\%$ $\frac{206}{830} = 25\%$ Undisturbed habitat > 50% of Polygon <i>undis</i> points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches <i>mid</i> points = 2 Undisturbed habitat 10 - 50% and > 3 patches <i>2 patches</i> points = 1 Undisturbed habitat < 10% of Polygon points = 0		
<b>H 2.3. Land use intensity in 1 km Polygon:</b> > 50% of Polygon is high intensity land use <i>63%</i> points = (- 2) Does not meet criterion above points = 0		
<b>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</b> Yes = 3 (No = 0)		
<b>Total for H 2</b>		0

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

<b>H 3.0. Is the habitat provided by the site valuable to society?</b>	
<b>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</b> Site meets ANY of the following criteria: points = 2 <input type="checkbox"/> It has 3 or more priority habitats within 100 m (see Appendix B) <input type="checkbox"/> It provides habitat for Threatened or Endangered species (any plant or animal on state or federal lists) <input type="checkbox"/> It is mapped as a location for an individual WDFW species <input type="checkbox"/> It is a Wetland of High Conservation Value as determined by the Department of Natural Resources <input type="checkbox"/> 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 <input checked="" type="checkbox"/> 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	

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



## 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.

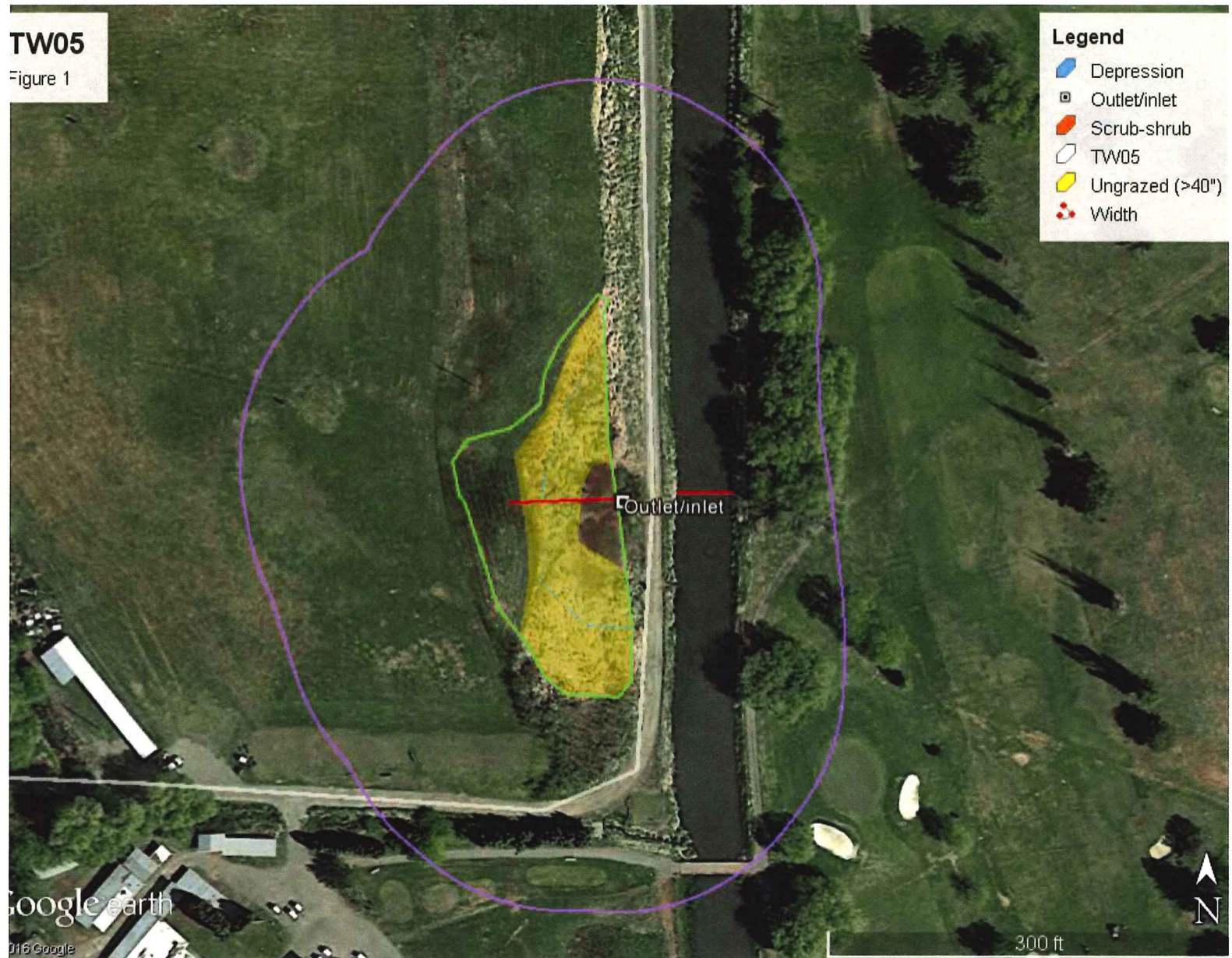


