draft/final wetland & stream assessment REPORT

 XX Region

Project Name

Month Day, Year

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# Acronyms & Abbreviations

Corps U.S. Army Corps of Engineers

DNR Washington Department of Natural Resources

Ecology Washington State Department of Ecology

EEM estuarine emergent

HGM hydrogeomorphic wetland classification

HTL high tide line

I interstate

MP milepost

NRCS U.S. Department of Agriculture Natural Resources Conservation Service

NWI National Wetlands Inventory

OHWM ordinary high water mark

PEM palustrine emergent

PEO project engineer office

PFO palustrine forested

PSS palustrine scrub-shrub

SR state route

WDFW Washington State Department of Fish and Wildlife

WSDOT Washington State Department of Transportation

WRIA water resource inventory area

## Introduction

This report identifies the location of and describes wetlands, streams, and other waters within the study area for the project name project.

This report will help the Washington State Department of Transportation (WSDOT) avoid and minimize impacts, apply for permits, and compensate for unavoidable impacts.

All waters identified in this report are assumed to be under both US Army Corps of Engineers (Corps) and Washington State Department of Ecology (Ecology) jurisdiction.

## Proposed Project

### Project Location

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1. Vicinity Map

### Project Purpose and Need

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### Project Description

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### Study Area

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1. Study area showing approximate wetland and stream locations

## Methods

The following data sources were reviewed for information on precipitation, topography, drainage patterns, soils, vegetation, potential or known wetlands and streams in the project vicinity, and sensitive species and habitats:

Antecedent Precipitation Tool Version 2.0 (U.S. Army Corps of engineers [Corps], 2023) OR U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) Climate Data for XX County, Station XX, Washington (U.S. Department of Agriculture Natural Resources Conservation Service [NRCS], n.d.a).

U.S. Geological Survey topographic maps (U.S. Geological Survey, n.d.).

National Wetlands Inventory (NWI) maps (U.S. Fish and Wildlife Service, n.d.).

NRCS Web Soil Survey for XX County, Washington (NRCS, 2019) and Washington State Hydric Soils (NRCS, n.d.b).

 XX County/City Wetland Inventory Map (Citation, XXXX) .

 Aerial photograph, Washington 1ft 2017, 4 band, Statewide Imagery.

Wetlands of High Conservation Value and Washington State threatened, endangered, and sensitive plants (Washington State Department of Natural Resources [DNR], n.d.).

Federally listed threatened, endangered, or candidate wildlife species (Washington State Department of Fish and Wildlife [WDFW], 2018) and proposed and designated critical habitat (National Oceanic and Atmospheric Administration Fisheries, n.d.).

WDFW Priority Habitats and Species (WDFW, n.d.b).

Scientific plant names in this report are from the Corps National Wetland Plant List, version 3.5 (Corps, 2020).

Fieldwork for this assessment was completed between Month Day, Year, and Month Day, Year by WSDOT OR Consultant Firm wetland biologists names.

Boundaries of waters within the study area were flagged by biologists and subsequently surveyed by a survey crew.

Some waters have boundaries extending beyond the study area. Boundaries extending outside of the study area were estimated using available mapping resources and visual observations from accessible areas.

The city of XX/XX County buffers (city of XX 202X/XX County, 202X) were applied to wetlands, streams, and other waters in the project, in conjunction with Ecology tables for adjusting rating scores (2004 to 2014 versions with July 2018 modifications) (Washington State Department of Ecology, n.d.) and the Washington State Department of Natural Resources (DNR) Forest Practices Rules, water type classifications (DNR, 2022).

### Wetlands

Wetlands were delineated using routine methods described in:

Corps of Engineers Wetlands Delineation Manual (Corps, 1987).

Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (AW Regional Supplement) (Corps, 2008). OR Regional Supplement to the Corps Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (WMVC Regional Supplement) (Corps, 2010).

