WETLAND DELINEATION REPORT

Morazz Estates Short Plat

Prepared for:
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Summary

The 15.64-acre property is located at 6481 Manastash Road in Ellensburg, Washington in unincorporated Kittitas County; which holds local jurisdiction over the property. The County tax parcel number is 335133. The property is situated outside of any Urban Growth Area (UGA).

In general, the property is an open abandoned agriculture field. It is covered in field grasses, common herbaceous species, and patches of trees and shrubs, such as black hawthorn, black cottonwood, pacific ninebark and native rose species. It is bounded to the south by a municipal irrigation ditch running along the north side of Manastash Road.

Topography surrounding the study area generally slopes downward from north to south. There are three main man-made irrigation ditches within the property that run from west to east and which have bypass valves to direct water from the public irrigation ditch. The hydrological input from the irrigation ditch and the network of other small water diversions (ditches with valves) on the property and lack of other disturbance or clearing has promoted the formation of a small forested area along the southern border of the property. The three existing ditches have no water source other than from surface which would be diverted from the municipal irrigation ditch. A fourth ditch exists but has no input apparatus.

The USFWS National Wetlands Inventory and WDFW wetland mappers identify a palustrine emergent wetland situated roughly in the middle of the property. The County online wetlands mapper (Compass) does not identify the feature (County, 2022a).

DNR identifies a type "F" stream on the southern portion of the property, which also appears on the County map.

MW Environmental LLC (MW) was tasked by Mechelle Moran (client) to document the presence or absence of the aforementioned wetland (hereafter named "Wetland A") identified by USFWS and WDFW.

MW Senior Environmental Scientist Jim Hearsey visited the property on March 22, 2022 to perform the site investigation. The area identified to contain a wetland by USFWS and WEDFW was found not to have a wetland within it.

The Type F stream identified by DNR was found to be an abandoned irrigation ditch with no stream characteristics and no possibility of fish access

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Appendices are compiled at the end of this document.

Abbreviations

bgs .... below ground surface
County...Kittitas County, Washington
DNR.................................... Washington State Department of Natural Resources
Ecology... Washington State Department of Ecology
HGM..hydrogeomorphic
HUC .... Hydraulic Unit Code
KCC..Kittitas County Code
MW Environmental...MW Environmental LLC
NRCS ....Natural Resources Conservation Service
NWI .... National Wetlands Inventory
PEM..palustrine emergent
RMZ...Riparian Management Zone
UGA..Urban growth Area
USACE ....US Army Corps of Engineers
USFWS.. US Fish & Wildlife Service
WAC ....Washington Administrative Code
WDFW... Washington Department of Fish & Wildlife

1 Introduction

1.1 Property Information

The 15.64-acre property is located at 6481 Manastash Road in Ellensburg, Washington in unincorporated Kittitas County (County). The County holds local jurisdiction over the property.

1.1 Location

The property is within the southwest quarter of the southeast quarter of Public Land Survey System: Township 17 North, Range 17 East, Section 12. The study area lies entirely within Water Resource Inventory Area (WRIA) 39 – Upper Yakima and 8-digit Hydraulic Unit Code (HUC) 17030001. The property is situated outside of any Urban Growth Area (UGA).

1.1 Landscape

In general, the property is an open abandoned agriculture field (Photo A1). It is covered in field grasses, common herbaceous species, and patches of trees and shrubs such as black hawthorn, black cottonwood, pacific ninebark and native rose species (Photo A2). It is bounded to the south by a municipal irrigation ditch, running along the north side of Manastash Road (Figure 1).

Topography surrounding the study area generally slopes downward from north to south. There are three main man-made irrigation ditches within the property, running from west to east, which have bypass valves to direct water, from the public irrigation ditch. The hydrological input from the irrigation ditch and the network of other small water diversions (ditches with valves) on the property, and lack of other disturbance, or clearing, has promoted the formation of a small, forested area along the southern border of the property (Figure 1, Photo A3). The three existing ditches have no water source, other than from surface which would be diverted from the municipal irrigation ditch. A fourth ditch exists, but it has no input apparatus.

1.1 Online Identification of Critical Areas

The U.S. Fish and Wildlife (USFWS) National Wetlands Inventory (NWI) and Washington State Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS on the Web) online wetland mappers identify a palustrine emergent (PEM, Cowardin) wetland situated roughly in the middle of the property (Figure 2). The County online wetlands mapper (*Compass*) does not identify the feature (County 2022a).

The Washington State Department of Natural Resources (DNR) identifies a type “F” (fish-bearing) stream on the southern portion of the property which also appears on the County map (Figures 2 & 3).

1.2 Scope and Purpose

MW Environmental LLC (MW) was tasked by Mechelle Moran (client) to document the presence or absence of the aforementioned wetland (hereafter named “Wetland A”) identified by USFWS and WDFW.

This wetland delineation report will support and inform future development permitting, and/or sales decisions.

While in the field, other notable features that may be of interest to the client were also noted.

2 Methods

2.1 Preliminary Background Data Collection

Prior to field investigations, it is recommended to perform background research to help identify the potential for critical areas in the study area and prioritize efforts. Background resources reviewed for this report include, but were not limited to:

- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data (USFWS 2022)
- NRCS WETS Precipitation Data (NRCS 2022)
- Kittitas County *Compass* data (County 2022a)
- DNR Forest Practices Application Mapping Tool (DNR 2022)
- Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS on the Web) data (WDFW 2022)
- Kittitas County Code (County 2022b)
- Google Earth Aerial imagery (Google 2022)

2.2 Wetland Methodology

2.2.1 Wetland Definition and Delineation Methods

Wetlands are formally defined under the CWA Section 404 as:

> *"those areas that are inundated or saturated by surface 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."*

Following Kittitas County Code (KCC) Chapter 17A.07.020, and standard U.S. Army Corps of Engineers (USACE) protocol, wetlands were delineated in accordance with the USACE 1987 *Wetlands Delineation Manual* (USACE 1987) and the *2008 Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Arid West* (USACE 2008). Formal data was recorded using the 2006 USCAE Wetland Determination Data Form – Arid West Region (Riparian Management Zones). Other resources used include the *Field Indicators of Hydric Soils in the United States, Version 8.2* (NRCS 2018) and the *Munsell Soil Color Book* (Munsell 2010).

