SR 240 Yakima River Bridge Replacement (Yakima River Bridge 2)

USACE NWP (23) 2002-4-00799

South Central Region
2017 MONITORING REPORT

Wetlands Program

Issued March 2018
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**SR 240 Yakima River Bridge Replacement**

**USACE NWP (23) 2002-4-00799**

<table>
<thead>
<tr>
<th>General Site Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>USACE NWP 23 Number</strong></td>
</tr>
<tr>
<td><strong>Mitigation Location</strong></td>
</tr>
<tr>
<td><strong>LLID Number</strong></td>
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</tbody>
</table>
| **Construction Date** | Initial construction: 2007 
Remediation: 2011–2012 |
| **Monitoring Period** | 2013–2017 |
| **Year of Monitoring** | 5 of 5 |
| **Area of Project Impact** | 0.47 acre |
| **Type of Mitigation** | Wetland Establishment |
| **Planned Area of Mitigation** | 0.94 acre |

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1 The area of project impact referenced from the USACE permit number 2002-4-00799 (USACE 2002).
2 The planned area of mitigation referenced from the revised mitigation performance standards dated June 9, 2011 (WSDOT 2011).
Summary of Monitoring Results and Management Activities (2017)

<table>
<thead>
<tr>
<th>Performance Standards</th>
<th>2017 Results³</th>
<th>Management Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water regime sufficient to support facultative or wetter vegetative species within the created wetland area</td>
<td>See results section</td>
<td></td>
</tr>
<tr>
<td>Minimum of 0.94 acres of wetland</td>
<td>See results section</td>
<td></td>
</tr>
<tr>
<td>At least one native emergent species in the emergent community</td>
<td>Five native species present</td>
<td></td>
</tr>
<tr>
<td>20% cover of native emergent species</td>
<td>75% cover (visual estimate)</td>
<td></td>
</tr>
<tr>
<td>At least one native wetland shrub species in the scrub-shrub community</td>
<td>Three native species present</td>
<td></td>
</tr>
<tr>
<td>20% cover of native wetland shrubs</td>
<td>25% cover (CI80% = 19-31%)</td>
<td></td>
</tr>
<tr>
<td>Wildlife presence documented</td>
<td>Presence documented;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>See results section</td>
<td></td>
</tr>
<tr>
<td>Noxious weeds eradicated or controlled as required</td>
<td>Class A noxious weed, flowering rush (<em>Butomus umbellatus</em>), reduced but still present on-site.</td>
<td>8/15–16/2017: Hand removal of remaining Class A Noxious Weed: flowering rush.</td>
</tr>
<tr>
<td></td>
<td>Small amounts of Class B-designate, purple loosestrife (<em>Lythrum salicaria</em>), and Class C-designate, pale yellow iris (<em>Iris pseudacorus</em>), present in the emergent area.</td>
<td></td>
</tr>
<tr>
<td>Reed canarygrass (<em>Phalaris arundinacea</em>) controlled if it interferes with the establishment of planted species</td>
<td>&lt;1% cover</td>
<td></td>
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</tbody>
</table>

Report Introduction

This report summarizes final-year (Year 5) monitoring activities at the 240 Yakima River Bridge 2 Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site success. Monitoring activities included vegetation surveys and photo-documentation. Monitoring was conducted on August 2, 2017.

³ Estimated values are presented with their corresponding statistical confidence interval. For example, 25% cover (CI80% = 19-31%) means we are 80% confident that the true cover value is between 19% and 31%.
What is the 240 Yakima River Bridge 2 Site?

This mitigation site is made up of 0.94 acre of wetland establishment (Figure 1) and 0.50 acre of wetland enhancement (not shown). This site was created to compensate for the loss of 0.47 acre of wetland due to the replacement of the SR 240 bridge that spans the Yakima River. The site is designed to include an emergent and scrub shrub wetland with an open water element, intending to provide off-channel fish habitat as well as wildlife connectivity.

![Site Sketch](image)

The site is situated beneath the Yakima River Bridge along the banks of the Yakima River. Much of the site is shaded and remediation efforts have been ongoing to establish a plant community that will thrive in this area. Appendix 2 includes site directions.
What are the performance standards for this site?
(from WSDOT 2011)

**Performance Standard 1**
The water regime will be sufficient to support facultative or wetter vegetative species within the created wetland area.

**Performance Standard 2**
The wetland areas will be delineated using current methodology to assure that the mitigation site contains a minimum of 0.94 acres of wetland.

**Performance Standard 3**
There will be at least one native emergent species in the emergent community.

**Performance Standard 4**
Cover of native wetland emergent species (planted and volunteer) will be at least 20 percent in the emergent community.

**Performance Standard 5**
There will be at least one native wetland shrub species in the scrub-shrub community.

**Performance Standard 6**
Cover of native wetland shrubs (planted and volunteer) will be at least 20 percent in the scrub-shrub community.

**Performance Standard 7**
Wildlife presence in the created and enhanced wetland areas will be documented via direct observations or indirect evidence such as tracks, scat, nests, or other indicators of use.
Performance Standard 8
Note 1: Eradication of all occurrences of Class A weeds is required by state law.
Note 2: The Washington State Noxious Weed Control Board or a county weed board may designate certain Class B weeds for control or eradication in regions where they are not yet widespread.
Note 3: Washington state-listed or county-listed Class A weeds must be eradicated. All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.
Note 4: Class B and Class C weeds as listed by the BCNWCB are designated for control. All occurrences shall be immediately reported to the site manager and control measures will be initiated within 30 days of the report.
Note 5: Noxious and Invasive weed control standards apply to both the wetland creation area and the enhancement zone.