Wetlands were classified using the U.S. Fish and Wildlife Service classification system (Cowardin et al., 1979) and the hydrogeomorphic classification system (HGM) (Brinson, 1993). Wetlands were rated using the Washington State Wetland Rating System for Eastern OR Western Washington: 2014 Update (Hruby, 2014). The XX Municipal Code (city of XX/XX County, 202X) references the 2004 Rating System. Wetland functions were assessed using the Wetland Functions Characterization Tool for Linear Projects (BPJ tool) (Null et al., 2000).

### Streams

The ordinary high water mark (OHWM) of each stream was delineated using Corps guidance for OHWM identification (Corps, 2005; Lichvar & McColley, 2008 OR Mersel & Lichvar, 2014).

Fish presence was determined based on available WDFW Fish Passage Inventory (WDFW, n.d.a) and Fish Distribution data (WDFW & Northwest Indian Fisheries Commission, 2018).

Impaired waters, those on the 303(d) list or covered by a Total Maximum Daily Load (TMDL), in the study area were identified using Ecology’s Water Quality Atlas website.

Special designations were determined using the:

Corps list of Navigable Waters of the United States in Washington State (Corps, 2008)

National Wild & Scenic Rivers System website for Washington State

Others

### High Tide Line

Biologists coordinated with the Corps on date to determine HTL.

The highest astronomical tide was used to delineate tidally influenced waters in the study area (Corps Seattle District, 2020).

OR

To establish High Tide Line, biologists reviewed mean elevation of the Highest Predicted Tide data for the station name, Washington Station number XXX for the 10-year period between month day, year and month day, year (Citation, XXX).

OR

Field indicators were observed on month day, year and used to establish HTL consistent with Anderson et al., 2016.

## Existing Conditions

### Landscape Setting

Text

### Watershed Description

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### Climate

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### Precipitation

Precipitation conditions were normal, drier than normal, OR wetter than normal for the three months prior to field work. X of the three months prior to field work were within the normal range with the second prior month drier than normal (Appendix A-1).

No, light, moderate, OR heavy precipitation was recorded in the ten days preceding field work (Appendix A-2).

### Growing Season

Text

## Results

### Wetlands

Text

1. Wetlands delineated within the study area.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Wetlanda** | **Cowardinb** | **HGM** | **Ecology ratingc** | **Local Jurisdiction ratingd** | **Wetland Size (acre)** | **Buffer Width (feet)e** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| Total |  |  |  |  |  |  |

**a** Wetland identifier

**b** NWI Class based on vegetation: PFO = palustrine forested, PSS = palustrine scrub-shrub, PEM = palustrine emergent (Cowardin et al., 1979).

**c** (Hruby, 2014)

**d** X County/City wetland rating (city of XX 202X/XX County, 202X)

**e** X County/City wetland buffer width based on wetland category and high intensity land use (city of XX 202X/XX County, 202X)

Text

See the delineation data sheets and photos (Appendix B), wetland rating forms (Appendix C), functional assessment summaries (Appendix D), and plan sheets showing wetland locations (Appendix E) for additional details.

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1. Wetland boundaries

#### Vegetation

Text

\*\*\*Insert Photo of Typical Wetland Vegetation and Size to Fit With Text and Page Format \*\*\*

1. Photo of typical wetland in the study area.

#### Soils

Text

#### Hydrology

Text

#### Wetland Functions

Text

1. Functions and values of wetlands in the study area.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Function/Valuea** | **W1** | **W2** | **W3** | **W4** | **W5** | **W6** | **W7** | **W8** | **W9** | **W10** |
| Sediment Removal |  |  |  |  |  |  |  |  |  |  |
| Nutrient and Toxicant Removal |  |  |  |  |  |  |  |  |  |  |
| Flood Flow Alteration |  |  |  |  |  |  |  |  |  |  |
| Erosion Control & Shoreline Stabilization |  |  |  |  |  |  |  |  |  |  |
| Production & Export of Organic Matter |  |  |  |  |  |  |  |  |  |  |
| General Habitat Suitability |  |  |  |  |  |  |  |  |  |  |
| Habitat for Aquatic Invertebrates |  |  |  |  |  |  |  |  |  |  |
| Habitat for Amphibians |  |  |  |  |  |  |  |  |  |  |
| Habitat for Wetland-Associated Mammals |  |  |  |  |  |  |  |  |  |  |
| Habitat for Wetland-Associated Birds |  |  |  |  |  |  |  |  |  |  |
| General Fish Habitat |  |  |  |  |  |  |  |  |  |  |
| Native Plant Richness |  |  |  |  |  |  |  |  |  |  |
| Educational or Scientific Value |  |  |  |  |  |  |  |  |  |  |
| Uniqueness and Heritage |  |  |  |  |  |  |  |  |  |  |