The methodology outlined in the manuals is based upon three essential characteristics of wetlands: (1) hydrophytic vegetation; (2) hydric soils; and (3) wetland hydrology. Field indicators of these three characteristics must all be present in order to determine that an area is a wetland (unless problem areas or atypical situations are encountered). This information was used to distinguish wetlands from non-wetlands (i.e., upland areas). If wetlands were determined to be present within the study area, wetland boundaries would be delineated with sequentially numbered boundary points, with GPS locations recorded for figure creation and spatial analysis.

2.2.2 Wetland Rating Methods

Following KCC Chapter 17A.07.020, wetlands would be rated in accordance with the Washington State Department of Ecology (Ecology)'s *Washington State Wetland Rating System for Eastern Washington* (Hruby 2014). This system rates wetlands based on the combined score of three wetland functions: water quality, hydrologic, and habitat.

This rating system is designed to differentiate between wetlands based on their sensitivity to disturbance, rarity, the functions they provide, and whether we can replace them or not. The emphasis is on identifying those wetlands: where our ability to replace them is low, that are sensitive to adjacent disturbance, that are rare in the landscape, that perform many functions well, and that are important in maintaining biodiversity. The following description (KCC Chapter 17A.07.020), informed by Ecology manuals, summarizes the rationale for including different wetland types in each category.

> **Category I** wetlands are those that 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. Category I wetlands include:
>
> i. Alkali wetlands;
> ii. Wetlands with high conservation value that are identified by scientists of the Washington Department of Natural Resources Natural Heritage Program;
> iii. Bogs and calcareous fens;
> iv. Mature and old-growth forested wetlands over 1/4 acre with slow-growing trees;
> v. Forests with stands of aspen; and
> vi. Wetlands scoring between twenty-two and twenty-seven (22-27) points in the Eastern Washington Rating System.
>
> **Category II** wetlands are difficult, though not impossible, to replace, and provide high levels of some functions. These wetlands occur more commonly than Category I wetlands, but still need a relatively high level of protection. Category II wetlands include:
>
> i. Forested wetlands in the floodplains of rivers;
> ii. Mature and old-growth forested wetlands over 1/4 acre with fast-growing trees;
> iii. Vernal pools; and
> iv. Wetlands scoring between nineteen and twenty-one (19-21) points in the Eastern Washington Rating System.
>
> **Category III** wetlands have a moderate level of functions and score between sixteen and eighteen (16-18) points in the Eastern Washington Rating System. These wetlands can be often adequately replaced with a well-planned mitigation project. Category III wetlands generally have been disturbed in some ways, and are often less diverse or

more isolated from other natural resources in the landscape than Category II wetlands.

Category IV wetlands have the lowest level of functions and are often heavily disturbed. They score fewer than sixteen (16) points in the Eastern Washington Rating System. These are wetlands that can usually be replaced, and in some cases improved. However, experience has shown that replacement cannot be guaranteed in any specific case. These wetlands may provide some important functions and also need to be protected.

2.2.3 Wetland Buffers

Wetland buffer widths would be determined by Kittitas County Code (KCC Chapter 17A.07.030) and are based on wetland category (Ecology) and surrounding land use impact level.

Table 1: Kittitas County Standard (wetland) **Buffer Widths**

Category of Wetland	Land Use with Low Impact1[1]	Land Use with Moderate Impact[2]	Land Use with High Impact[3]
I	125 ft	190 ft	250 ft
II	100 ft	150 ft	200 ft
III	75 ft	110 ft	150 ft
IV	25 ft	40 ft	50 ft

[1] Low impact use and developments include: forestry (cutting of trees only), low intensity open space (hiking, bird-watching, and like uses), unpaved trails, and utility corridor without a maintenance road and little or no vegetation management.

[2] Moderate impact use and developments include: residential (1 unit/acre or less), moderate intensity open space (parks with biking, jogging, and like uses), conversion from non-agricultural lands to moderate intensity agriculture (orchard, hay fields, and like uses), paved trails, building of logging roads, and utility corridor or right-of-way shared by several utilities and including access/maintenance roads.

[3] High impact use and developments include: commercial, urban, industrial, institutional, retail sales, residential (more than 1 unit/acre), conversion from non-agricultural lands to high intensity agriculture (dairies, animal feed lots, nurseries and green houses, and like uses), high intensity recreation (golf courses, ball fields, and like uses).

2.3 Stream Methodology

2.3.1 Stream Definition and Delineation Methods

Streams would be identified using standard indicators such as bed, bank, substrate sorting, incising, presence of ordinary high-water mark, etc. KCC Chapter 17A.04.030 applies stream buffer widths from the ordinary high-water mark.

2.3.2 Stream Typing (classification)

KCC 17A.04.020 categorizes water types as follows:

1. **Waters of the state classification.** For purposes of this Chapter, Kittitas County hereby adopts the water typing system specified in Washington Administrative Code (WAC) 222-16-030, as described below:
   . **Type S:** all waters, within their ordinary high water mark, meeting the criteria as "shorelines of the state" and "shorelines of statewide significance" under RCW Chapter 90.58. The current list of Shoreline waters, along with their specific shorelines environments, is provided in the Kittitas County Shoreline Master Program (KCC Title 17B). Type S streams and lakes are protected by the Shoreline Master Program, rather than through this Title.
   a. **Type F:** segments of natural waters other than Type S Waters, which are within the bankfull widths of defined channels and periodically inundated area of their associated wetlands, or within lakes, ponds, or impoundments having a surface area of 0.5 acre or greater at seasonal low water and which in any case contain fish habitat.
   b. **Type Np:** all segments of natural waters within the bankfull width of defined channels that are perennial non-fish habitat stream. Perennial stream waters do not go dry any time of a year of normal rainfall. However, for the purpose of water typing, Type Np Waters include the intermittent dry portions of the perennial channel below the uppermost point of perennial flow.
   c. **Type 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 are not located downstream from any stream reach that is a Type Np, F or S Water. Ns Waters must be upstream from and physically connected by an above-ground channel system to Type S, F, or Np Waters. *[WAC 222-16-030]*

2.3.3 Kittitas County Stream Buffer Width Standards

The County defines buffers as Riparian Management Zones (RMZs).