Performance Standard 9
Reed canarygrass will be controlled only if it interferes with the establishment of planted species on the site.

Appendix 1 shows the as-built grading and planting plan (WSDOT 2016).
How were the performance standards evaluated?


The table below documents the sampling methodology utilized for the remaining performance standards (PS) as required by the mitigation plan. For additional details on the methods see the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).

**Placement of Baseline:** A 90-meter-long baseline was placed perpendicular to the bridge along the southern edge of the site. Eighteen transects were positioned perpendicular to the baseline. Transects 5-13 were located under the bridge.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>PS 1, 3 &amp; 4</th>
<th>PS 1, 5 &amp; 6</th>
<th>PS 7</th>
<th>PS 8 &amp; 9</th>
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<tr>
<td>Target population</td>
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</tr>
<tr>
<td>Native emergent</td>
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</tr>
<tr>
<td>species</td>
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</tr>
<tr>
<td>Native woody species</td>
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</tr>
<tr>
<td>Wildlife</td>
<td></td>
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</tr>
<tr>
<td>Noxious weeds</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Zone</td>
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<td></td>
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</tr>
<tr>
<td>PEM</td>
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<tr>
<td>Sample method</td>
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<tr>
<td>Visual estimate</td>
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<td>Line Intercept</td>
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</tr>
<tr>
<td>Observation</td>
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<td></td>
</tr>
<tr>
<td>Visual estimate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SU length</td>
<td>10</td>
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</tr>
<tr>
<td>Total # of SU</td>
<td>47</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 2** Site Sampling Design (2017)
Is this site a success?

This site has struggled to succeed since its initial construction in 2007, primarily due to bridge shading effects and fluctuating water levels. Since re-evaluation of the site and subsequent remediation efforts in 2011 and 2012, however, the mitigation has been much more successful. Native woody species are now well-established in the areas outside of the bridge’s shading effects and a small but robust native emergent community has been established at the mouth of the backwater. The site is now meeting all of its revised final-year vegetative performance standards.

Results for Performance Standard 1
(The water regime will be sufficient to support facultative or wetter vegetative species within the created wetland area.):

The water regime was found to be sufficient to support, and outside the dripline of the bridge does support, facultative or wetter vegetative species (see results for Performance Standards 3 and 5 below for a list of applicable native species present).

Results for Performance Standard 2
(Minimum of 0.94 acres of wetland):

A wetland delineation was conducted on August 3, 2015 and the results show a total of 1.00 acre of wetland within the wetland creation area (see Appendix 3 for the full wetland delineation report).

Results for Performance Standard 3
(There will be at least one native emergent species in the emergent community.):

Five native emergent species were identified within the emergent community. The community is dominated by broadleaf cattail (Typha latifolia) and wapato (Sagittaria latifolia). Other native herbaceous species present in this zone include rice cutgrass (Leersia oryzoides), yellowseed false pimpernel (Lindernia dubia), and devil's beggartick (Bidens frondosa). There were also several volunteer sandbar willows (Salix exigua) present in this zone.
Results for Performance Standard 4
(20% cover of native emergent species):

Cover of native emergent species in the emergent wetland (Photo 1) was visually estimated at 75 percent. This includes only the small area that has developed as emergent wetland at the mouth of the backwater. The rest of the permanently inundated backwater area has virtually no vascular plant growth and is dominated by algae.

Results for Performance Standard 5
(At least one native wetland shrub species in the scrub-shrub community):

Three native shrub species were identified within the scrub-shrub wetland community. The dominant species was Pacific willow (*Salix lasiandra*), which was accompanied by sandbar willow, and a couple of gray alders (*Alnus incana*).

Results for Performance Standard 6
(20% percent cover of native wetland shrubs):

Cover of native wetland shrubs in the scrub-shrub wetland (Photo 2) is estimated at 25% (CI80% = 19-31%). This includes areas under the bridges that were not permanently inundated. The vast majority of the woody cover was located outside of the dripline of the bridges to the east and west. The cover in these areas alone is estimated at 58% (CI80% = 50-66%).
Results for Performance Standard 7
(Wildlife presence will be documented):

Documented wildlife presence in 2017 included deer (lots of tracks on-site and a doe and fawn observed drinking from the ponded area) (Photo 3), unidentified small mammal tracks, bullfrogs, and schools of catfish fry. Additionally, in 2016, a Great Blue Heron was observed along the northern edge of the site.

Results for Performance Standard 8
(Noxious weeds will be eradicated or controlled as required):

A Class A noxious weed, flowering rush, was first identified on-site in 2015 within the permanent standing water area near the emergent wetland. Since herbicide treatment has been shown to be ineffective against this species, painstaking eradication efforts were enacted involving carefully hand-digging each plant while taking great care to collect the entire root mass without breaking off pieces of root or bulbils. Despite these efforts, a small amount of this species was still present at the time of monitoring in 2017, though it was much reduced from its previous extent and was not flowering (Photo 5). The site manager was notified immediately after monitoring and the remaining plants were removed on August 15 and 16, 2017.