**a** “-“ indicates that the function is not present

“X” indicates the function is present

“X\*” indicates a principal function of the wetland

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1. Wetland X
2. Wetland X summary

|  |  |
| --- | --- |
| **Location** | West of SR 000, north of XXX Blvd, and south of XXX Creek |
| **Local Jurisdiction** | city of XX/XX County |
| **Ecology Rating (2014)** |  |
| **Local Rating** |  |
| **city of XX/XX County****Buffer Width** | XX feet  |
| **Wetland Size** | XX.XX acres |
| **Cowardin Class** |  |
| **HGM Class** |  |
| **Wetland Data Sheet(s)** | Appendix B; Sampling Point W1-SP1  |
| **Upland Data Sheet(s)** | Appendix B; Sampling Point W1-SP2 |
| **Dominant Vegetation** | Trees – Sitka spruce (*Picea sitchensis*)Shrubs – hardhack (*Spiraea douglasii*)Herbaceous – small-fruited bulrush (*Scirpus microcarpus*), slough sedge (*Carex obnupta*) |
| **Soils** | Soil matrices of 10YR 3/2 with redoximorphic concentrations were observed throughout the upper 16 inches of the soil surface. Indicator Redox Dark Surface (F6) met. |
| **Hydrology** | Hillside seeps are the primary hydrology source for this wetland. The lowest area of the wetland abutting XXX Creek receives occasional overbank flows and regular hyporheic flow. Shallow inundation to three inches was observed small depressional areas nearest the creek. Indicators Inundation (A1) and Saturation (A3) met. |
| **Rationale for Delineation** | Slope and riverine wetland with hydric soils, supports hydrophytic vegetation, and has soils saturation in August during a drier part of the growing season. Hydric soils were helpful in determining the wetland boundary. Wetland soils had matrices of chroma 2. Upland areas directly adjacent had soil matrices of chroma 3. |
| **Rationale for Local Rating** | The XXX County Municipal Code classifies wetlands based on the Washington State Wetland Rating System and on land use intensity (XXX County 2020). Wetland X rates as a Category XX. |
| **Functions** | In general water quality and hydrologic functions are lacking or of low quality. The wetland provides moderate to high habitat functions. Functions summaries provided in Table 2 and Appendix D. |
| **Buffer Condition** | Buffer ranges from forested areas dominated by native conifers to mowed and managed grasslands. Forested buffer provides screening and habitat functions. Mowed areas of the buffer provided little buffering function. |

### Streams

Text

1. Streams within the study area.

|  |  |  |
| --- | --- | --- |
| **Stream Name** | **DNR Water Typea** | **Buffer Width (feet) b** |
|
|  |  |  |

a DNRWater Types: Type S = shorelines of the state, Type F = fish bearing or with physical criteria to support potential fish use, Type Np = non-fish bearing perennial, Type Ns = non-fish bearing seasonal (DNR, 2022)

b city of XX/XX County buffers applied (city of XX/XX County, 202X)