Table 2: Standard RMZ (*stream buffer*) **Widths (KCC Chapter 17A.04.030.4)**

Kittitas County Non-shoreline Rivers, Streams, Lakes and Ponds (does not include building setback [KCC 17A.01.090.5])		
Stream Type	Riparian Management Zone Widths[1,2]	
	Cascade Ecoregion (feet) Agriculture	Columbia Plateau Ecoregion (feet) Forest
Type S (Shoreline)	See the SMP	See the SMP
Type F	150	100
Type Np	100	65
Type Ns	50	40

[1] Interrupted RMZs: When a fish and wildlife habitat conservation area RMZ contains an existing legally established public or private road, the Director may allow an alteration or development on the landward side of the road provided that the alteration or development will not have a

detrimental impact to the habitat area. The Director may require a habitat management plan if - after considering the hydrologic, geologic, and/or biological habitat connection potential and the extent and permanence of the buffer interruption - such a plan is deemed necessary to confirm the lack of detrimental impact on the habitat area.

[2] Multiple RMZs: In the event that RMZs for any fish and wildlife habitat conservation area are contiguous or overlapping, the most protective of the collective RMZs shall apply.

[3] The Cascade and Columbia Plateau Ecoregions are derived from the Water Resource Inventory Areas (WRIA) 38, 39, and 40 ecoregion boundaries. The Cascade Ecoregion includes North Cascades, Cascades, and Eastern Cascade Slopes and Foothills ecoregions. The Columbia Plateau Ecoregion includes the shrub-steppe ecoregion known as the Columbia Plateau.

3 Results

MW Senior Environmental Scientist Jim Hearsey visited the property on March 22, 2022, to perform the site investigation. The weather was clear and in the mid-50's degrees Fahrenheit. He was met by Trevor Moran (client) who provided background on the property and showed him some of the notable features particularly the irrigation ditch bypass valve control bunkers in various states of repair (Photos A4, A5 & A6).

Jim Hearsey preceded to investigate the property for wetlands and recorded data and locations of notable features and sample points (Figure 2). The wetland identified by USFWS and WDFW was found not to exist on the property, and multiple sample points were recorded to establish the upland nature of the area (Appendix B – USACE Wetland Determination Data Sheets).

3.1 Recent Precipitation Data

Following Natural Resources Conservation Service (NRCS) protocol (NRCS 1997), weather data (NRCS 2022) indicates that precipitation levels have been normal for the three-month periods prior to the March 22,2022 field investigation. However, February had been drier than normal (Appendix C – Recent Precipitation Data).

3.2 Wetland A (non-existent)

Multiple locations within and around the area identified as wetland by USFWS and WDFW were investigated (Figure 2). Locations were chosen that had the highest likelihood of having the three requisite wetland indicators (i.e., hydrophytic vegetation, hydric soil, and wetland hydrology).

Two informal test pits were dug (Test Pits 1 & 2, Figure 2), both of which showed no hydric soil or wetland hydrology. Three formal wetland sample points (B, C & D, Figure 2) were analyzed with data recorded on USACE Wetland Determination data forms (Appendix B – Wetland Determination Data Forms). None of these locations met soil wetland soil or hydrology parameters, while they all met wetland vegetation parameters, which is common in eastern Washington.

3.2.1 Sample Point B

Vegetation

Vegetation at sampling point B-SP1 met the Dominance Test for hydrophytic vegetation; which is not uncommon in upland areas in Eastern Washington. Dominant plant species include black hawthorn (*Crataegus douglasii*), Pacific ninebark (*Rosa physocarpus*), and an unidentified *Centaurea* herbaceous species.

Soil

The soil at sampling point B-SP1 was loam, with Munsell ® soil color being 10YR 2/1 (black) from 0-8 inches below ground surface (bgs), and 10YR 2/2 (very dark brown) from 8 – 16 inches bgs. The soil profile met no hydric soil indicators.

Hydrology

No wetland hydrology indicators were observed.

3.2.2 Sample Point C

Vegetation

Vegetation at sampling point C-SP1 met the Dominance Test for hydrophytic vegetation, which is not uncommon in upland areas in Eastern Washington. Dominant plant species include black cottonwood (*Populus balsamifera*), curly dock (*Rumex crispus*), and numerous unidentified field and pasture grass species.

Soil

The soil at sampling point C-SP1 was loam, with Munsell ® soil color being 10YR 2/2 (very dark brown) from 0-7 inches below ground surface (bgs). From 7 – 16 inches bgs, the soil showed signs of disturbance (likely prior tilling), as the matrix was mixed, with horizons not being horizontal. At this depth, the matrix was a 50/50 mix of 10YR 4/1 (dark grey) and 10YR 2/2 (very dark brown).

Hydrology

No wetland hydrology indicators were observed.

3.2.1 Sample Point D

Vegetation

Vegetation at sampling point D-SP1 met the Dominance Test for hydrophytic vegetation, which is not uncommon in upland areas in Eastern Washington. Dominant plant species include unidentified field and pasture grass species, with traces of Queen Anne's lace (*Daucus carota*) and narrowleaf plantain (Plantago lanceolata).

Soil

The soil at sampling point C-SP1 was loam, with Munsell ® soil color being 10YR 2/2 (very dark brown) from 0-7 inches below ground surface (bgs). From 7 – 16 inches bgs, the soil showed signs of disturbance (likely prior tilling), as the matrix was mixed, with horizons not being horizontal. At this depth, the matrix was a 50/50 mix of 10YR 4/1 (dark grey) and 10YR 2/2 (very dark brown).

Hydrology

No wetland hydrology indicators were observed.

3.1 Streams

No jurisdictional streams were identified on the property.