Small amounts of Class B-designate purple loosestrife and Class C-designate paleyellow iris were present in the emergent wetland area and reported for control.
Results for Performance Standard 9
(Reed canarygrass will be controlled if it interferes with the establishment of planted species):

The cover of reed canarygrass was minimal (visually estimated at one percent across the site) and did not appear to be interfering with the establishment of planted species.

What is planned for this site?
Routine weed control will continue in 2018.
Appendix 1 – As-Built Grading and Planting Plan
(WSDOT 2016)
Appendix 2 – Photo Points
The photographs below were taken from permanent photo-points on August 2, 2017 and document current site development.
Driving Directions:
From I-5, take SR 12 to the Tri-Cities area. From 182/12 West, take SR 240 south toward Kennewick. Exit at Columbia Park Trail and turn left at the end of the exit ramp to travel east on Columbia Park Trail. Go to the first intersection at Nevada Avenue and turn around. Just before the entrance ramp to SR 240 northbound, hop the curb to the right and enter the bike trail. Follow the bike trail until, just before the bridge over the Yakima River, there will be a gate on the right (this gate will be locked and will require a key obtainable from the southwest region environmental offices). Enter through the gate and follow the trail under the bridge to the site.
Appendix 3 – Wetland Delineation Report
WETLAND DELINEATION REPORT

SR 240 Yakima River Bridge 2 Mitigation Site

SR 240 Yakima River Bridge Replacement
USACE (NWP 23) 2002-4-00799

Benton County, Washington

Prepared by:
Tatiana Dreisbach
WSDOT Environmental Services Office
Olympia, Washington

February 2016
Introduction

This report was prepared by the Washington State Department of Transportation (WSDOT) to describe the wetland boundary delineation for the SR 240 Yakima River Bridge 2 Mitigation Site. Field work was conducted by WSDOT wetland biologist Tatiana Dreisbach, on August 3, 2015. The delineation identifies 1.00 acre of wetland within the mitigation site boundaries. The delineation occurred near the end of the growing season in a drought year resulting in a problematic hydrology situation. Vegetation is also problematic in areas under the shading influence from the bridge overhead. Soils are also problematic resulting from disturbance associated with the construction of the bridge and improvements to SR 240. A future delineation during a period with normal precipitation conditions will be more informative and the wetland boundary may vary from the results identified in August 2015.

| General Information for the SR 240 Yakima River Bridge 2 Mitigation Site |
|---------------------------------|--------------------------|
| Location: S24, T9N, R28E. Benton County. (Vicinity map, Figure 1) | |
| USACE NWP 23 Number | 2002-4-00799 |
| Long./Lat. ID Number | 192566462529 |
| Land Resource Region (LRR) | B |
| Major Land Resource Area (MLRA) | 7 |
| Construction Date | Initial construction 2007; Remediation in subsequent years |
| Monitoring Period | 2013 - 2017 |
| Year of Monitoring | 3 of 5 (in 2015) |
| Area of Project Impact | 0.47 acre |
| Required Creation | 0.94 acre |
| Total Delineated Wetland Area | 1.00 acre (0.21 acre vegetated wetland, 0.79 acre unvegetated wetland) |

1 Project impact numbers from USACE Nationwide Permit (23) 2002-4-00799 with 0.47 acre impacts (USACE 2002).
Location

Figure 1. Vicinity Map
Methods

Wetland boundaries within the SR 240 Yakima River Bridge 2 mitigation site were delineated using routine methods described in the:

- Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987).
- Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE 2008)

Wetland boundaries were delineated based on on-site observations of hydrology, soils, and plant communities, in conjunction with background information. All three factors were problematic and methods described in Chapter 5 of the Arid West Regional Supplement (USACE 2008) were applied.

A Global Positioning System (GPS) Trimble GeoXT mapping grade unit was used to record the wetland boundaries and sampling point locations (Figure 2). Wetland boundary points were recorded at regular intervals and at any change in direction along the boundary.

Wetland Delineation and Study Area

Study Area
Wetlands described in this report were assessed only within the wetland mitigation site boundary (Figure 2).

Wetlands
The SR 240 Yakima River Bridge 2 mitigation site has riverine wetland areas with several Cowardin classes. Palustrine open water (POW) and palustrine scrub-shrub (PSS) are the predominant vegetation communities with a small palustrine emergent (PEM) area near the connection of the backwater area of the site to the Yakima River. These communities are established in areas beyond the shading influence of the bridge above. The PSS community is dominated by willows (Salix spp.). The area of POW wetland that is typically present in the central portion of the wetland was greatly diminished from normal conditions due to drought occurring in the 2015 growing season. The areas that are typically POW had some herbaceous vegetation colonizing in absence of standing water. The small PEM area on the fringe of the POW area is dominated by native species including slender flatsedge (Cyperus bipartatus) and broadleaf cattail (Typha latifolia). Areas under the shading influence of the bridge have problematic vegetation conditions. Wetland vegetation is generally lacking in this area. As the water draws down through the growing season, weedy upland species establish in the shady area under the bridge.

