

# SR 240 Yakima River Bridge 2 Replacement

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

### South Central Region

### 2015 MONITORING REPORT

### Wetlands Program

*Issued March 2016*



**Washington State  
Department of Transportation**

Environmental Services Office

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# SR 240 Yakima River Bridge 2 Replacement Mitigation Site

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



General Site Information		
<b>USACE NWP 23 Number</b>	2002-4-00799	
<b>Mitigation Location</b>	Under the SR 240 bridges that span the Yakima River in Benton Co.	
<b>LLID Number</b>	1192566462529	
<b>Construction Date</b>	Initial construction 2007; Remediation 2011 and 2012	
<b>Monitoring Period</b>	2013–2017	
<b>Year of Monitoring</b>	3 of 5	
<b>Area of Project Impact<sup>1</sup></b>	0.47 acre	
<b>Type of Mitigation</b>	Wetland Establishment	Wetland Enhancement <sup>2</sup>
<b>Planned Area of Mitigation</b>	0.94 acre	0.50 acre

<sup>1</sup> Impact acreage sourced from USACE 2002. Mitigation acreage sourced from WSDOT 2002.

<sup>2</sup>This acreage is not required for meeting the USACE mitigation requirement, but may be considered for credit should the wetland establishment acreage fall short.

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## Summary of Monitoring Results and Management Activities (2015)

Performance Standards	2015 Results <sup>3</sup>	Management Activities
Water regime will be sufficient to support facultative or wetter vegetation species within the created wetland area	Present	
Wetland Delineation (0.94 acre wetland creation)	1.00 acre total wetland creation area (see Appendix 4)	
At least one native emergent species in the emergent community of the creation zone	Present	
10% cover native wetland emergent species in the emergent community of the wetland creation zone, or four plants per 100ft <sup>2</sup>	63% cover (CI <sub>80%</sub> = 50-76%)	
At least one native wetland shrub species in the scrub-shrub community of the wetland creation zone.	Present	
Density of four plants, or four stems, per 100ft <sup>2</sup> in the scrub-shrub wetland of the creation zone	Density of 0.46 plants/100ft <sup>2</sup> and 38% cover (CI <sub>80%</sub> = 31-45%) in areas beyond shading effects of the bridge in both the creation and enhancement zones	
Wildlife presence will be documented	Deer and fish observed	
Washington state-listed or county-listed Class A weeds must be eradicated. Class B and Class C weeds as listed by the Benton County Noxious Weed Control Board will be controlled.	Flowering rush ( <i>Butomus umbellatus</i> ) removed; Kochia ( <i>Bassia scoparia</i> ), and Canada thistle ( <i>Cirsium arvense</i> ) present	Weed control was conducted in 2015.
Reed canarygrass ( <i>Phalaris arundinacea</i> ) will be controlled	Reed canarygrass present	
Water regime will be sufficient to support facultative or wetter vegetation species within the enhanced wetland area	Will be evaluated in 2017.	
Wetland Delineation (0.50 acre wetland enhancement)		
At least one native wetland shrub species in the scrub-shrub community of the wetland enhancement zone.		
Density of four plants, or four stems, per 100ft <sup>2</sup> in the scrub-shrub wetland of the enhancement zone		