The County sets stream buffers by stream type (KCC Chapter 17A.04.030.4). The definition of a "stream" (KCC Chapter 17A.02.740) refers to the County definition of a "watercourse" (KCC Chapter 17A.02.790) which reads as follows:

> "Watercourse," "river" or "stream" means any portion of a stream or river channel, bed, bank, or bottom waterward of the ordinary high water line of waters of the state. Watercourse also means areas in which fish may spawn, reside, or pass, and tributary waters with defined bed or banks that influence the quality of habitat downstream. Watercourse also means waters that flow intermittently or that fluctuate in level during the year, and the term applies to the entire bed of such waters whether or not the water is at peak level. A watercourse includes all surface-water-connected wetlands that provide or maintain habitat that supports fish life. **This definition does not include irrigation ditches**, canals, stormwater treatment and conveyance systems, **or other entirely artificial watercourses**, except where they exist in a natural watercourse that has been altered by humans."

Four artificially-created irrigation ditches were identified on the property (Figures 4a & 4b). The waterway remotely identified by DNR as a Type F "stream" is actually just one of these artificial irrigation ditches (heretofore named Ditch 4) and may be the oldest of the four. It receives no water, as the municipal irrigation ditch along Manastash Road conveys any local surface water eastward. It is possible that prior to the municipal irrigation ditch, it conveyed water, as the beginning of Ditch 4 is a culvert perched above the municipal irrigation ditch (Photo A7), running northeast under a gravel access road onto the property. A deep, previously-dug utility access pit (Photo A8), east of the Ditch 4 culvert under the access road, within the remnant channel, remains dry. Ditch 4 exhibits evidence that it has not flown for quite some time (leaf litter, etc.) and "downstream"/east of the utility access pit, it loses any discernible bed or bank, or other features, to identify it as a stream.

Three other irrigation ditches exist on the property (Ditches 1, 2 and 3, Figures 4a & 4b, Photos A9, A10, A11 & A12), in various states of maintenance and repair. These ditches originate at control valves located in bunkers (Photos A4, A5, & A6), and if turned on, would receive water from the municipal irrigation ditch (A13) whose water rights and access are highly regulated. Ditch 1 (Figure 4a, Photo A9) is the most-recently maintained (by Trevor Moran) of the three.

4 References

County 2022a. *Compass.* Online web mapping application. Available at https://kitcogis.maps.arcgis.com/apps/webappviewer/index.html?id=8bcc146d9c2847acb2e9aa239187c25e

County 2022b. Kittitas County Code. Available at https://www.co.kittitas.wa.us/boc/countycode/default.aspx

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe 1979. Classification of Wetlands and Deepwater Habitats of the United States. Government Printing Office. Washington, D.C.

DNR 2022. DNR Forest Practices Application Mapping Tool. Available at https://fpamt.dnr.wa.gov/default.aspx

Google 2022. Aerial imagery. Available at https://www.google.com/maps.

Hruby, T. 2014. *Washington State Wetland Rating System for Eastern Washington: 2014 Update.* (Publication #14-06-030). Olympia, WA: Washington Department of Ecology.

Munsell 2010. *Munsell Soil Color Book*. Munsell Color. Munsell Soil-Color Charts with Genuine Munsell color chips 2009 Revised / 2019 production. Grand Rapids, MI

NRCS 1997. *Engineering Field Handbook*. Part 650. Chapter 19. Hydrology Tools for Wetland Determination. Available at https://directives.sc.egov.usda.gov/viewerFS.aspx?hid=21429

NRCS 2018. *Field Indicators of Hydric Soils in the United States. A Guide for Identifying and Delineating Hydric Soils*. Version 8.2. L.M. Vasilas, G.W. Hurt and J.F. Berkowitz eds. U.S. Department of Agriculture, NRCS in cooperation with the National Technical Committee for Hydric Soils. Available at https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_053171.pdf

NRCS 2022. Retrieving Climate Data and Summary Reports from AgACIS. Available at https://www.wcc.nrcs.usda.gov/climate/navigate_wets.html

USACE 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. USACE. Waterways Experiment Station. Vicksburg, Mississippi. March.

USACE 2006. *Wetland Determination Data Form – Arid West Region*. Version 11-1-2006.

USACE 2008. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0) U.S. Army Corps of Engineers. U.S. Army Engineer Research and Development Center. 3909 Halls Ferry Road, Vicksburg, MS 39180-6199

USFWS 2022. US Fish and Wildlife Service. National Wetlands Inventory. Wetlands Mapper. Available at https://www.fws.gov/wetlands/data/Mapper.html

WDFW 2022. Priority Habitats and Species (PHS) on the Web. Available at http://apps.wdfw.wa.gov/phsontheweb

5 Limitations and Liability Statement

The results presented in this report are based on our best professional judgement and understanding of the applicable codes and regulations, and interpretation of data collected both in the field and from other available sources. Delineations presented should be considered preliminary until approved by the USACE, and any other applicable regulatory agencies or jurisdictions. Since wetlands, waterways and ditches are dynamic features of the landscape, their borders may change over time. Regulatory bodies generally consider 5 years to be the lifespan of delineations. Also, laws, codes and/or regulations and jurisdictional assignment may change over time.

This report has been prepared exclusively for Mechelle & Trevor Moran (client) and the regulatory agencies to which they may submit this report. Use of this report, or the findings herein, by any other parties is at their own risk and is hereby expressly discouraged. MW Environmental LLC will not support, or be liable, for usage by such unauthorized parties.

6 Qualifications of Authors

Jim Hearsey (Senior Environmental Scientist)

Jim Hearsey holds a B.A. in Chemistry (Univ. of Wash.), a B.S. in Fisheries Resources (Univ. of Idaho), and M.S. in Fisheries Management (Humboldt State University) and is a published author of several peer-reviewed papers on fish physiology and habitat correlations, including in the journal SCIENCE. He has over 12 years of experience in fisheries research, habitat evaluation, and environmental compliance for natural resources, transportation, and development projects. His specialties include fish habitat assessment and restoration, as well critical areas studies, permitting, Endangered Species Act (ESA) compliance, and Biological Assessments (BA). He has experience in the entire environmental compliance process for stream and wetland impacts, including delineations, characterizations, ratings, critical area reports, environmental documentation (NEPA/SEPA), impact evaluation, mitigation design, and permitting.

Jim has formal training in wetland delineations and ratings by the Wetland Training Institute. He is also certified by Ecology in the use of the updated (2014) wetland rating method and forms. He has performed over 100 wetland delineations and ratings, and has been team leader on multiple linear projects. He is certified by WDFW in fish passage barrier and habitat assessment and has been field team leader on multiple stream classifying and habitat characterization projects. Jim is the lead author of this delineation report and performed the majority of the background and field research, along with the critical areas ratings and classifications.