The delineation determined 1.00 acre of wetland present within the SR 240 Yakima River Bridge 2 mitigation site, including shaded areas under the bridge with problematic vegetation and hydrology situations and POW areas. Of the 1.00 acre wetland, 0.21 acre is vegetated PEM or PSS wetland. Delineation data were collected at three
sampling points and recorded on wetland determination data forms (Appendix A). Paired wetland and upland sample points were used to define the wetland edge. Additional wetland sample points characterize various wetland vegetation communities. Data recorded on wetland determination data forms characterize typical wetland and upland conditions observed on site. Vegetation, soils, and hydrology were examined in many additional sampling locations to determine the wetland boundary.

Precipitation
The Regional Delineation Supplement Version 2.0 (USACE 2008) recommends using methods described in Chapter 19 in Engineering Field Handbook (NRCS 1997) 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. When considering the three prior months as whole, drier than normal precipitation conditions were present prior to field work. In addition to the three prior months, data for the entire growing season beginning in February was reviewed. The entire growing season prior to the field work experienced drier than normal/drought conditions (Appendix B-1). Precipitation was not recorded in the ten days preceding field work (Appendix B-2).

Growing Season
The following evidence of the growing season was observed at the time of the delineation:

- Leaves remained present on deciduous woody vegetation.
- Many herbaceous species were still in flower.

Difficult Wetland Situation
Each of the three factors were problematic during the August 3, 2015 delineation. This wetland delineation should be considered preliminary given the problematic wetland situation with each of the three factors and should be confirmed, and the boundary amended as necessary, during a future site visit when hydrology and precipitation conditions are normal.

- Vegetation was assessed during a drought year, near the end of the growing season, on a mitigation site where woody and herbaceous vegetation has been planted, much of the wetland is shaded by an overhead bridge and where the water level on site is directly related to water levels in the Yakima River controlled by the McNary Dam.
- Soils are problematic due to disturbance during construction of the bridge above.
- Hydrology was assessed during a drought year, where precipitation was below normal conditions and maintained water levels behind the McNary Dam were below normal. Water marks on bridge piers were observable several feet above the soil surface and likely indicate much higher water levels, with long duration inundation, over a much larger area, typically influence the wetland.
The delineation was performed using a combination of field observations, anecdotal information and photographs from site managers about typical water levels during periods with normal precipitation, and best professional judgment.

Figure 2. Study area in blue, wetland boundary in red, and sampling point locations in black.
### SR 240 Yakima River Bridge 2 Mitigation Site – Wetland Delineation Summary

<table>
<thead>
<tr>
<th>Total Delineated Wetland Area</th>
<th>1.00 acre (of which 0.21 acre is vegetated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland Determination Data Forms</td>
<td>Appendix A; Sampling Points W1-SP1 and W1-SP2</td>
</tr>
<tr>
<td>Upland Determination Data Form</td>
<td>Appendix A; Sampling Point W1-SP3</td>
</tr>
<tr>
<td>Delineator</td>
<td>Tatiana Dreisbach</td>
</tr>
<tr>
<td>Delineation Date</td>
<td>August 3, 2015</td>
</tr>
</tbody>
</table>

#### Vegetation
- **Trees** – none
- **Shrubs** – willows (*Salix spp.*) [species not confirmed but all observed willows were planted, of the same species, and assumed to be peach-leaf willow (*Salix amygdaloides*)]
- **Herbs** – slender flatsedge (*Cyperus bipartus*), western marsh cudweeds (*Gnaphalium palustre*), false pimpernel (*Linderina dubia*), barnyardgrass (*Echinochloa crus-galli*), broadleaf cattail (*Typha latifolia*), red goosefoot (*Chenopodium rubrum*), grand redstem (*Ammaria robusta*), biennial wormwood (*Artemisia biennis*), mexican fireweed (*Bassia scoparia*), and cinquefoil (*Potentilla spp.*)

#### Soils
In some areas soils examined to a depth of 12 inches exhibited hydric characteristics. Matrix colors of 2.5Y 4/2 were observed. Redoximorphic concentrations and depletions were observed in some layers. Indicator Depleted Matrix (F3) met. In other areas soils were problematic and hydric soil indicators were not observed. Soils meet criteria for problematic hydric soils (recently developed wetlands – soils newly forming following construction of the bridge above).

#### Hydrology
Water levels in the wetland (high water table and backwater during higher flows) are directly related to the adjacent Yakima River. Water levels in this reach of the river are maintained by the downstream McNary Dam. Hydrology was problematic during the delineation due to the drought conditions influencing the 2015 growing season. The areas that typically exhibit permanent and seasonal inundation were greatly diminished this year. Site observations of hydrology indicators included water marks several feet above the soil surface on bridge piers, surface soil cracks, and dry-season water table.

#### Rationale for Delineation
All three factors were problematic. Wetland boundary placed based on field observations including subtle hydrology indicators, topography, and vegetation community changes. In addition photographs showing typical extent of wetland hydrology during periods with normal rainfall were reviewed prior to site visit. Observed water marks on bridge piers confirmed photo documentation and the elevation of the water on the piers, when visually extrapolated out to similar elevations across the site, coincided with subtle hydrology and vegetation community changes observed.

The site should be re-delineated during a period with normal hydrology. The wetland boundary identified during the August 2015 delineation may need to be amended based on results of a future delineation.
Limitations

This wetland delineation report documents the investigation, best professional judgment and conclusions of WSDOT based on the site conditions encountered at the time of this study. The wetland delineation was performed in compliance with accepted standards for professional wetland biologists and applicable federal, state, and local ordinances. It is correct and complete to the best of our knowledge. It should be considered a preliminary jurisdictional determination of wetlands and other waters until it has been reviewed and approved in writing by the appropriate jurisdictional authorities and when it can be confirmed during a period with normal precipitation conditions.