TW05

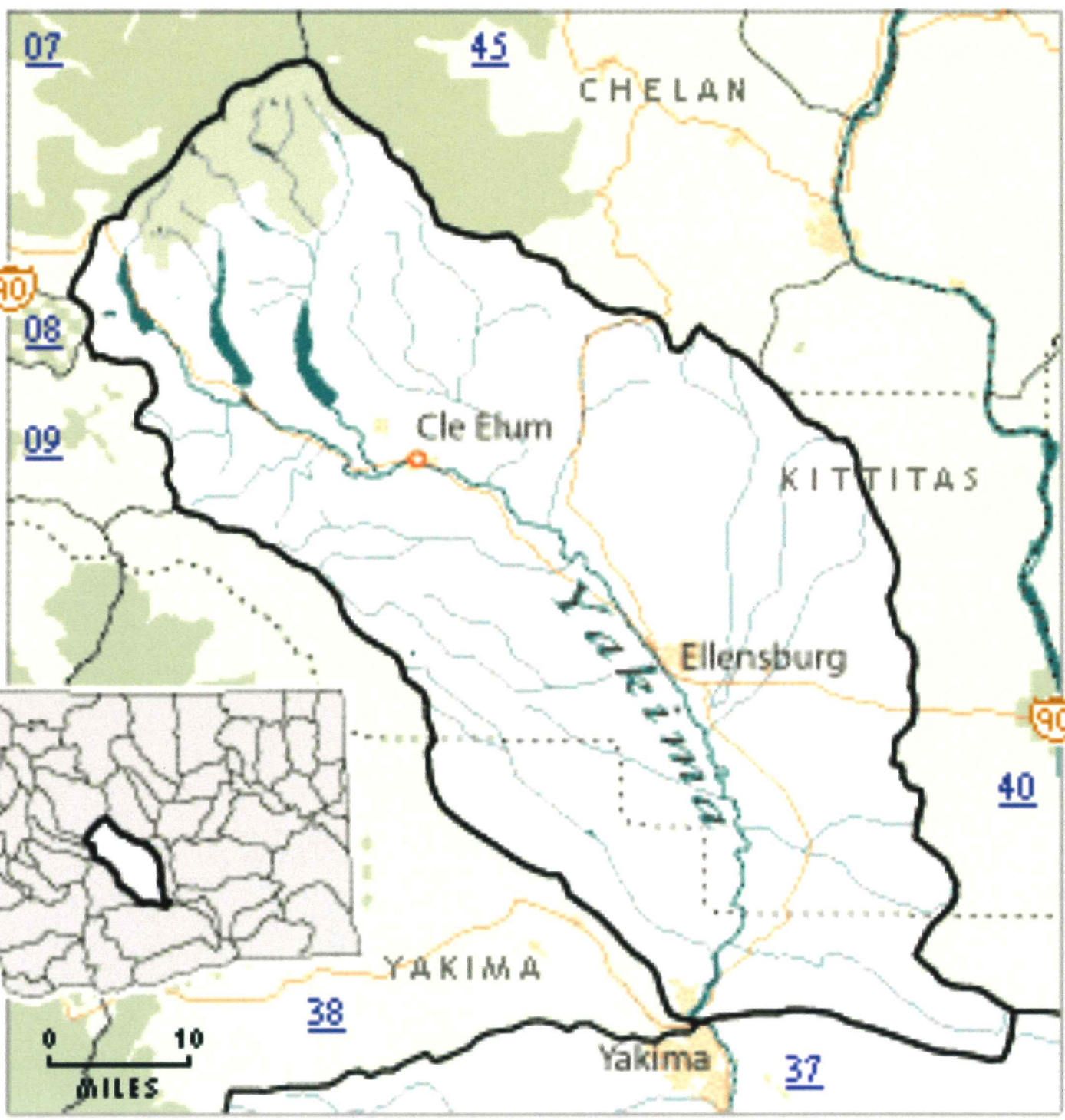
Figure 1

**Legend**

- Depression
- Outlet/inlet
- Scrub-shrub
- TW05
- Ungrazed (>40")
- Width







TW05

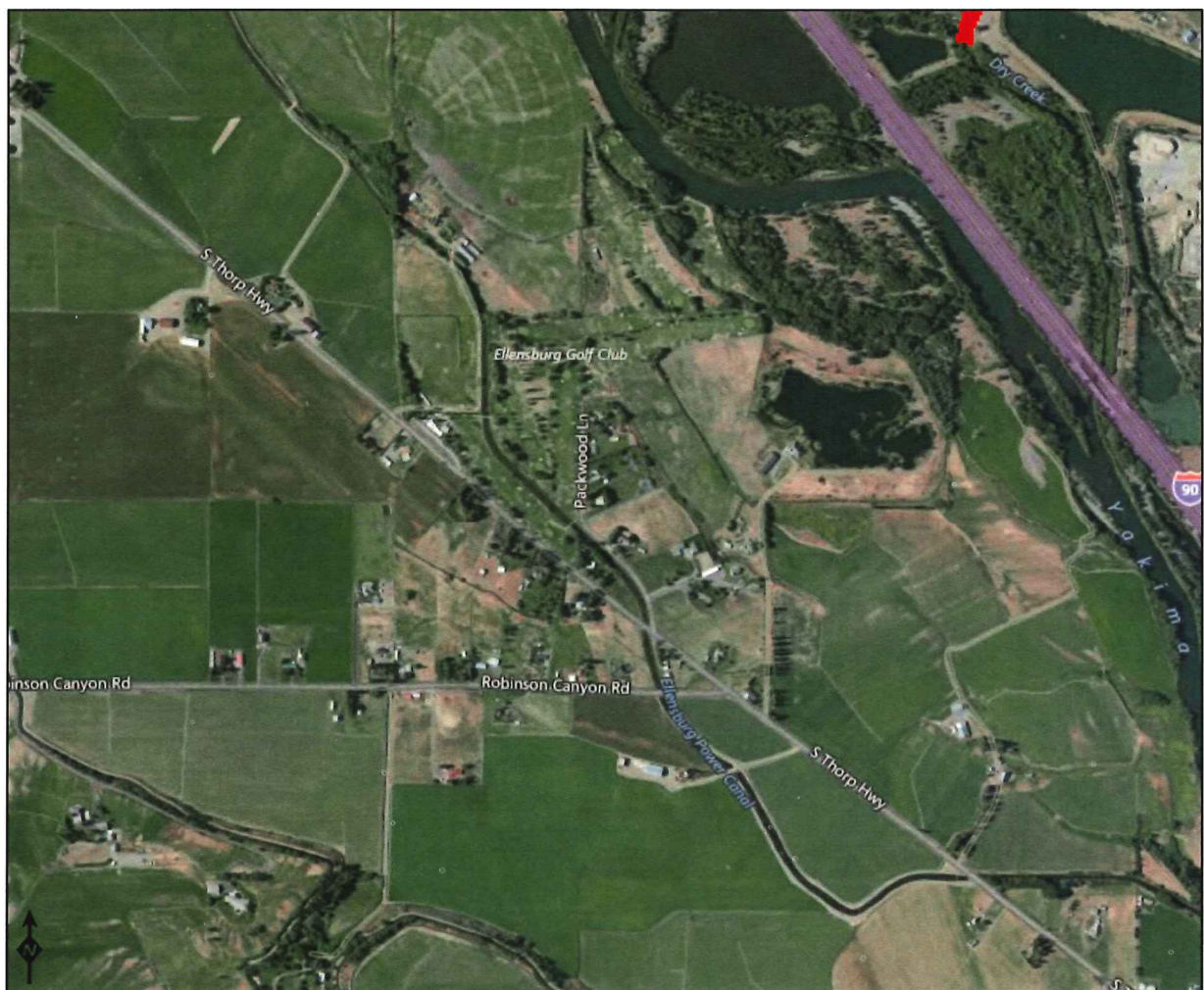
Figure 3





April 25, 2017

TW05 - Figure 4



**Assessed Waters/Sediment**

**Water**

-  Category 5 - 303d
-  Category 4C
-  Category 4B
-  Category 4A
-  Category 2
-  Category 1

**Sediment**



-  Category 5 - 303d
-  Category 4C
-  Category 4B
-  Category 4A
-  Category 2
-  Category 1

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0 0.125 0.25 0.5



Home

Water Quality & Supply

Waste & Toxics

Air & Climate

Cleanup & Spills

## Water Quality Improvement Projects (TMDLs)

### WATER QUALITY IMPROVEMENT PROJECTS (TMDLs)

Overview of the process

Project Catalog