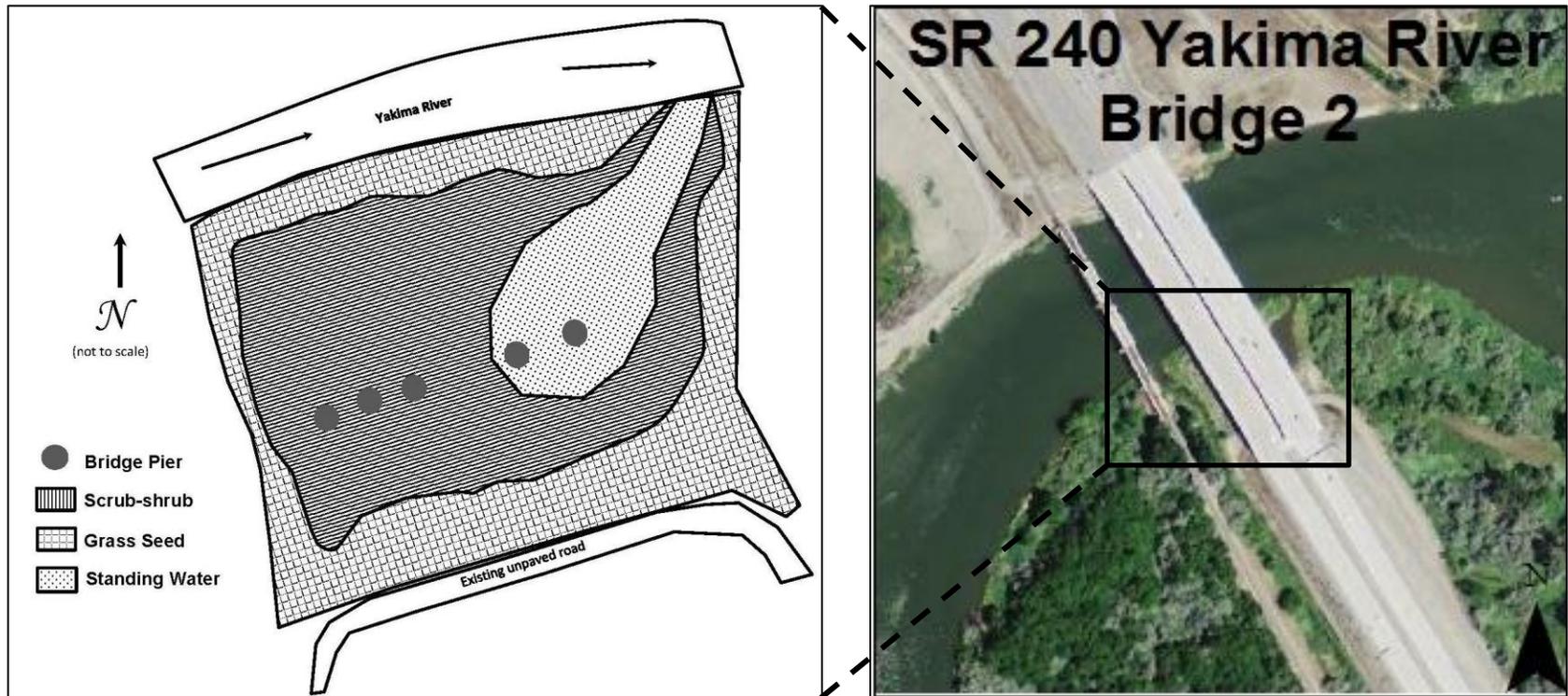
<sup>3</sup> Estimated values are presented with their corresponding statistical confidence interval. For example, 63% (CI<sub>80%</sub> = 50-76% cover) means we are 80% confident that the true cover value is between 50% and 76%.

## **Report Introduction**

This report summarizes third-year (Year 3) monitoring activities at the State Route (SR) 240 Yakima River Bridge 2 Replacement Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities included vegetation surveys and photo documentation on August 3-5, 2015, and a wetland delineation on August 3, 2015. Only the wetland creation area was evaluated. Both the creation and enhancement areas will be evaluated in the Year 5 (2017) monitoring report.

## What is the SR 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.



**Figure 1 Site Sketch**

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?

### Year 3

#### 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 acre of wetland creation area.

#### Performance Standard 3

There will be at least one native emergent species in the emergent community [of the wetland creation zone].

#### Performance Standard 4

Cover of native wetland emergent species (planted and volunteer) will be at least 10 percent in the emergent community [of the wetland creation zone], or 4 plants per 100 square feet.

#### Performance Standard 5

There will be at least one native wetland shrub species in the scrub-shrub community [of the wetland creation zone].

#### Performance Standard 6

Density of native wetland shrubs (planted and volunteer) will be at least four stems per 100 square feet [in the wetland creation zone].

#### 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 indication of use.

Performance Standard 8

- Eradication of all occurrences of Class A weeds is required by state law.
- 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.
- 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.
- 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.
- Noxious and invasive weed control standards apply to both the wetland creation area and the enhancement zone.

Performance Standard 9

Reed canarygrass, a Washington State Class C weed, will be controlled.

**Performance Standards Not Evaluated in 2015:**

Performance Standard 10

The water regime will be sufficient to support facultative or wetter vegetative species within the enhanced wetland area.

Performance Standard 11

The wetland areas will be delineated using current methodology to assure that the mitigation site contains a minimum of 0.50 acre of wetland enhancement area.

Performance Standard 12

There will be at least one native wetland shrub species in the scrub-shrub community [of the wetland enhancement zone].