APPENDIX A: Selected Photos

Photo A1 – Photo of Wetland A, facing south from near sample Point D – SP1, showing typical vegetation in open field.

Photo A2 – Photo of typical vegetation patches in open field, facing north/northeast from near Sample Point D-SP1.

Photo A3 – Photo from edge of forested area in southern portion of property, facing southeast, with showing vegetation in forested area.

Photo A4 - Photo of Ditch 1 control valve bunker, facing east up Ditch 1. Note lack of bed material sorting or cut bank, and leaf litter.

Photo A5 – Close up of Ditch 1 control valve bunker, showing typical design using baffles to direct/divert water. Note that outlet to property (left) is perched above minor trapped, standing water.

Photo A6 –Ditch 3 control valve bunker. Note that no outlet is visible, nor signs of surface flow in area.

Photo A8 – Old utility access pit in direct alignment of Ditch 4. Culvert shown is “downstream” end of hanging culverin previous photo.

Photo A9 – Ditch 1, facing east (downslope) from access road on property, showing culvert under road.


Photo A10 – Ditch 2, facing east from culvert under access road.

Photo A11 – Ditch 2, facing west from culvert under access road. Note vegetation growing in centerline.


Photo A12 – Ditch 3, facing east from culvert under access road.


A13 – Municipal irrigation ditch, facing east from private access road over ditch.

APPENDIX B: USACE Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Ellensburg City/County: Kittitas Sampling Date: 3/22/22

Applicant/Owner: Trevor Moran State: WA Sampling Point: B-SP1

Investigator(s): Jim Hearsey Section, Township, Range: TN 17 North, Range 17 East, Section 12

Landform (hillslope, terrace, etc.): field Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): B - Arid West Lat: Long: Datum:

Soil Map Unit Name: NWI classification: Wetland

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

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

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

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

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

Remarks: Area is prior agriculture field

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Crataegus douglasii	20	Y	FAC
2. Rosa pisocarpa	35	Y	FAC
3. Physocarpus capitatus	1	N	FACW
4.			
5.			
	56	= Total Cover	
Herb Stratum (Plot size: 15' radius)			
1. Verbascum thapsus	10	N	FACU
2. Plantago lanceolata	1	N	FAC
3. Centaurea species	50	Y	FACU
4. Cirsium arvense	6	N	FACU
5. Taraxacum officinale	1	N	FACU
6. unidentified field grasses	37	Y	FAC*
7.			
8.			
9.			
10.			
11.			
	105	= Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
	161	= Total Cover	
% Bare Ground in Herb Stratum 0			

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks: *Grasses are presumed FAC to be conservative for this evaluation.

SOIL

Sampling Point: B-SP1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	100					LOAM	
8-16	10YR 2/2	100					LOAM	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ **No** ☒

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

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Ellensburg City/County: Kittitas Sampling Date: 3/22/22

Applicant/Owner: Trevor Moran State: WA Sampling Point: c-SP1

Investigator(s): Jim Hearsey Section, Township, Range: TN 17 North, Range 17 East, Section 12

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

Subregion (LRR): B - Arid West Lat: Long: Datum:

Soil Map Unit Name: NWI classification: none

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

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

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

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

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

Remarks: Area is piror agriculture field

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Populus balsamifera	15	Y	FAC
2.			
3.			
4.			
5.			
	15 = Total Cover		
Herb Stratum (Plot size: 5' radius)			
1. Rumex crispus	2	N	FAC
2. unidentified field grasses	95	Y	FAC*
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	97 = Total Cover		
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
	112 = Total Cover		
% Bare Ground in Herb Stratum 5			

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks: *Grasses are presumed FAC to be conservative for this evaluation.

SOIL

Sampling Point: C-SP1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/2	100					LOAM	
7-16	10YR 2/2	50					LOAM	
	10YR 4/1	50					LOAM	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:____________________

Depth (inches):____________________

Hydric Soil Present? Yes ☐ **No** ☒

Remarks: HORIZONS ARE DISTURBED AND TURNED, LIKELEY FROM PRIOR TILLING

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): ________

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

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): ________

Wetland Hydrology Present? Yes ☐ **No** ☒

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

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Ellensburg City/County: Kittitas Sampling Date: 3/22/22

Applicant/Owner: Trevor Moran State: WA Sampling Point: D-SP1

Investigator(s): Jim Hearsey Section, Township, Range: TN 17 North, Range 17 East, Section 12

Landform (hillslope, terrace, etc.): TERRACE Local relief (concave, convex, none): NONE Slope (%): 1

Subregion (LRR): B - Arid West Lat: Long: Datum:

Soil Map Unit Name: NWI classification: Wetland

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

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

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

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

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

Remarks: Area is piror agriculture field

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: radius)			
1. unidentified field grasses	95	Y	FAC*
2. Daucus carota	1	N	UPL
3. Plantago lanceolata	1	N	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	97	= Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
	97	= Total Cover	
% Bare Ground in Herb Stratum 5			

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks: *Grasses are presumed FAC to be conservative for this evaluation.

SOIL

Sampling Point: D-SP1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/1	100					LOAM	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type:__________

Depth (inches):__________

Hydric Soil Present? Yes ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches):
Water Table Present?	Yes ☐	No ☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (inches):

Wetland Hydrology Present? Yes ☐ **No** ☒

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

Remarks:

APPENDIX C: Recent Precipitation Data

Figure 19-7 Rainfall documentation worksheet

Rainfall Documentation
(use with photographs)

Date: 3/22/2022

Weather Station: WETS station - Ellensburg, WA

Landowner: Rasmussen Tract no.:

County: Kittitas

State: WA

Soil Name:

Growing Season: 50% chance above frezing, 5/9 to 9/27, 141 days

Photo Date:

		Long-term rainfall records							
	Month	3 yrs. In 10 less than	Normal	3 yrs. In 10 more than	Rainfall	Condition dry, wet, normal	Condition value	Month weight value	Product of previous two columns
1st month prior*	Feb	0.59	0.91	1.10	0.00	Dry	1	3	**3**
2nd month prior*	Jan	0.65	1.19	1.45	1.49	Wet	3	2	**6**
3rd month prior*	Dec	0.73	1.47	1.80	0.43	Dry	1	1	**1**
	* Compared to photo date							Sum=	**10**

Note: if sum is

6 - 9	then prior period has been drier than normal	Dry	=1
10 - 14	then prior period has been normal	Normal	=2
15 - 18	then prior period has been wetter than normal	Wet	=3

Conditon value: Dry =1, Normal =2, Wet =3

Conclusions: ***Prior period has been normal***

WETS Table

WETS Station: ELLENSBURG, WA								
Requested years: 1971 - 2000								
Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg Snowfall
Jan	34.4	19.4	26.9	1.19	0.65	1.45	4	8.5
Feb	41.6	23.4	32.5	0.91	0.59	1.10	4	3.4
Mar	52.5	28.7	40.6	0.76	0.36	0.93	3	1.1
Apr	60.6	34.2	47.4	0.59	0.35	0.71	2	0.2
May	68.6	41.9	55.2	0.57	0.35	0.69	2	0.0
Jun	75.5	48.3	61.9	0.64	0.26	0.78	2	0.0
Jul	83.3	52.8	68.0	0.37	0.19	0.42	1	0.0
Aug	83.5	52.1	67.8	0.36	0.10	0.38	1	0.0
Sep	75.0	42.7	58.9	0.45	0.15	0.44	1	0.0
Oct	62.0	32.7	47.3	0.55	0.19	0.64	2	0.1
Nov	44.7	26.7	35.7	1.10	0.59	1.35	4	3.3
Dec	34.4	19.9	27.2	1.47	0.73	1.80	5	10.6
Annual:					7.67	9.98		
Average	59.7	35.2	47.5	-	-	-	-	-
Total	-	-	-	8.97			30	27.2

GROWING SEASON DATES			
Years with missing data:	24 deg = 4	28 deg = 4	32 deg = 3
Years with no occurrence:	24 deg = 0	28 deg = 0	32 deg = 0
Data years used:	24 deg = 26	28 deg = 26	32 deg = 27
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	4/5 to 10/24: 202 days	4/20 to 10/10: 173 days	5/9 to 9/27: 141 days
70 percent *	4/1 to 10/29: 211 days	4/16 to 10/14: 181 days	5/5 to 10/2: 150 days
* Percent chance of the growing season occurring between the Beginning and Ending dates.			

STATS TABLE - total precipitation (inches)													
Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1893		1.21	0.84	2.17	1.38		0.47	0.00	1.11	0.71	1.65	0.33	9.87
1894	1.21	0.81	1.03	0.67	0.46	0.53			0.13	0.94	0.99	M1.04	7.81
1895	2.37	0.25	0.02	0.18	0.62	T	T		0.98	0.00	0.20	2.25	6.87
1896	1.89	0.58	0.71	0.94	1.26	0.17	0.00		0.63	0.22	3.45	1.36	11.21
1897	1.62	1.93	0.15	0.08	0.42	0.80	0.17		0.19	0.47	3.92	2.93	12.68
1898	0.36	0.47	0.12	0.03	0.12	0.73	0.05	0.29	0.22	0.22	0.56	0.54	3.71
1899	2.44	1.68	0.18	0.10	0.39	0.19	0.05	0.99	0.40	0.65	2.27	0.58	9.92
1900	0.97	0.70	0.91	0.50	0.42	0.05	0.10	0.23	1.40	0.98	1.27	1.14	8.67
1901	1.97	1.74	0.31	0.32	0.88	0.29	0.00	0.03	0.	0.	2.20	0.89	9.42

									52	27			
1902	1.26	3.20	0.43	1.79	0.66	0.05	0.51	0.00	0.17	0.74	1.53	3.24	13.58
1903	0.67	0.28	0.27	0.51	0.10	1.28	0.05	0.30	0.69	0.60	3.59	0.41	8.75
1904	0.56	2.37	2.32	0.73	T	0.63	0.40	0.28	0.20	0.19	1.25	1.44	10.37
1905	1.81	0.36	0.41	0.16	0.54	4.54	0.15	0.34	0.38	1.42	0.47	0.77	11.35
1906	1.08	1.20	1.02	0.00	1.23	0.87	0.09	0.33	0.27	0.20	3.20	2.81	12.30
1907	2.09	1.33	0.62	0.30	0.38	1.37	0.27	0.40	1.20	0.29	0.66	2.12	11.03
1908	0.82	0.79	0.61	0.18	1.42	0.10	1.67	0.04	0.04	1.31	0.70	M0.32	8.00
1909	M1.70	0.86	0.36	T	0.26	0.41	0.89	0.00	0.56	0.58	2.71	1.08	9.41
1910	1.13	0.99	0.88	0.37	0.16	0.44	0.00	0.00	0.65	0.16	2.48	1.08	8.34
1911	0.24	0.40	0.32	0.22	1.54	0.59	T	0.20	2.76	0.23	0.25	0.82	7.57
1912	1.99	0.70	0.32	0.65	0.52	0.86	0.38	0.95	0.24	0.91	1.46	1.23	10.21
1913	1.06	0.81	0.05	0.56	0.84	1.07	0.00	0.13	M0.23	1.25	1.35	0.88	8.23
1914	2.42	0.99	0.07	0.49	0.78	0.93	0.68	0.00	0.85	1.25	0.82	1.26	10.54
1915	1.46	1.59	0.83	0.26	2.16	0.26	0.44	0.06	0.03	0.64	3.31	2.22	13.26
1916	1.43	2.76	1.38	0.18	0.17	0.77	M1.06	0.00	0.23	T	0.61	1.10	9.69
1917	0.70	0.67	0.38	0.53	0.18	0.38	0.02	0.00	0.55	T	1.34	3.06	7.81
1918	1.10	0.67	0.45	T	0.89	0.18	1.33	0.31	0.10	1.38	0.65	0.85	7.91
1919	2.01	1.75	0.51	0.15	0.67	T	T	0.20	1.28	0.17	0.65	0.78	8.17
1920	0.91	T	0.02	0.51	0.42	0.34	0.65	0.59	0.60	0.95	1.61	2.24	8.84
1921	2.37	1.01	0.53	0.18	1.06	0.25	0.05	T	0.35	0.37	4.30	1.68	12.15
1922	0.36	0.30	0.60	0.05	M0.39	T	0.00	0.50	0.51	0.98	0.46	2.40	6.55
1923	1.51	0.36	0.47	0.64	0.38	1.05	0.58	0.88	0.93	0.67	M0.36	1.89	9.72
1924	1.06	1.01	0.05	T	T	0.11	0.17	0.29	0.35	0.15	2.26	0.72	6.17
1925	M0.87	0.42	0.05	0.76	0.96	0.76	0.00	0.00	2.09	0.35	0.56	1.17	7.99
1926	0.80	1.51	0.24	0.13	T	0.20	0.00	0.31	0.25	0.53	3.56	1.79	9.32
1927	3.78	0.87	0.26	0.10	0.39	0.27	T	0.18	0.71	1.68	2.30	0.77	11.31
1928	1.46	0.10	0.45	0.70	0.12	0.31	0.18	0.35	0.26	0.49	0.74	1.35	6.51
1929	1.43	0.01	0.35	0.21	0.49	0.50	0.00	0.00	0.11	0.11	0.00	1.25	4.46
1930	0.37	1.36	0.60	0.38	0.25	0.29	0.00	0.00	0.21	0.17	0.21	0.15	3.99
1931	1.22	0.25	1.35	0.00	T	1.27	0.00	0.00	0.31	0.37	0.45	2.63	7.85
1932	1.10	0.33	0.85	0.28	0.53	0.04	T	0.17	0.09	0.17	1.75	0.77	6.08
1933	0.81	0.40	1.09	0.03	0.77	0.49	T	0.44	0.39	1.02	0.43	M3.46	9.33
1934	0.85	0.10	0.66	0.17	0.05	0.12	M0.00	0.00	0.18	0.99	1.66	0.94	5.72
1935	M0.58	0.07	0.57	0.00	0.12	0.27	0.06	M0.05	M0.	0.	0.42	0.38	3.25