by **WRIA**  
by **County**

Funding Opportunities

Project Development  
Priority Lists

Related Information

TMDL Contacts

### RELATED ECOLOGY PROGRAMS

Water Quality

[Water Quality Improvement](#) > [Water Quality Improvement Projects by WRIA](#) > WRIA 39: Upper Yakima

### WRIA 39: Upper Yakima

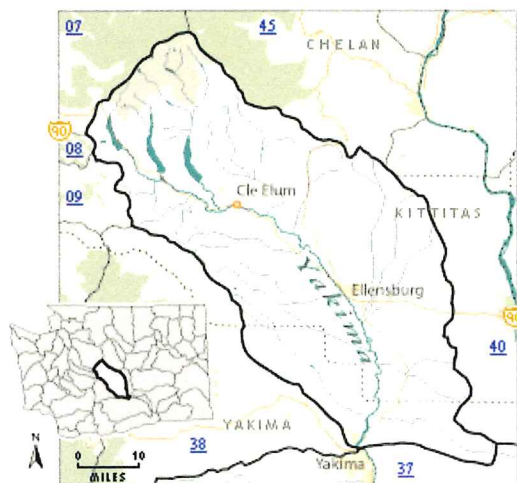
The following table lists overview information and links to specific water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area ([WRIA](#)). Please use links (where available) for more information on a project.

#### Yakima River basin project index:

[www.ecy.wa.gov/programs/wq/tmdl/yakima\\_wq/index.html](http://www.ecy.wa.gov/programs/wq/tmdl/yakima_wq/index.html)

#### Counties

- [Kittitas](#)
- [Yakima](#)