Performance Standard 13

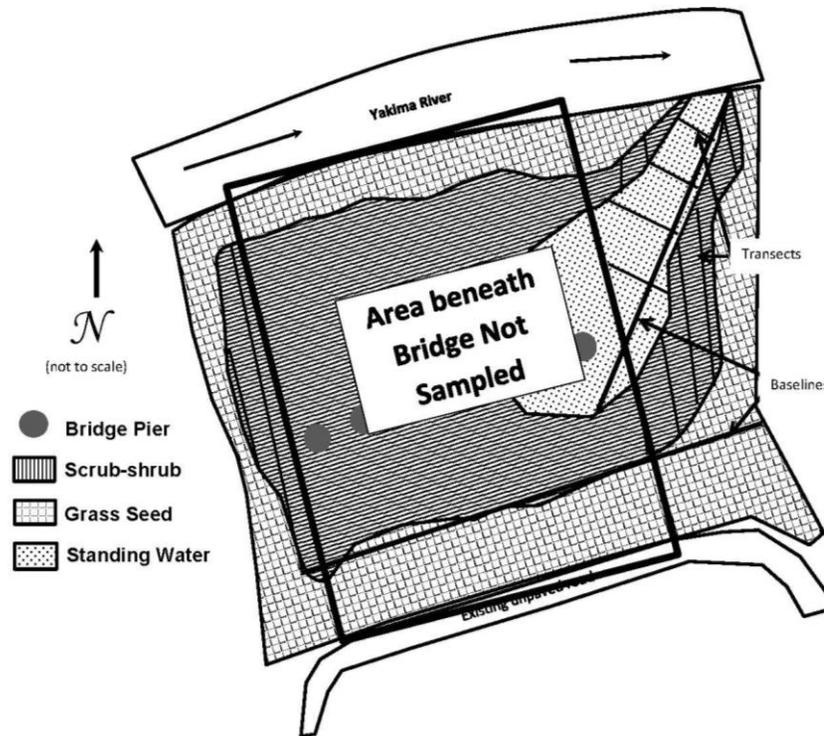
Density of native wetland shrubs (planted and volunteer) or four stems per 100 square feet [in the wetland enhancement zone].

Appendix 1 shows the as-built planting plan (WSDOT 2012).

## How were the performance standards evaluated?

WSDOT staff performed a wetland delineation using 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 2010) and a Global Positioning System (Trimble Mapping Grade) (Performance Standards 1 and 2).

Appendix 3, Table 1 documents the sampling methodology utilized for all of the remaining performance standards (PS) as required by the mitigation plan or permits. For additional details on the methods see the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).



**Placement of Emergent Wetland Baseline:** The baseline was placed north to south on the east side of the permanent water area. Length: 50m with five transects.

**Placement of Scrub-shrub Wetland Baseline:** The baseline was placed east to west along the bottom edge of the scrub-shrub wetland. Length: 28m with seven transects.

Figure 2 Site Sampling Design (2015)

## How is the site developing?

In general the site is doing well. Willows (*Salix* species) are establishing in areas beyond the bridge. The shading effects of the bridge continues to limit the establishment of vegetation below, with only five stressed willows observed there. The emergent area is dominated by native species and provides significant herbaceous cover.

Juvenile carp and mosquitofish were found in the ponded area. The pond was observed to be functioning as off-channel habitat.

Results for Performance Standard 1

(Water regime will be sufficient to support facultative or wetter vegetation in the created wetlands):

The wetland is populated with native woody and herbaceous species including obligates: slender flatsedge (*Cyperus bipartitus*), broadleaf cattail (*Typha latifolia*), and yellowseed false pimpernel (*Lindernia dubia*); facultative wet: western marsh cudweeds (*Gnaphalium palustre*), red goosefoot (*Chenopodium rubrum*), and biennial wormwood (*Artemisia biennis*); and facultative: barnyardgrass (*Echinochloa crus-galli*). (Photo 1)

Results for Performance Standard 2

(Wetland delineation with 0.94 acre created wetland):

The August 3, 2015 delineation results show 1.00 acre of wetland within the wetland creation area (see Appendix 4). This delineation occurred during a period with below normal precipitation conditions. Vegetation is planted with a large portion of the wetland occurring under the bridge and in highly disturbed soils. These conditions make all three wetland factors problematic. A future delineation should be performed during a period of normal precipitation to provide a more informed delineation result and an update to the August 2015 delineation result. Hydrology is also largely controlled by operation of the McNary Lock and dam which backwaters the Columbia and Yakima Rivers, which can also affect the delineation results.



**Photo 1  
Facultative or wetter vegetation in the wetland  
(August 2015)**

Results for Performance Standard 3

(At least one native emergent species in the emergent community):

Many native emergent plant species were observed in the emergent wetland including slender flatsedge, yellowseed false pimpernel, broadleaf cattail, western marsh cudweeds, devil's beggartick (*Bidens frondosa*), fringed willowherb (*Epilobium ciliatum*), red goosefoot, grassleaf mudplantain (*Heteranthera dubia*), grand redstem (*Ammannia robusta*), Canadian horseweed (*Erigeron canadensis*), and small ribseed sandmat (*Euphorbia glyptosperma*).

Results for Performance Standard 4

(10% cover native wetland emergent species OR 4 plants per 100 square feet):

Cover of native herbaceous species in the emergent wetland is estimated at 63 percent ( $CI_{80\%} = 50-76\%$ ). This value exceeds the performance standard target. (Photo 2)



**Photo 2**  
**Cover in the emergent wetland (August 2015)**

Results for Performance Standard 5

(At least one native shrub species in the scrub-shrub wetland of the created wetland zone):

Native willows were observed in the scrub-shrub wetland in the creation area.