References


Appendix A —Wetland Determination Data Forms

Wetland Delineation Data Forms for:
W1-SP1
W1-SP2
W1-SP3

Wetland polygons, sampling point locations, and wetland names shown in Figure 2.
### WETLAND DETERMINATION DATA FORM - Arid West Region

**Project/Site:** 240 Yakima River Bridge 2  
**City/County:** Richland/Benton  
**State:** WA  
**Sampling Date:** 03-Aug-15  
**Applicant/Owner:** WSDOT  
**Investigator(s):** Tatiana Dreisbach  
**Landform (hillslope, terrace, etc.):** Floodplain  
**Subregion (LRR):** LRR B  
**Soil Map Unit Name:** Pasco silt loam, 0 to 2 percent slopes

**Wetland Hydrology Present?**  
<table>
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<th>Yes</th>
<th>No</th>
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</table>

**Hydric Soil Present?**  
<table>
<thead>
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<th>No</th>
</tr>
</thead>
</table>

**Is the Sampled Area within a Wetland?**  
<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

All three factors problematic. Veg planted, disturbed, and shaded in central portion of wetland by bridge. Soils highly manipulated by construction of bridge, then mitigation site. Hydrology in a drought year. Snow pack last year extremely low and system not recharged as it would be in normal year. Therefore inundation duration much shorter than typical. inundation only in smaller area than normal for this time of year.

### VEGETATION

- **Tree Stratum** (Plot size: 15 x 15 feet)
  - Cyperus bipartus 60%  
  - Gnaphalium palustre 10%  
  - Conyza canadensis 5%  
  - Panicum capillare 2%  
  - Plantago major 5%  
  - Lindernia dubia 5%  

- **Sapling/Shrub Stratum** (Plot size: 15 x 15 feet)
  - 0%  

- **Herb Stratum** (Plot size: 5 x 5 feet)
  - Cyperus bipartus 65.2% OBL  
  - Gnaphalium palustre 10.9% FACW  
  - Conyza canadensis 5.4% UPL  
  - Panicum capillare 2.2% FACU  
  - Plantago major 5.4% FAC  
  - Lindernia dubia 5.4% FACW  
  - 0%  

- **Woody Vine Stratum** (Plot size: 5 x 5 feet)
  - 0%  

**% Bare Ground in Herb Stratum:** 8  
**% Cover of Biotic Crust:** 0

### Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

**Summary of Findings:**

- Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐
- Are “Normal Circumstances” present? Yes ☑ No ☐
- Are Vegetation ☑ , Soil ☐ , or Hydrology ☑ significantly disturbed? Yes ☑ No ☐
- Are Vegetation ☐ , Soil ☐ , or Hydrology ☐ naturally problematic? Yes ☑ No ☐

### Prevalence Index worksheet:

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<th>Indicator Status</th>
<th>Total Cover</th>
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<td>FACW species</td>
<td>15 x 2 = 30</td>
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<tr>
<td>FAC species</td>
<td>5 x 3 = 15</td>
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</tr>
<tr>
<td>FACU species</td>
<td>2 x 4 = 8</td>
<td></td>
</tr>
<tr>
<td>UPL species</td>
<td>5 x 5 = 25</td>
<td></td>
</tr>
</tbody>
</table>

**Column Totals:** 92 (A) 143 (B)  
**Prevalence Index = B/A = 1.554**

### Hydrophytic Vegetation Indicators:

- **Dominance Test is > 50%**
- **Prevalence Index is ≤ 3.0**
- **Morphological Adaptations** (Provide supporting data in Remarks or on a separate sheet)
- **Problematic Hydrophytic Vegetation** (Explain)

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

- **Hydrophytic Vegetation Present?** Yes ☑ No ☐

---

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.*
**Soil**

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

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Matrix</th>
<th>Redox Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6</td>
<td>2.5Y</td>
<td>2.5Y</td>
</tr>
<tr>
<td>6-12</td>
<td>2.5Y</td>
<td>2.5Y</td>
</tr>
</tbody>
</table>

- **Color (moist)**: 2.5Y
- **%**: 4/2
- **Texture**: Silt Loam
- **Remarks**: gravel and small cobbles

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

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5) (LRR C)
- 1 cm Muck (A9) (LRR D)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Muck Mineral (S1)
- Sandy Gleyed Matrix (S4)

**Indicators for Problematic Hydric Soils:**

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

**Hydric Soil Present?** Yes ☐  No ☐

**Restrictive Layer (if present):**

- **Type:**
- **Depth (inches):**

**Hydrology**

**Wetland Hydrology Indicators:**

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1) (Nonriverine)
- Sediment Deposits (B2) (Nonriverine)
- Drift deposits (B3) (Nonriverine)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)

- **Salt Crust (B11)**
- **Biotic Crust (B12)**
- **Aquatic Invertebrates (B13)**
- **Hydrogen Sulfide Odor (C1)**
- **Oxidized Rhizospheres along Living Roots (C3)**
- **Presence of Reduced Iron (C4)**
- **Recent Iron Reduction in Plowed Soils (C6)**
- **Thin Muck Surface (C7)**
- **Other (Explain in Remarks)**

**Secondary Indicators:**

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

**Field Observations:**

- **Surface Water Present?** Yes ☐  No ☐  Depth (inches): __________
- **Water Table Present?** Yes ☐  No ☐  Depth (inches): __________
- **Saturation Present?** Yes ☐  No ☐  Depth (inches): __________

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

**Remarks:**

Drought conditions - problematic hydrology. Soils moist. Geomorphic position adjacent to Yakima River and in floodplain. Dry-season water table observed in adjacent ponded area that is five horizontal feet away with inundation just under 24 inches vertically below soil surface at sample point location.