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1. Stream X
2. Stream X summary

|  |  |
| --- | --- |
| **Stream Name**  |  |
| **WRIA Name** |  |
| **WDFW Site ID** |  |
| **Local Jurisdiction** | City of XX/XX County |
| **DNR Water Type** |  |
| **Local Stream Rating** |  |
| **Buffer Width** | XXX feet |
| **Documented Fish Usea**  | list species  |
| **Location of Stream Relative to Project Corridor** | The creek parallels the entire project, and crosses the project twice, once near the beginning and end. |
| **Connectivity** | Flows south from Turtle Peak to the Eagle River near SR 000 |
| **Fish Habitat** | The stream is well shaded by riparian vegetation. Several pools and riffles were observed throughout the length within the project study area. |
| **Water Quality** | The creek is listed on the 303(d) list for Washington State for fecal coliform turbidity. |
| **Special Designations** | This stream does not have any special designations. |
| **Riparian/Buffer Condition** | The existing buffer west of the creek has mature forest. Vegetation in the riparian buffer is a combination of Sitka alder and serviceberry. SR 000 borders some of the riparian areas within the project. |

a Documented fish species known to occur in the stream from available data sources (WDFW, n.d.a; WDFW & Northwest Indian Fisheries Commission, 2018).

### High Tide Line

Text

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1. HTL field determination explanation
2. HTL summary

|  |  |
| --- | --- |
| **Tidal Water Name**  |  |
| **Local Jurisdiction** |  |
| **WRIA** |  |
| **City/County Shoreline Master Program shoreline designation** |  |
| **HTL elevationa** |  |
| **Buffer Width** | XXX feet |
| **Location Relative to Project Corridor** |  |
| **Field indicators above the HTL** |  |
| **Field indicators below the HTL** |  |
| **Buffer Condition** |  |

aHTL elevation relative to station name and number

### Other Aquatic Resources

Text

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1. Name of aquatic resource
2. Name of aquatic resource summary

|  |  |
| --- | --- |
| **Water Name** |  |
| **WRIA Name** |  |
| **Local Jurisdiction** |  |
| **DNR Water Type** |  |
| **Buffer Width** | XXX feet |
| **Documented Fish Usea**  | list species  |
| **Location of Water Relative to Project Corridor** |  |
| **Connectivity** | Flows south from Turtle Peak to the Eagle River near SR 000 |
| **Fish Habitat** | The lake is well shaded by riparian vegetation.  |
| **Water Quality** | The lake is listed on the 303(d) list for Washington State for fecal coliform turbidity. |
| **Special Designations** |  |
| **Buffer Condition** | The existing buffer west of the lake has mature forest. Vegetation in the buffer is a combination of Sitka alder and serviceberry. |

a Documented fish species known to occur in the stream from available data sources (WDFW, n.d.a; WDFW & Northwest Indian Fisheries Commission, 2018).

## Limitations

This assessment report documents the investigation, best professional judgment, and conclusions of WSDOT based on the site conditions encountered at the time of this study. The delineation was performed in compliance with accepted standards for professional wetland biologists and applicable federal, state, and local laws and ordinances, and WSDOT policies and guidance. The information contained in this report is correct and complete to the best of our knowledge.

This report is a preliminary jurisdictional determination of wetlands and other waters until it has been reviewed and approved in writing by the appropriate jurisdictional authorities. The final determination of the wetland boundary, classification, and required setback and buffer will be made by local, state, and federal jurisdictions.

This delineation is valid for five years from the date of the report unless new information warrants a revision on a more frequent basis (Corps, RGL 05-02).

## References

Anderson, P.S., Meyer, S., Olson, P., & Stockdale, E. (2016, October). *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State* (Publication No. 16-06-029). Washington State Department of Ecology. <https://apps.ecology.wa.gov/publications/summarypages/1606029.html>

Brinson, M.M. (1993). *A hydrogeomorphic classification for wetlands*. (Publication No. WRP-DE-4). U.S. Army Corps of Engineers Waterways Experiment Station. <https://wetlands.el.erdc.dren.mil/pdfs/wrpde4.pdf>

city of XXX. (Year, Month Day Published). city of XXX Municipal Code. Chapter XXX Critical Areas and Resource Lands, Section XXX Wetlands, and Section XXX Fish and Wildlife Habitat Conservation Areas. [add](https://www.codepublishing.com/WA/Yelm/) link