Results for Performance Standard 6

(At least 4 plants/100ft<sup>2</sup>, native wetland shrubs in the scrub-shrub wetland for the created wetland zone):

Density of native shrubs in the scrub-shrub wetland is 0.46 plants/100 square feet in areas beyond the shading effects of the bridge based on a total count. This value is below the performance standard target for density. Cover of native shrubs in the scrub-shrub wetland for the creation and enhancement areas combined is estimated at 38 percent (CI<sub>80%</sub>= 31-45%) for areas beyond the shading effects of the bridge. This value exceeds the Year 5 performance standard target. Only five individual woody plants were observed under the bridge. (Photo 3)

Results for Performance Standard 7

(Wildlife presence will be documented):

Deer were observed on site accessing water in the ponded area under the bridge. Juvenile fish were observed in the ponded areas of the site.



**Photo 3**  
**Cover in the scrub-shrub wetland (August 2015)**

Results for Performance Standard 8

(Eradication of Class A weeds, and control of Class B and C weeds):

Cover of noxious weeds in areas of the site not affected by shading of the bridge is estimated at 5% (CI<sub>80%</sub>= 3-7%). Flowering rush, a Washington State Class A noxious weed was observed in the open water area of the wetland. The region biologist was notified and the plant was removed the following day on August 4, 2015. Other noxious weeds observed include Kochia, a Washington State Class B noxious weed, and Canada thistle and reed canarygrass, both Washington State Class C weeds.

Results for Performance Standard 9

(Reed canarygrass will be controlled):

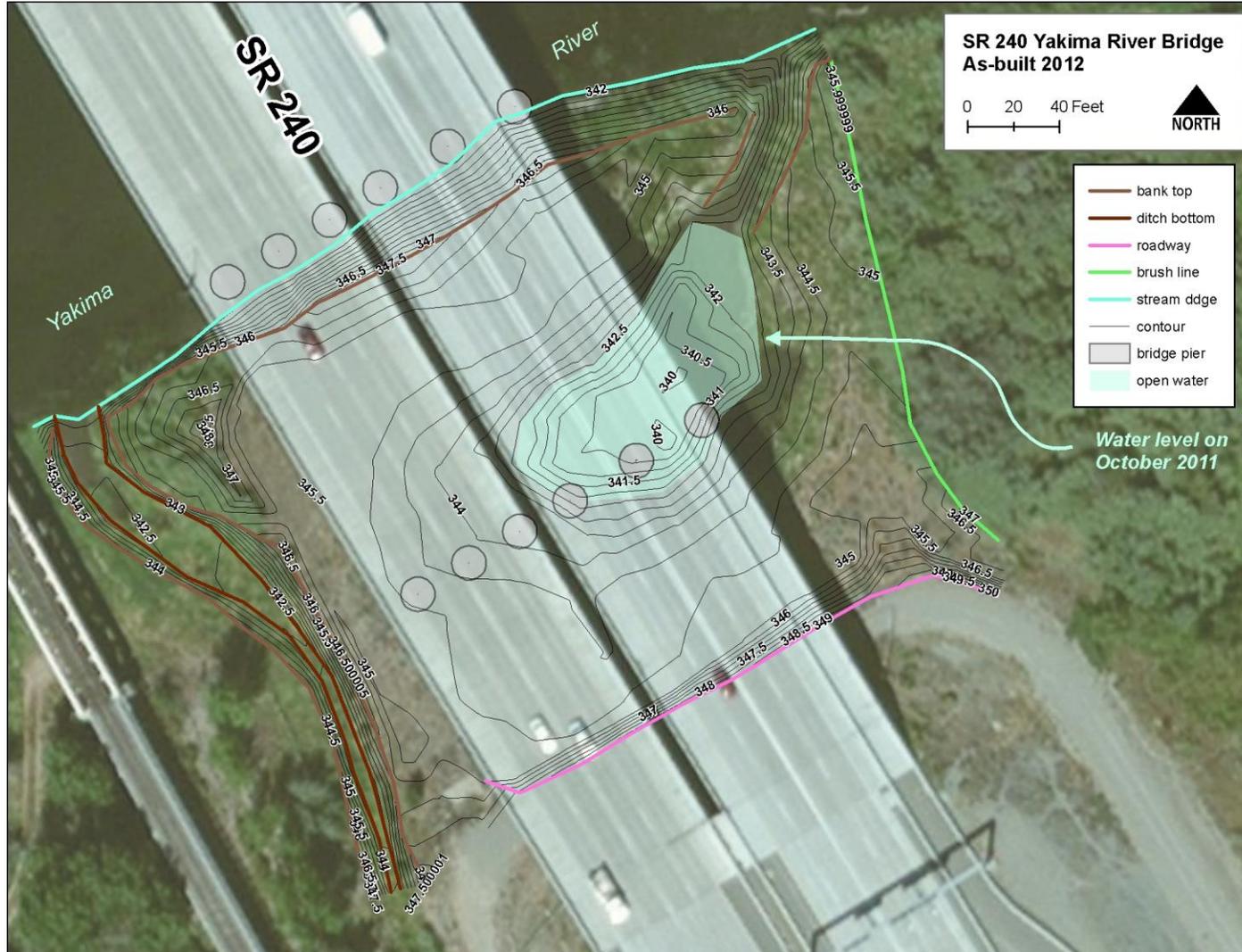
Reed canarygrass was observed on site, but occurs in small isolated patches.