US Army Corps of Engineers  Arid West - Version 2.0
Are climatic/hydrologic conditions on the site typical for this time of year?

Yes ☐ No ☐

(If no, explain in Remarks.)

Are Vegetation ☑, Soil ☑, or Hydrology ☑ significantly disturbed?

Yes ☑ No ☐

Are "Normal Circumstances" present? Yes ☑ No ☐

(If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

All three factors problematic. Veg planted, disturbed, and shaded in central portion of wetland by bridge. Soils highly manipulated by construction of bridge, then mitigation site. Hydrology in a drought year. Snow pack last year extremely low and system not recharged as it would be in normal year. Therefore inundation duration much shorter than typical. inundation only in smaller area than normal for this time of year.

Vegetation - Use scientific names of plants.

<table>
<thead>
<tr>
<th>Tree Stratum</th>
<th>Absolute % Cover</th>
<th>Dominant Species</th>
<th>Rel.Strat. Cover</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Salix spp.</td>
<td>30</td>
<td>100.0% FACW</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Cover</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sapling/Shrub Stratum</th>
<th>Absolute % Cover</th>
<th>Dominant Species</th>
<th>Rel.Strat. Cover</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Echinocloa crus-galli</td>
<td>5</td>
<td>14.7% FACW</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>2. Meilotis albus</td>
<td>5</td>
<td>14.7% UPL</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>3. Apocynum cannabinum</td>
<td>2</td>
<td>5.9% FAC</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>4. Bassa scoparia</td>
<td>5</td>
<td>14.7% FAC</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>5. Cirsium arvense</td>
<td>2</td>
<td>5.9% FACU</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>6. Potentilla spp.</td>
<td>5</td>
<td>14.7%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>7. Chenopodium rubrum</td>
<td>5</td>
<td>14.7% FACW</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>8. Artemisia biennis</td>
<td>5</td>
<td>14.7% FACW</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Cover</td>
<td>34</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Herb Stratum</th>
<th>Absolute % Cover</th>
<th>Dominant Species</th>
<th>Rel.Strat. Cover</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Echinocloa crus-galli</td>
<td>5</td>
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<td>0.0%</td>
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<td>5</td>
<td>14.7% UPL</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>3. Apocynum cannabinum</td>
<td>2</td>
<td>5.9% FAC</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>4. Bassa scoparia</td>
<td>5</td>
<td>14.7% FAC</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>5. Cirsium arvense</td>
<td>2</td>
<td>5.9% FACU</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>6. Potentilla spp.</td>
<td>5</td>
<td>14.7%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>7. Chenopodium rubrum</td>
<td>5</td>
<td>14.7% FACW</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>8. Artemisia biennis</td>
<td>5</td>
<td>14.7% FACW</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Cover</td>
<td>66</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

% Bare Ground in Herb Stratum: 66

% Cover of Biotic Crust: 0

Remarks:

Salix species is not confirmed but may be peach-leaf willow (Salix amygaloides) FACW.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.
### Soil Profile Description:

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

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Matrix Type</th>
<th>Color (moist)</th>
<th>%</th>
<th>Redox Features Type</th>
<th>%</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>C</td>
<td>2.5Y 4/2</td>
<td>95</td>
<td>C</td>
<td>5</td>
<td>M</td>
<td>Silt Loam</td>
</tr>
</tbody>
</table>

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

#### Hydric Soil Indicators:

(Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5) (LRR C)
- 1 cm Muck (A9) (LRR D)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Muck Mineral (S1)
- Sandy Gleyed Matrix (S4)

- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox depressions (F8)
- Vernal Pools (F9)

#### Indicator for Problematic Hydric Soils:

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

#### Restrictive Layer (if present):

- Type: ________________________________
- Depth (inches): ________________________

#### Hydric Soil Present? Yes ☐ No ☐

Remarks:
Soils too dry and compacted to dig, however soil matrix at surface is a depleted matrix with 5% distinct concentrations. If these soil colors persist from 0-6 inches it is likely that indicator F3 is met.

### Hydrology

#### Wetland Hydrology Indicators:

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1) (Nonriverine)
- Sediment Deposits (B2) (Nonriverine)
- Drift deposits (B3) (Nonriverine)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Biotic Crust (B12)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Plowed Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

- Water Stains (B1) (Riverine)
- Sediment Deposits (B2) (Riverine)
- Drainage Patterns (B10)
- Dry Season Water Table (C2)
- Reddy Soil Crust (C8)
- Clayey Aquitard (D3)
- Saturation Visible on Aerial Imagery (C9)
- Shallow Aquitard (D3)
- FAC-neutral Test (D5)

#### Field Observations:

- Surface Water Present? Yes ☐ No ☐
- Water Table Present? Yes ☐ No ☐
- Saturation Present? (includes capillary fringe) Yes ☐ No ☐

Depth (inches): ________________

#### Wetland Hydrology Present? Yes ☐ No ☐

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

Remarks:
Hydrology assessed in a year with drier than normal conditions. Hydrology is assumed to be present in this location as indicated by water marks at same elevation on bridge piers and photographs from site managers during periods with normal precipitation.