Project Name	Pollutants	Status**	TMDL Lead
<a href="#">Crystal Creek</a>	Ammonia-N BOD (5-day) Chlorine Fecal Coliform	EPA approved	<a href="#">Jane Creech</a> 509-454-7860
<a href="#">Selah Ditch</a>	Fecal Coliform Temperature	EPA approved	<a href="#">Greg Bohn</a> 509-454-4174
<a href="#">Teanaway River</a> segments: <ul style="list-style-type: none"> <li>• Upper West Fork Teanaway River</li> <li>• Upper Middle Fork Teanaway River</li> <li>• Upper North Fork Teanaway River</li> <li>• Stafford Creek</li> <li>• Lower West Fork Teanaway River</li> <li>• Lower Middle Fork Teanaway River</li> <li>• Lower North Fork Teanaway River</li> <li>• Mainstem Teanaway River</li> </ul>	Temperature	EPA approved	<a href="#">Jane Creech</a> 509-454-7860
<a href="#">Wilson/Cooke Creek</a> Tributaries: <ul style="list-style-type: none"> <li>• Badger Creek</li> <li>• Bull Ditch</li> <li>• Caribou Creek</li> <li>• Cherry Creek</li> <li>• CID Canal</li> <li>• Coleman Creek</li> <li>• Cook Creek</li> <li>• EWC Canal</li> <li>• Johnson Drain</li> <li>• KRDCanal</li> </ul>	Fecal Coliform	EPA approved Has an implementation plan  Post-TMDL monitoring report	<a href="#">Jane Creech</a> 509-454-7860 <a href="#">Greg Bohn</a> 509-454-4174



<div> Mercer Creek <ul style="list-style-type: none"> <li>Naneum Creek</li> <li>Parke Creek</li> <li>Whiskey Creek</li> <li>Wilson Creek</li> <li>Wipple Wasteway</li> </ul> </div>			
<div> Yakima River, Upper </div>	<div> Dieldrin DDT Suspended Sediments Turbidity </div>	EPA approved	<div> Jane Creech 509-454-7860 </div>
	<div> Temperature </div>	<div> EPA approved Has an implementation plan </div>	<div> Jane Creech 509-454-7860 </div>
<div> Yakima River </div>	<div> Toxics </div>	<div> Under development </div>	<div> Jane Creech 509-454-7860 </div>

**\*\* Status** will be listed as one of the following: Approved by EPA, Under Development or Implementation. No status means project work has not yet started.

- For more information about WRIA 39:**
- [Waterbodies in WRIA 39](#) - using the Water Quality Assessment Query Tool
  - [Watershed Information for WRIA 39](#)

\* The Department of Ecology and other state resource agencies frequently use a system of 62 "Water Resource Inventory Areas" or "WRIAs" to refer to the state's major watershed basins.

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Last updated December 2016

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## **APPENDIX F: KITTITAS COUNTY WETLAND BUFFER GUIDANCE**





## Chapter 17A.04

### CRITICAL AREAS DESIGNATION AND DEVELOPMENT STANDARDS

#### Sections

[17A.04.010](#) Wetlands.

[17A.04.015](#) No net loss of wetland areas.

[17A.04.020](#) Buffer width requirements.

[17A.04.025](#) Wetland buffer ranges.

[17A.04.030](#) Wetland buffer averaging.

[17A.04.035](#) Natural condition of wetland buffer.

[17A.04.040](#) Allowed uses.

[17A.04.045](#) Building setback lines from wetland buffers.

[17A.04.050](#) Wetland replacement ratios.

17A.04.010 Wetlands.

Wetlands in Kittitas County are defined in [Section 17A.02.310](#) and classified in four categories: Category I (extreme high value), Category II (high value), Category III (average value), Category IV (less than average value). Critical area wetlands in Kittitas County are defined as Category I, Category II, Category III and Category IV wetlands as determined by the planning manager.

Category IV wetlands may be determined by the director to constitute a critical area based upon application of the criteria in this chapter. (Ord. 95-15 (part), 1995; Ord. 94-22 (part), 1994).

17A.04.015 No net loss of wetland areas.

Kittitas County shall require, to the extent practical, and except for Category IV wetlands, a zero net loss of natural wetlands functions and values together with, if reasonably possible through voluntary agreements or government incentives, a gain of wetlands in the long term. (Ord. 94-22 (part), 1994).

17A.04.020 Buffer width requirements.

Wetland buffer requirements apply to all nonexempt activities on regulated wetlands. All wetland buffers shall be measured from the wetland boundary.