									17	56			
1936	2.33	1.10	0.82	0.50	0.63	1.91	0.20	0.00	0.16	0.19	0.22	1.83	9.89
1937	M1.62	1.40	1.60	1.42	0.04	4.43	0.05	0.55	0.35	0.39	3.14	2.45	17.44
1938	0.95	1.90										0.95	3.80
1939	0.77	1.01	0.45	0.03	0.31	0.17	0.01	0.11	0.13	0.34	0.08	1.95	5.36
1940	1.20	2.50	0.38	1.09	0.49	0.03	0.43	0.04	0.85	1.49	1.09	1.74	11.33
1941	1.26	0.85	0.67	1.32	0.57	0.54	0.10						5.31
1942													
1943													
1944													
1945													
1946													
1947													
1948													
1949													
1950													
1951													
1952													
1953									0.08	M0.08	0.98	1.03	2.17
1954	2.34	0.40	0.33	0.04	0.26	0.53	0.26	0.20	0.77	0.22	0.69	0.19	6.23
1955	0.39	0.47	0.89	0.37	0.15	0.42	0.29	0.00	0.61	0.87	2.58	M2.26	9.30
1956	2.49	0.49	0.47	T	0.92	1.57	0.09	0.08	0.51	0.87	0.30	0.80	8.59
1957	0.82	M0.70	M2.34	0.80	0.85	0.37	T	0.44	0.36	1.17	0.28	0.90	9.03
1958	1.52	1.58	1.12	M0.41	0.33	M0.47	0.02	0.13	0.16	0.54	1.92	0.93	9.13
1959	2.12	0.74	0.65	0.03	0.17	0.39	0.12	T	1.02	0.63	0.84	0.28	6.99
1960	0.52	1.58	0.74	0.73	1.07	0.08	T	0.36	0.18	0.25	1.61	0.93	8.05
1961	0.48	2.19	2.47	0.96	1.05	0.86	0.20	0.11	0.00	0.30	0.93	1.87	11.42
1962	0.22	1.61	0.53	0.84	1.68	0.52	T	0.22	0.34	1.84	1.53	0.72	10.05
1963	0.19	1.54	1.04	2.15	0.29	0.57	0.45	0.31	0.21	0.70	0.93	1.91	10.29
1964	0.92	0.03	0.05	0.38	0.12	1.04	0.21	0.10	0.06	0.25	1.01	2.60	6.77
1965	1.65	0.11	0.10	0.84	0.07	0.35	0.41	0.94	0.07	0.08	1.79	1.23	7.64
1966	1.42	0.26	0.49	0.00	0.17	0.65	1.28	0.00	1.39	0.89	2.60	1.19	10.34
1967	0.91	0.02	0.50	1.20	0.45	1.24	T	0.00	0.14	M0.51	0.57	1.04	6.58
1968	1.82	1.03	0.28	0.14	0.55	T	0.01	1.65	0.03	0.94	1.46	1.60	9.51
1969	M1.22	1.30	0.08	0.47	0.29	0.18	0.00	0.05	1.15	0.38	0.28	1.90	7.30
1970	4.39	0.47	0.63	0.51	1.08	0.04	T	0.02	0.00	0.46	1.69	2.00	11.29
1971	1.68	0.86	3.40	0.42	0.38	0.40	0.13	0.03	0.56	0.41	0.66	2.19	11.12
1972	M0.63	0.54	0.96	0.39	1.22	1.63	T	0.40	0.26	0.00	1.14		7.17
1973	0.23	0.24	0.11				0.04	0.02		1.30		2.53	4.47
1974	1.88	0.81	0.76	1.13	0.34	0.24	0.17	T	T	0.26	0.52	1.26	7.37