Cowardin, L.M., Carter, V., Golet, F.C., & LaRoe ET. (1979). *Classification of wetlands and deepwater habitats of the United States*. U.S. Fish and Wildlife Service. (Publication No. FWS/OBS-79/31). <https://www.fws.gov/wetlands/documents/classification-of-wetlands-and-deepwater-habitats-of-the-united-states.pdf>

Hruby, T. (2014). *Washington State Wetland Rating System for Eastern Washington-2014* (Publication No. 14-06-030). Washington Department of Ecology. <https://ecology.wa.gov/Water-Shorelines/Wetlands/Tools-resources/Rating-systems>

Hruby, T. (2014). *Washington State Wetland Rating System for Western Washington-2014* (Publication No. 14-06-029). Washington Department of Ecology. <https://ecology.wa.gov/Water-Shorelines/Wetlands/Tools-resources/Rating-systems>

Lichvar, R.W., & McColley, S.M. (2008). *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Publication No. TR-08-12). US Army Corps of Engineer Research and Development Center. <https://www.spl.usace.army.mil/Portals/17/docs/regulatory/JD/FinalOHWMManual_2008.pdf>

Mersel, M.K., & Lichvar, R.W. (2014). *A Guide to Ordinary High Water Mark (OHWM) Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States* (Publication No. TR-14-13). US Army Corps of Engineer Research and Development Center. <https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/reg_supp/>

National Oceanic and Atmospheric Administration Fisheries. (n.d.). *Critical Habitat*. Retrieved Month Day, Year, from [https://www.arcgis.com/apps/MapJournal/index.html?appid=75e5f6b4387f4809b5a6b1f251e38bda#](https://www.arcgis.com/apps/MapJournal/index.html?appid=75e5f6b4387f4809b5a6b1f251e38bda)

Null, W.S., Skinner, G., & Leonard, W. (2000). *Wetland functions characterization tool for linear projects*. Washington State Department of Transportation, Environmental Affairs Office. <https://wsdot.wa.gov/sites/default/files/2021-10/Env-Wet-FunctionCharacterTool.pdf>

*United States v. Washington*, No. C70-9213 (W.D. Wash. Mar. 29, 2013)

U.S. Army Corps of Engineers. (1987). *Corps of Engineers wetlands delineation manual*. (Publication No. Y-87-1 [online edition]). US Army Engineer Waterways Experiment Station. <https://usace.contentdm.oclc.org/digital/collection/p266001coll1/id/4532/>

U.S. Army Corps of Engineers. (2005). *Regulatory Guidance Letter 05-05 Ordinary High Water Mark Identification*. Regulatory guidance letters. <https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/Guidance-Letters/>

U.S. Army Corps of Engineers. (2008, September). *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Publication No. TR-08-28). U.S. Army Corps of Engineer Research and Development Center. <https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/reg_supp/>

U.S. Army Corps of Engineers. (2010, May). *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (Publication No. TR-10-3). U.S. Army Corps of Engineer Research and Development Center. <https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/reg_supp/>

U.S. Army Corps of Engineers. (2020). *National Wetland Plant List, version 3.5*. US Army Corps of Engineers. <http://wetland-plants.usace.army.mil/nwpl_static/v34/home/home.html>

U.S. Army Corps of Engineers Seattle District. (2020, February 21). *Special Public Notice*. <https://www.nws.usace.army.mil/Portals/27/docs/regulatory2/Public%20Notices/SPNs/20200221-HTL-SPN.pdf?ver=2020-02-21-162336-390>

U.S. Army Corps of Engineers. (2023, June 27) *Antecedent Precipitation Tool, Version 2.0*. US Army Corps of Engineers. Retrieved Month Day, Year from [Release APT v2.0.0 · erdc/Antecedent-Precipitation-Tool · GitHub](https://github.com/erdc/Antecedent-Precipitation-Tool/releases/tag/v2.0.0)