#### Category Size of Wetland

#### Required Buffer

I	any size	50 - 200 feet
II	over 2,000 sq. ft.	25 - 100 feet
III	over 10,000 sq. ft.	20 - 80 feet
IV*	43,560 sq. ft. (1 acre)	Building setbacks will be determined by the zoning lot line setbacks, but shall not exceed 25 feet.

\*Includes only nonirrigation induced or enhanced Category IV wetlands. Irrigation water does influence ground water table elevations in Kittitas County.

(Ord. 96-14 (part), 1996; Ord. 95-15 (part), 1995; Ord. 94-22 (part), 1994).



#### 17A.04.025 Wetland buffer ranges.

The wetland buffer ranges have been established to reflect the impact of certain intense land uses on wetland function and values. The director shall base the buffer size on the following criteria and shall establish the least restrictive width of buffer necessary to account for all of the following considerations:

1. The overall intensity of the proposed use;
2. The presence of threatened, endangered, or sensitive species;
3. The site's susceptibility to severe erosion;
4. The use of a buffer enhancement plan by the applicant which uses native vegetation or other measures which will enhance the functions and values of the wetland or buffer. (Ord. 94-22 (part), 1994).

#### 17A.04.030 Wetland buffer averaging.

Wetland buffers may be modified by averaging buffer widths. Wetland buffer width averaging shall be allowed only where the applicant demonstrates that the following exists:

1. That averaging is necessary to avoid an extraordinary hardship to the applicant caused by circumstances peculiar to the property;
2. That the wetland contains variations in sensitivity due to existing physical characteristics;
3. That the proposed use would be located adjacent to areas where buffer width is reduced, and that such land uses are low in impact;
4. That width averaging will not adversely impact wetland function and values. (Ord. 9422 (part), 1994).

#### 17A.04.035 Natural condition of wetland buffer.

Natural condition of wetland buffer. Wetland buffer areas shall be retained in their natural condition or may be improved to enhance buffer functions and values. Where buffer disturbance has occurred during construction, revegetation with native vegetation may be required. The Kittitas County noxious weed ordinance shall be adhered to. (Ord. 94-22 (part), 1994).

#### 17A.04.040 Allowed uses.

In addition to exempt activities otherwise identified herein, the following activities are allowed to occur on wetland and wetland buffer areas: nonmotorized outdoor recreational activities including hunting and fishing; educational activities; existing and ongoing agricultural activities, silviculture and mining; and maintenance of existing facilities, structures, ditches, roads, bridges and other utility systems. Up to two acres of Class IV wetlands may be filled, drained or modified with no approval required from the planning manager. If more than two acres of Class IV wetlands are filled, drained or modified, approval of the planning manager is required. Such development activity shall provide mitigation in accordance with [Section 17A.04.050](#) for that portion of the wetland fill or modification that exceeds two acres. Category IV wetlands may be used for secondary stormwater management facilities having no reasonable alternative on-site location, provided there is no significant adverse impact to the functions and values of those wetlands. (Ord. 95-15 (part), 1995; Ord. 94-22 (part), 1994).

17A.04.045 Building setback lines from wetland buffers.

A building setback line equal to the side yard setback requirement of the applicable zoning district is required from the edge of any wetland buffer. Minor intrusions into the area of the building setback may be allowed if the director determines that such intrusions will not negatively impact the wetland. The setbacks shall be shown on all site plans submitted with the application. (Ord. 94-22 (part), 1994).

17A.04.050 Wetland replacement ratios.

Wetland replacement ratios are expressed in gross area required for replacement. The actual replacement, enhancement or rehabilitation of wetlands shall be determined by the director and meet all applicable standards for such. Replacement areas shall be determined according to function, acreage, type, location, time factors, ability to be self sustaining and projected success. Wetland functions and values shall be calculated using the Kittitas County critical areas policy document and the professional judgment of the director.

<b>Category of Wetland</b>	<b>Replacement Ratio</b>
I	3:1
II	2:1
III	1.5:1
IV	1:1 for the portion of a wetland fill or modification

(Ord. 96-14 (part), 1996; Ord. 95-15 (part), 1995; Ord. 94-22 (part), 1994).