1975	1.60	1.16	0.63	0.68	0.44	0.43	0.27	1.70	0.00	1.12	0.75	1.86	10.64
1976	0.92	0.93	0.37	0.44	0.11	0.14	0.20	1.40	0.03	0.06	0.01	0.07	4.68
1977	0.12	0.49	0.56	0.27	0.86	0.91	0.11	0.70	0.98	0.16	1.00	2.71	8.87
1978	2.71	1.44	0.82	0.70	0.48	0.32	0.67	0.28	0.52	0.01	0.92	0.24	9.11
1979	0.67	0.99	0.27	0.16	0.05	0.02	0.16	0.59	0.12	1.19	1.50	M0.76	6.48
1980	1.99	1.92	0.31	0.36	0.60	1.10	0.35		0.68	0.58	1.42	2.95	12.26
1981	1.07	1.02	0.07		1.06	0.44	0.62	0.12	0.78	0.63	1.09	2.09	8.99
1982	1.10	1.20	0.25	0.13	0.49	0.69	0.54	0.16	1.48	1.40	0.97	2.24	10.65
1983	M1.17	1.53	2.07	0.86	0.42	0.15	0.45	0.54	0.65	0.02	2.18	M1.69	11.73
1984	0.54	0.61	1.30	0.97	0.84	1.69	T	0.03	1.19	0.21	2.24	0.50	10.12
1985	0.12	0.69	1.01	0.06	0.33	0.51	0.05	0.03	0.88	0.40	0.90	1.22	6.20
1986	1.80	1.36	0.23	0.22	0.11	0.17	0.18	0.11	1.81	0.58	0.72	1.03	8.32
1987	1.38	0.49	0.43	0.27	0.58	0.22	0.43	0.06	0.00	0.02	0.45	3.16	7.49
1988	0.75	T	0.22	1.00	0.44	0.78	T	0.12		0.03	1.43	0.57	5.34
1989	0.37	1.43	1.30	0.86	0.70	0.02	0.04	0.13	T	0.92	0.67	0.32	6.76
1990	1.49	0.20	0.14	0.55	1.18	0.84	0.68	2.11	0.04	0.52	0.16	0.34	8.25
1991	0.21	0.22	1.56	0.42	0.39	1.62	1.11	0.25	0.01	0.39	1.81	0.37	8.36
1992	0.47	0.74	0.71	1.12	0.00	1.17	0.95	0.25	0.10	0.46	1.20	M2.00	9.17
1993	1.12	0.58	0.68	0.97	0.55	1.61	0.49	T	T	0.13	0.20	1.39	7.72
1994	0.57	0.69	0.16	1.21	0.60	0.98	0.66	0.16	0.20	1.67	1.36	1.53	9.79
1995	2.94	0.33	1.30	0.90	0.67	0.60	0.59	0.38	1.11	0.65	2.56	2.11	14.14
1996	1.58	2.09	0.36	0.54	0.76	0.38	0.33	0.07	0.17	0.73	1.95	M4.22	13.18
1997	1.40	M0.49	0.88	0.43	M0.46	M1.01	0.31	0.30	0.53	1.94	1.13	0.36	9.24
1998	2.02	1.73	1.00	0.54	1.60	0.17	1.05	0.13	T	0.24	1.00	1.55	11.03
1999	M1.25	1.29	0.30	0.17	0.57	0.13	0.38	0.40	T	0.30	1.10	0.45	6.34
2000	1.36	1.37	0.61	0.71	0.40	0.16	0.00	0.00	0.38	0.29	0.99	0.93	7.20
2001	0.59	0.44	0.78	1.03	0.13	1.40	T	0.26	0.19	0.64	2.01	1.29	8.76
2002	M0.78	0.57	0.54	1.06	0.63	M0.19	0.13	0.00	0.04	0.08	0.52	3.22	7.76
2003	2.52	0.31	0.50	0.98	0.21	0.26	0.00	0.13	0.08	0.38	0.16		5.53
2004	M1.29	M1.27	0.61	0.12	0.88	M0.41	0.39	0.83	0.33	0.91	0.18		7.22
2005	0.90	0.16	0.53	0.33	1.68	0.19	0.14	0.06		0.79	1.85		6.63
2006	M2.44	0.83	0.24	0.85	0.83	0.63	0.05	0.00	0.73	0.38	3.58	M2.39	12.95
2007	0.34	0.98	0.12	0.09	0.44	0.19	0.05	0.09	0.03	1.07	1.55	1.14	6.09
2008	0.83	0.32	0.64	M0.37		0.22	0.12	0.45	T	0.39	1.66	M0.86	5.86

2009	M2.66	0.62	1.50	0.40	0.38	0.11	0.05	0.02	0.39	1.18	0.56	0.66	8.53
2010	2.16	1.10	M0.03	0.77	1.33	1.00	0.03	0.03	1.81	M0.44	M0.64	1.70	11.04
2011	0.86	0.28	2.10	0.26	2.84	0.34	0.55	M0.00	0.02	0.65	M0.40	0.57	8.87
2012	1.19	0.79	1.39	1.00	0.23	0.63	M0.53	0.02	0.31	1.95	0.74	1.90	10.68
2013	0.18	0.03	0.57	0.50	M0.00		0.01	0.20	1.47	0.19	M0.37	0.44	3.96
2014	0.41	1.10	0.70	0.33	M0.27	0.06	0.23	0.92	0.30	M1.26	0.73	0.91	7.22
2015	0.80	1.13	0.63	0.00	0.93	0.06	T	0.01	0.04	0.47	0.96	3.88	8.91
2016	2.30	0.40	2.50	0.45	1.09	0.45	0.91	0.08	0.19	2.57	0.63	0.66	12.23
2017	1.54	2.04	1.49	1.83	0.88	0.46	0.00	0.09	0.17	1.14	1.83	0.73	12.20
2018	0.95	M0.35	0.65	0.77	0.59	0.61	0.00	0.00	0.01	M1.44	0.37	1.17	6.91
2019	1.03	1.90	0.41	0.88	1.33	0.17	T	M0.70	0.74	0.68	0.14	0.67	8.65
2020	1.27	0.32	0.31	0.10	0.97	0.32	0.00	0.00	0.37	0.78	0.70	0.79	5.93
2021	1.41	0.60	0.06	0.11	0.12	0.33	0.00	0.05	0.46	0.53	1.69	0.43	5.79
2022	1.49	T	M0.38										1.87
Notes: Data missing in any month have an "M" flag. A "T" indicates a trace of precipitation.													
Data missing for all days in a month or year is blank.													
Creation date: 2022-03-24													