**What is planned for this site?**

The site will continue to be monitored for flowering rush and other noxious weeds that may establish and need to be removed.

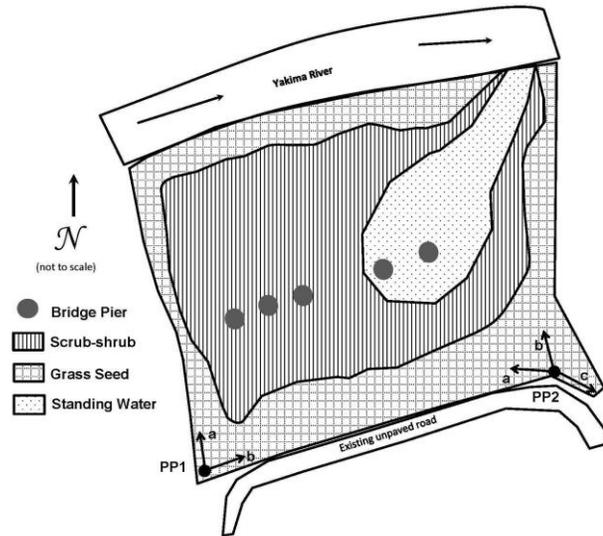
# Appendix 1 – As-Built Planting Plan

(from WSDOT 2012)



# Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on August 4, 2015 and document current site development.



**Photo Point 1a**



**Photo Point 1b**



**Photo Point 2a**



**Photo Point 2b**



**Photo Point 2c**

**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 Ave 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 you see the site on your right (a few hundred meters). There are a number of gates in the fence to access the site.

# Appendix 3 – Data Table

Table 1. Sampling Methodology

	<b>PS 3</b>	<b>PS 4</b>	<b>PS 5</b>	<b>PS 6</b>	<b>PS 7</b>	<b>PS 8</b>	<b>PS 9</b>	<b>PS 10</b>	<b>PS 11</b>
<b>Attribute</b>	Number of Species	Cover	Number of Species	Cover	Number of Species	Cover	Presence	Presence	Presence
<b>Target pop.</b>	Herbaceous	Herbaceous	Shrubs	Shrubs	Shrubs	Shrubs	Wildlife	Noxious Weeds	Noxious Weeds
<b>Zone</b>	Emergent Wetland	Emergent Wetland	Scrub-Shrub Wetland	Scrub-Shrub Wetland	Scrub-Shrub Wetland	Scrub-Shrub Wetland	Entire Site	Entire Site	Entire Site
<b>Sample method</b>	Species List	Point-Intercept	Species List	Line-Intercept	Species List	Line-Intercept	Qualitative	Qualitative	Qualitative
<b>SU length</b>	NA	2m	NA	15m	NA	15m	NA	NA	NA
<b>SU width</b>	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>Points per SU</b>	NA	20	NA	NA	NA	NA	NA	NA	NA
<b>Total # of SU</b>	NA	5	NA	13	NA	13	NA	NA	NA

# **Appendix 4 – Wetland Delineation**

# **WETLAND DELINEATION REPORT**

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## **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**  
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**Olympia, Washington**