US Army Corps of Engineers Arid West - Version 2.0
**WETLAND DETERMINATION DATA FORM - Arid West Region**

**Project/Site:** 240 Yakima River Bridge 2  
**City/County:** Richland/Benton  
**State:** WA  
**Sampling Date:** 04-Aug-15

**Applicant/Owner:** WSDOT  
**Investigator(s):** Tatiana Dreisbach  
**Landform:** slope of access road  
**Local relief (concave, convex, none):** concave  
**Slope:** 5.0% / 2.9°

**Subregion (LRR):** LRR B  
**Lat.:** 46.253  
**Long.:** -119.257  
**Datum:** NAD83HARN

**Soil Map Unit Name:** Pasco silt loam, 0 to 2 percent slopes

**Are climatic/hydrologic conditions on the site typical for this time of year?** Yes  
**Are Vegetation** Yes, Soil Yes, or Hydrology Yes significantly disturbed?  
**Are Normal Circumstances** Yes present? Yes  
**Are Vegetation** Yes, Soil Yes, or Hydrology Yes 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  
**Hydric Soil Present?** Yes  
**Wetland Hydrology Present?** Yes

All three factors problematic. Veg planted, disturbed, and shaded in central portion of wetland by bridge. Soils highly manipulated by construction of bridge, then mitigation site. Hydrology in a drought year. Snow pack last year extremely low and system not recharged as it would be in normal year. Therefore inundation duration much shorter than typical. inundation only in smaller area than normal for this time of year.

---

**VEGETATION - Use scientific names of plants.**

**Tree Stratum** (Plot size: 15 x 15 feet)

<table>
<thead>
<tr>
<th>Species</th>
<th>Absolute % Cover</th>
<th>Dominant Species</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bassia scoparia</td>
<td>5</td>
<td>5</td>
<td>5.0% FACU</td>
</tr>
<tr>
<td>Bromus tectorum</td>
<td>10</td>
<td>10</td>
<td>10.0% FACU</td>
</tr>
<tr>
<td>Hordeum jubatum</td>
<td>5</td>
<td>5</td>
<td>5.0% FACU</td>
</tr>
<tr>
<td>Melilotus albus</td>
<td>2</td>
<td>2</td>
<td>2.0% FACU</td>
</tr>
<tr>
<td>Salsola tragus</td>
<td>10</td>
<td>10</td>
<td>10.0% FACU</td>
</tr>
<tr>
<td>Chenopodium album</td>
<td>5</td>
<td>5</td>
<td>5.0% FACU</td>
</tr>
<tr>
<td>Upland</td>
<td>12</td>
<td>12</td>
<td>12.0% FACU</td>
</tr>
</tbody>
</table>

**Sapling/Shrub Stratum** (Plot size: 15 x 15 feet)

<table>
<thead>
<tr>
<th>Species</th>
<th>Absolute % Cover</th>
<th>Dominant Species</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chenopodium album</td>
<td>5</td>
<td>5</td>
<td>5.0% FACU</td>
</tr>
<tr>
<td>Melilotus albus</td>
<td>2</td>
<td>2</td>
<td>2.0% FACU</td>
</tr>
<tr>
<td>Upland</td>
<td>12</td>
<td>12</td>
<td>12.0% FACU</td>
</tr>
</tbody>
</table>

**Herb Stratum** (Plot size: 5 x 5 feet)

<table>
<thead>
<tr>
<th>Species</th>
<th>Absolute % Cover</th>
<th>Dominant Species</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salsola tragus</td>
<td>10</td>
<td>10</td>
<td>10.0% FACU</td>
</tr>
<tr>
<td>Chenopodium album</td>
<td>5</td>
<td>5</td>
<td>5.0% FACU</td>
</tr>
<tr>
<td>Melilotus albus</td>
<td>2</td>
<td>2</td>
<td>2.0% FACU</td>
</tr>
<tr>
<td>Upland</td>
<td>12</td>
<td>12</td>
<td>12.0% FACU</td>
</tr>
</tbody>
</table>

**Woody Vine Stratum** (Plot size: 5 x 5 feet)

<table>
<thead>
<tr>
<th>Species</th>
<th>Absolute % Cover</th>
<th>Dominant Species</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chenopodium album</td>
<td>5</td>
<td>5</td>
<td>5.0% FACU</td>
</tr>
<tr>
<td>Melilotus albus</td>
<td>2</td>
<td>2</td>
<td>2.0% FACU</td>
</tr>
<tr>
<td>Upland</td>
<td>12</td>
<td>12</td>
<td>12.0% FACU</td>
</tr>
</tbody>
</table>

**Summary of Findings**

**Hydrophytic Vegetation Present?** Yes

**Hydric Soil Present?** Yes

**Wetland Hydrology Present?** Yes

**Prevalence Index worksheet:**

- Total Cover

  - OBL species: 0 x 1 = 0
  - FACW species: 0 x 2 = 0
  - FAC species: 10 x 3 = 30
  - FACU species: 15 x 4 = 60
  - UPL species: 12 x 5 = 60