U.S. Department of Agriculture Natural Resources Conservation Service. (2015). Chapter 19 Hydrology Tools for Wetland Identification and Analysis. *Part 650 Engineering Field Handbook* (pp.19-85 - 19-89). <https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=37808.wba>

U.S. Department of Agriculture Natural Resources Conservation Service. (2019, July 31). *Web Soil Survey*. US Department of Agriculture. <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

U.S. Department of Agriculture Natural Resources Conservation Service.(n.d. a). *Field Office Technical Guide*. US Department of Agriculture. Climate Data for XX County, Station XX, Washington 45XXXX. Retrieved Month Day, Year from <http://agacis.rcc-acis.org/>

U.S. Department of Agriculture Natural Resources Conservation Service. (n.d. b). *State Soil Data Access (SDA) Hydric Soils List*: XXX County (WA). Retrieved Month Day, Year from <https://www.nrcs.usda.gov/publications/query-by-state.html>

U.S. Fish and Wildlife Service. (n.d.). *National Wetlands Inventory Wetlands Mapper*. Retrieved Month Day, Year from <https://www.fws.gov/program/national-wetlands-inventory/wetlands-mapper>

U.S. Geological Survey. (n.d.) *US Topo: Maps for America*. Retrieved Month Day, Year from <https://www.usgs.gov/core-science-systems/national-geospatial-program/us-topo-maps-america?qt-science_support_page_related_con=0#qt-science_support_page_related_con>

Washington State Department of Ecology. (n.d.) Tables for adjusting rating scores (2004 to 2014 versions with July 2018 modifications). *Wetland rating system*. <https://ecology.wa.gov/Water-Shorelines/Wetlands/Tools-resources/Rating-systems>

Washington State Department of Natural Resources. (2022, September). *Forest Practices Application Mapping Tool*. Retrieved Month Day, Year from <https://fpamt.dnr.wa.gov/default.aspx>

Washington State Department of Natural Resources. (n.d.). *The Washington Natural Heritage Program Data Explorer*. Retrieved Month Day, Year from <https://www.dnr.wa.gov/NHPdataexplorer>

Washington State Department of Fish and Wildlife. (n.d.a). *Washington State Fish passage*. Retrieved Month Day, Year from <https://geodataservices.wdfw.wa.gov/hp/fishpassage/index.html>

Washington State Department of Fish and Wildlife. (n.d.b). *PHS on the Web*. Retrieved Month Day, Year from <https://geodataservices.wdfw.wa.gov/hp/phs/>

Washington State Department of Fish and Wildlife. (2018, January 31). *Wildlife Occurrence Points, Species*. Retrieved Month Day, Year from WSDOT GIS Workbench Pro 3.1.241833.

Washington State Department of Fish and Wildlife, & Northwest Indian Fisheries Commission. (2018, January 31). *Salmonid Stock Inventory* & *Statewide Integrated Fish Distribution datasets*. These two data sets combine into a WSDOT accessed GIS layer titled *Fish Species of Interest*. Retrieved Month Day, Year from WSDOT GIS Workbench Pro 3.1.241833.

1. Background Information

Appendix A includes the following sub-appendices:

A-1 Comparison of Observed and Normal Precipitation for XXX, Washington

A-2 Daily Precipitation for 10 Days Preceding Fieldwork, XXX, Washington

A-3 Highest Predicted Tide Data

A-4 U.S. Geological Survey Topographic Map

A-5 National Wetland Inventory Map

A-6 Natural Resource Conservation Service Soil Survey Map

A-7 XXX County/City Wetland Inventory Map

A-8 Aerial photograph, Washington 1ft 2017, 4 band, Statewide Imagery

1. Comparison of Observed and Normal Precipitation

The Regional Delineation Supplement Version 2.0 (Corps, 2008 OR 2010) recommends using methods described in Chapter 19 in Engineering Field Handbook (NRCS, 2015) to determine if precipitation occurring in the three full months prior to the site visit was normal, drier than normal, or wetter than normal. Actual rainfall is compared to the normal range of the 30-year average. The following table shows this information.