**February 2016**



**Washington State**  
**Department of Transportation**

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

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

# Location

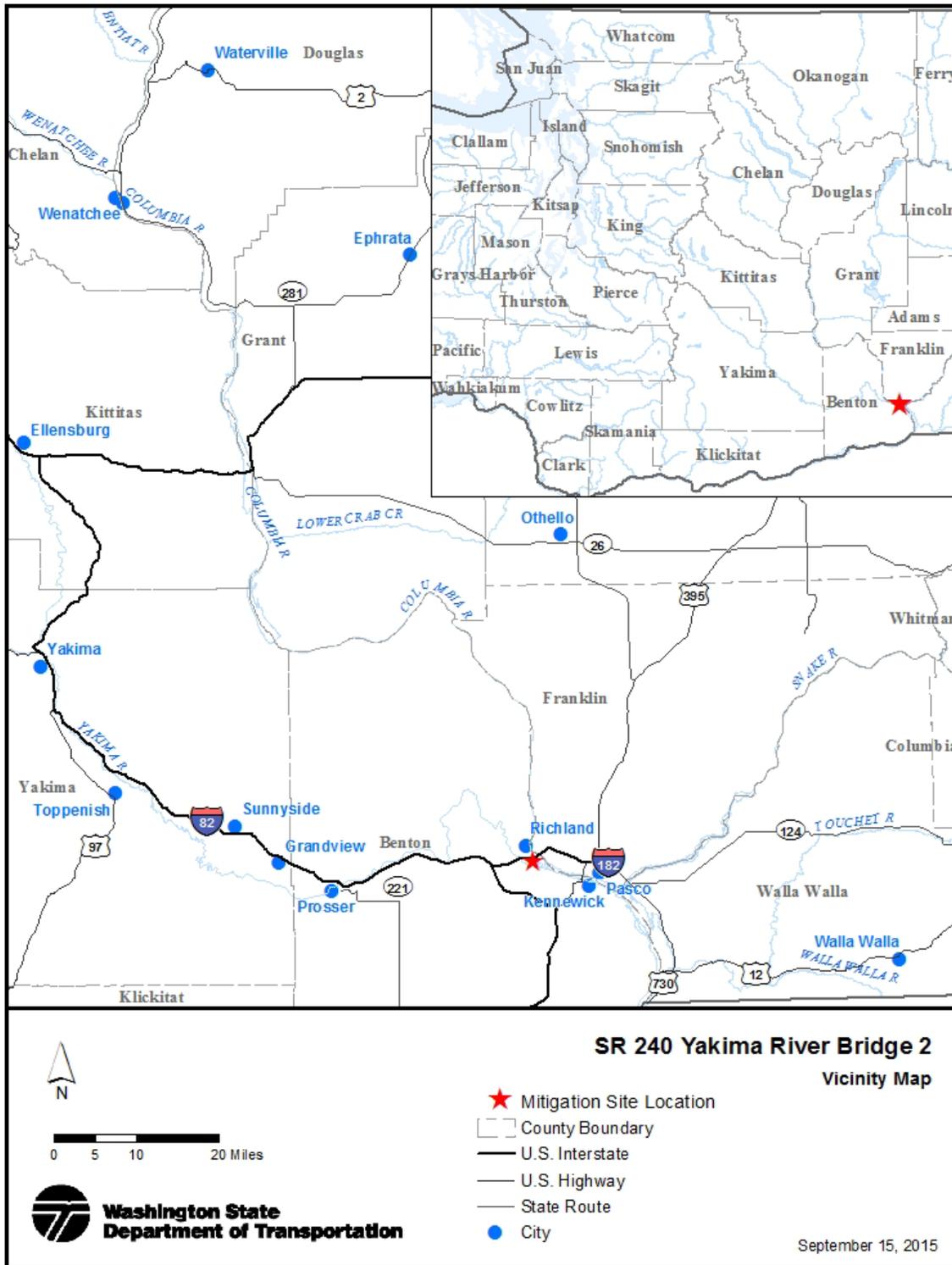


Figure 1. Vicinity Map

# Methods

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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

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### 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**

<b>Total Delineated Wetland Area</b>		1.00 acre (of which 0.21 acre is vegetated)	
	<b>Wetland Determination Data Forms</b>	Appendix A; Sampling Points W1-SP1 and W1-SP2	
	<b>Upland Determination Data Form</b>	Appendix A; Sampling Point W1-SP3	
	<b>Delineator</b>	Tatiana Dreisbach	
	<b>Delineation Date</b>	August 3, 2015	
<b>Vegetation</b>	<p>Trees – none                  Shrubs – willows (<i>Salix spp.</i>) [species not confirmed but all observed willows were planted, of the same species, and assumed to be peach-leaf willow (<i>Salix amygdaloides</i>)]                  Herbs – slender flatsedge (<i>Cyperus bipartus</i>), western marsh cudweeds (<i>Gnaphalium palustre</i>), false pimpernel (<i>Linderina dubia</i>), barnyardgrass (<i>Echinochloa crus-galli</i>), broadleaf cattail (<i>Typha latifolia</i>), red goosefoot (<i>Chenopodium rubrum</i>), grand redstem (<i>Ammania robusta</i>), biennial wormwood (<i>Artemisia biennis</i>), mexican fireweed (<i>Bassia scoparia</i>), and cinquefoil (<i>Potentilla spp.</i>)</p>		
<b>Soils</b>	<p>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).</p>		
<b>Hydrology</b>	<p>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.</p>		
<b>Rationale for Delineation</b>	<p>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.</p> <p>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.</p>		

# Limitations

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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.