  Column Totals: 37 (A) 150 (B)

  Prevalence Index = B/A = 4.054

**Hydrophytic Vegetation Indicators**

- Dominance Test is > 50%
- Prevalence Index is ≤3.0
- Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation (Explain)

---

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.*
### Soil Profile Description:

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

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Matrix</th>
<th>Redox Features</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Color (moist)</td>
<td>%</td>
</tr>
</tbody>
</table>
| 0-1            | 2.5YR   | 4/2 | 100           |     |      |      |         | **Silt Loam**
|                |         |     |               |     |      |      |         | gravel s and cobbles present |

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

### Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5) (LRR C)
- 1 cm Muck (A9) (LRR D)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Muck Mineral (S1)
- Sandy Gleyed Matrix (S4)

- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox depressions (F8)
- Vernal Pools (F9)

### Restrictive Layer (if present):

- Type: ____________________________
- Depth (inches): ____________________

- Hydric Soil Present?  **Yes**  **No**

### Remarks:

Soils too dry and compacted to dig. Sample point occurs about one foot in elevation above water mark of bridge pier.

### Hydrology

#### Wetland Hydrology Indicators:

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

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1) (Nonriverine)
- Sediment Deposits (B2) (Nonriverine)
- Drift deposits (B3) (Nonriverine)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Biotic Crust (B12)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Plowed Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

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

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

### Field Observations:

- Surface Water Present? **Yes**  **No**  Depth (inches): ____________
- Water Table Present? **Yes**  **No**  Depth (inches): ____________
- Saturation Present? (includes capillary fringe) **Yes**  **No**  Depth (inches): ____________

**Wetland Hydrology Present?**  **Yes**  **No**

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

### Remarks:
Appendix B — Precipitation Data

Appendix B-1. Comparison of Observed and Normal Precipitation (NRCS 1997)

Monthly precipitation data for Richland, Washington in the three months prior to delineation field work.

<table>
<thead>
<tr>
<th>Month</th>
<th>3 yrs. in 10 less than</th>
<th>Average</th>
<th>3 yrs. in 10 more than</th>
<th>Rainfall</th>
<th>Condition dry, wet, normal</th>
<th>Condition Value</th>
<th>Month weight value</th>
<th>Product of previous two columns</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st prior month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>0.06</td>
<td>0.25</td>
<td>0.30</td>
<td>0.02</td>
<td>D</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>June</td>
<td>0.18</td>
<td>0.41</td>
<td>0.51</td>
<td>0.00</td>
<td>D</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>May</td>
<td>0.30</td>
<td>0.61</td>
<td>0.75</td>
<td>1.21</td>
<td>W</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Sum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

Note: If sum is

- 6 - 9 then prior period has been drier than normal
- 10 - 14 then period has been normal
- 15 - 18 then period has been wetter than normal

Condition value:

- Dry (D) = 1
- Normal (N) = 2
- Wet (W) = 3

Conclusions: Drier than normal precipitation conditions were present prior to the field visit.
Monthly precipitation data for Richland, Washington during the early 2015 growing season.

<table>
<thead>
<tr>
<th>Month</th>
<th>3 yrs. in 10 less than</th>
<th>Average</th>
<th>3 yrs. in 10 more than</th>
<th>Rainfall</th>
<th>Condition dry, wet, normal</th>
<th>Condition Value</th>
<th>Month weight value</th>
<th>Product of previous two columns</th>
</tr>
</thead>
<tbody>
<tr>
<td>4th prior month</td>
<td>Apr 0.28</td>
<td>0.57</td>
<td>0.70</td>
<td>0.03</td>
<td>D</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>5th prior month</td>
<td>Mar 0.35</td>
<td>0.71</td>
<td>0.86</td>
<td>0.73</td>
<td>N</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>6th prior month</td>
<td>Feb 0.43</td>
<td>0.75</td>
<td>0.92</td>
<td>0.64</td>
<td>N</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Sum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: If sum is
6 - 9 then prior period has been drier than normal
10 - 14 then period has been normal
15 - 18 then period has been wetter than normal

Conclusions: Drier than normal precipitation conditions were present for the entire growing season prior to the field visit.

Condition value:
Dry (D) = 1
Normal (N) = 2
Wet (W) = 3
Appendix B-2. Daily Precipitation 10 days preceding field work, Richland, Washington

<table>
<thead>
<tr>
<th>Date (2015)</th>
<th>Daily Precipitation (inches)(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 2</td>
<td>0.00</td>
</tr>
<tr>
<td>Aug1</td>
<td>0.00</td>
</tr>
<tr>
<td>Jul 31</td>
<td>0.00</td>
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<tr>
<td>Jul 30</td>
<td>0.00</td>
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<tr>
<td>Jul 29</td>
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<tr>
<td>Jul 28</td>
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<tr>
<td>Jul 27</td>
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<tr>
<td>Jul 26</td>
<td>0.00</td>
</tr>
<tr>
<td>Jul 25</td>
<td>0.00</td>
</tr>
<tr>
<td>Jul 24</td>
<td>0.00</td>
</tr>
</tbody>
</table>

\(^a\) NRCS 2015
Literature Cited