**Monthly precipitation data for XXX, Washington.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Month** | **3 yrs. in 10 less thana** | **Averagea** | **3 yrs. in 10 more thana** | **Rain falla** | **Condition dry, wet, normalb** | **Condition Value** | **Month weight value** | **Product of previous two columns** |
| 1st prior month |  |  |  |  |  |  |  | 3 |  |
| 2nd prior month |  |  |  |  |  |  |  | 2 |  |
| 3rd prior month |  |  |  |  |  |  |  | 1 |  |
|  |  |  |  |  |  |  |  | **Sum** |  |

a NRCS, n.d.a

b Conditions are considered normal if they fall within the low and high range around the average.

Note: If sum is Condition value:

 6 - 9 then prior period has been drier than normal Dry (D) = 1

10 - 14 then period has been normal Normal (N) = 2

 15 - 18 then period has been wetter than normal Wet (W) = 3

Conclusions: Drier than normal, Normal, Wetter than normal precipitation conditions were present prior to the Month Day, Year field visit.

1. Daily Precipitation for 10 Days Preceding Fieldwork, XXX, Washington

To determine if light, moderate, or heavy precipitation occurred in the 10 days prior to field work, the 10-day total is compared to 1/3 of the monthly average precipitation for the month evaluated (NRCS n.d.a).

**Daily precipitation data preceding the Month Day, 20XX field visit for XXX, Washington.**

|  |  |
| --- | --- |
| **Date** **(20XX)** | **Daily Precipitation (inches)a** |
| Month Date | X.XX |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
| **Sum**  |  |

a NRCS n.d.a

“T” values indicate a trace value was recorded.

Conclusions: Light, Moderate, Heavy precipitation was recorded in the ten days preceding field work.

1. Highest Predicted Tide Data

Mean elevation of HPT over a 10-year period from Month Day, Year to Month Day, Year (National Oceanic and Atmospheric Administration, XXXX)

|  |  |
| --- | --- |
| **Date** | **HPT elevation** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

Mean elevation of HPT = XX.XX

1. U.S. Geological Survey Topographic Map

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1. National Wetland Inventory Map

\*\*\*Insert Figure Here and Fill Entire Page \*\*\*

1. Natural Resource Conservation Service Soil Survey Map

\*\*\*Insert Figure Here and Fill Entire Page \*\*\*

1. city of XX /XX County Wetland Inventory Map

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1. Aerial Photograph of Study Area, Washington 1ft 2017, 4 band, Statewide Imagery

\*\*\*Insert Figure Here and Fill Entire Page \*\*\*

1. Wetland Delineation Data Sheets

Appendix B includes the following sample point data sheets:

W1-SP1

W1-SP2

W2-SP1

W2-SP2

W2-SP3

1. Wetland Rating Forms

Appendix C includes wetland rating forms and all required figures for each wetland.

1. Wetland Functional Assessment Summaries

|  |
| --- |
| Summary of Functions and Values**Project: Wetland ID:****Cowardin Class: HGM: Ecology Rating: city of X/X County Rating:****Assessed by: Date:** |
| **Function/Value** |  **Y**  | **N** | **Rationale** **(qualifiers & attributes)**  | **Principal Function** | **Comments** |
| Flood flow alteration |  |  |  |  |  |
| Sediment removal |  |  |  |  |  |
| Nutrient and toxic removal |  |  |  |  |  |
| Erosion control & shoreline stabilization |  |  |  |  |  |
| Production of organic matter and its export |  |  |  |  |  |
| General habitat suitability |  |  |  |  |  |
| Habitat for aquatic invertebrates |  |  |  |  |  |
| Habitat for amphibians |  |  |  |  |  |
| Habitat for wetland-associated mammals |  |  |  |  |  |
| Habitat for wetland-associated birds |  |  |  |  |  |
| General fish habitat |  |  |  |  |  |
| Native plant richness |  |  |  |  |  |
| Educational or scientific use |  |  |  |  |  |
| Uniqueness & heritage |  |  |  |  |  |

1. Plan Sheets