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# **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      **Sampling Date:** 03-Aug-15  
**Applicant/Owner:** WSDOT      **State:** WA      **Sampling Point:** w1-sp1  
**Investigator(s):** Tatiana Dreisbach      **Section, Township, Range:** S 24 T 9N R 28E  
**Landform (hillslope, terrace, etc.):** Floodplain      **Local relief (concave, convex, none):** concave      **Slope:** 10.0 % / 5.7 °  
**Subregion (LRR):** LRR B      **Lat.:** 46.253      **Long.:** -119.257      **Datum:** NAD83HARN  
**Soil Map Unit Name:** Pasco silt loam, 0 to 2 percent slopes      **NWI classification:** PEM

**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?**      **Are "Normal Circumstances" present?** Yes  No   
**Are Vegetation**  , **Soil**  , **or Hydrology**  **naturally problematic?**      (If needed, explain any answers in Remarks.)

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

<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/> <b>Hydric Soil Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/> <b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	<b>Is the Sampled Area within a Wetland?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>
<p>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.</p>	

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

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status	
<b>Tree Stratum</b> (Plot size: 15 x 15 feet )				<b>Dominance Test worksheet:</b> Number of Dominant Species That are OBL, FACW, or FAC: <u>1</u> (A)  Total Number of Dominant Species Across All Strata: <u>1</u> (B)  Percent of dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
3. _____	_____	<input type="checkbox"/> 0.0%	_____	
4. _____	_____	<input type="checkbox"/> 0.0%	_____	
0 = Total Cover				
<b>Sapling/Shrub Stratum</b> (Plot size: 15 x 15 feet )				<b>Prevalence Index worksheet:</b> Total % Cover of:      Multiply by <b>OBL species</b> <u>65</u> x 1 = <u>65</u> <b>FACW species</b> <u>15</u> x 2 = <u>30</u> <b>FAC species</b> <u>5</u> x 3 = <u>15</u> <b>FACU species</b> <u>2</u> x 4 = <u>8</u> <b>UPL species</b> <u>5</u> x 5 = <u>25</u> <b>Column Totals:</b> <u>92</u> (A) <u>143</u> (B)  Prevalence Index = B/A = <u>1.554</u>
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
3. _____	_____	<input type="checkbox"/> 0.0%	_____	
4. _____	_____	<input type="checkbox"/> 0.0%	_____	
5. _____	_____	<input type="checkbox"/> 0.0%	_____	
0 = Total Cover				
<b>Herb Stratum</b> (Plot size: 5 x 5 feet )				
1. <u>Cyperus bipartus</u>	60	<input checked="" type="checkbox"/> 65.2%	OBL	
2. <u>Gnaphalium palustre</u>	10	<input type="checkbox"/> 10.9%	FACW	
3. <u>Coryza canidensis</u>	5	<input type="checkbox"/> 5.4%	UPL	
4. <u>Panicum capillare</u>	2	<input type="checkbox"/> 2.2%	FACU	
5. <u>Plantago major</u>	5	<input type="checkbox"/> 5.4%	FAC	
6. <u>Echinochloa crus-galli</u>	5	<input type="checkbox"/> 5.4%	FACW	
7. <u>Lindernia dubia</u>	5	<input type="checkbox"/> 5.4%	OBL	
8. _____	0	<input type="checkbox"/> 0.0%	_____	
9. _____	0	<input type="checkbox"/> 0.0%	_____	
10. _____	0	<input type="checkbox"/> 0.0%	_____	
11. _____	0	<input type="checkbox"/> 0.0%	_____	
92 = Total Cover				
<b>Woody Vine Stratum</b> (Plot size: 5 x 5 feet )				
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
0 = Total Cover				
<b>% Bare Ground in Herb Stratum:</b> <u>8</u>		<b>% Cover of Biotic Crust:</b> <u>0</u>		

**Remarks:**

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

**Soil**

**Sampling Point: w1-sp1**

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

Depth (inches)	Matrix			Redox Features					Texture	Remarks
	Color (moist)		%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-6	2.5Y	4/2	85	5Y	5/2	10	D	M	Silt Loam	gravels and small cobbles
				5YR	3/4	5	C	M		concentration is prominent
6-12	2.5Y	4/2	100						Silt Loam	gravels and small cobbles

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

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

- Histosol (A1)
- 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)

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

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

<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present.

**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) (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:

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.

**WETLAND DETERMINATION DATA FORM - Arid West Region**

**Project/Site:** 240 Yakima River Bridge 2      **City/County:** Richland/Benton      **Sampling Date:** 04-Aug-15  
**Applicant/Owner:** WSDOT      **State:** WA      **Sampling Point:** w1-sp2  
**Investigator(s):** Tatiana Dreisbach      **Section, Township, Range:** S 24 T 9N R 28E  
**Landform (hillslope, terrace, etc.):** Floodplain      **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      **NWI classification:** PSS

**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?**      **Are "Normal Circumstances" present?** Yes  No   
**Are Vegetation**  , **Soil**  , **or Hydrology**  **naturally problematic?**      (If needed, explain any answers in Remarks.)

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

<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/> <b>Hydric Soil Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/> <b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	<b>Is the Sampled Area within a Wetland?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>
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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.**

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status	
<b>Tree Stratum</b> (Plot size: 15 x 15 feet )				<b>Dominance Test worksheet:</b> Number of Dominant Species That are OBL, FACW, or FAC: <u>5</u> (A)  Total Number of Dominant Species Across All Strata: <u>7</u> (B)  Percent of dominant Species That Are OBL, FACW, or FAC: <u>71.4%</u> (A/B)
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
3. _____	_____	<input type="checkbox"/> 0.0%	_____	
4. _____	_____	<input type="checkbox"/> 0.0%	_____	
	0	<b>= Total Cover</b>		
<b>Sapling/Shrub Stratum</b> (Plot size: 15 x 15 feet )				<b>Prevalence Index worksheet:</b> Total % Cover of:      Multiply by <b>OBL species</b> <u>0</u> x 1 = <u>0</u> <b>FACW species</b> <u>45</u> x 2 = <u>90</u> <b>FAC species</b> <u>7</u> x 3 = <u>21</u> <b>FACU species</b> <u>2</u> x 4 = <u>8</u> <b>UPL species</b> <u>5</u> x 5 = <u>25</u> <b>Column Totals:</b> <u>59</u> (A) <u>144</u> (B)  Prevalence Index = B/A = <u>2.441</u>
1. Salix spp.	30	<input checked="" type="checkbox"/> 100.0%	FACW	
2. _____	0	<input type="checkbox"/> 0.0%	_____	
3. _____	0	<input type="checkbox"/> 0.0%	_____	
4. _____	0	<input type="checkbox"/> 0.0%	_____	
5. _____	0	<input type="checkbox"/> 0.0%	_____	
	30	<b>= Total Cover</b>		
<b>Herb Stratum</b> (Plot size: 5 x 5 feet )				
1. Echinochloa crus-galli	5	<input checked="" type="checkbox"/> 14.7%	FACW	
2. Melilotus albus	5	<input checked="" type="checkbox"/> 14.7%	UPL	
3. Apocynum cannabinum	2	<input type="checkbox"/> 5.9%	FAC	
4. Bassia scoparia	5	<input checked="" type="checkbox"/> 14.7%	FAC	
5. Cirsium arvense	2	<input type="checkbox"/> 5.9%	FACU	
6. Potentilla spp.	5	<input checked="" type="checkbox"/> 14.7%	_____	
7. Chenopodium rubrum	5	<input checked="" type="checkbox"/> 14.7%	FACW	
8. Artemisia biennis	5	<input checked="" type="checkbox"/> 14.7%	FACW	
9. _____	0	<input type="checkbox"/> 0.0%	_____	
10. _____	0	<input type="checkbox"/> 0.0%	_____	
11. _____	0	<input type="checkbox"/> 0.0%	_____	
	34	<b>= Total Cover</b>		
<b>Woody Vine Stratum</b> (Plot size: 5 x 5 feet )				
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
	0	<b>= Total Cover</b>		
<b>% Bare Ground in Herb Stratum:</b> <u>66</u>		<b>% Cover of Biotic Crust</b> <u>0</u>		

**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**

Sampling Point: w1-sp2

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks		
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>				
0-1	2.5Y	4/2	95	2.5Y	4/4	5	C	M	Silt Loam	concentration is distinct

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

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

- Histosol (A1)
- 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)

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

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

<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present.

**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:**

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:**

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 manages during periods with normal precipitation.

**WETLAND DETERMINATION DATA FORM - Arid West Region**

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

**Applicant/Owner:** WSDOT **State:** WA **Sampling Point:** w1-sp3

**Investigator(s):** Tatiana Dreisbach **Section, Township, Range:** S 24 T 9N R 28E

**Landform (hillslope, terrace, etc.):** 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 **NWI classification:** Upland

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? Are "Normal Circumstances" present? Yes  No

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

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

<b>Hydrophytic Vegetation Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/> <b>Hydric Soil Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/> <b>Wetland Hydrology Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>	<b>Is the Sampled Area within a Wetland?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
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.**

Stratum	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status	Dominance Test worksheet:
<b>Tree Stratum</b> (Plot size: 15 x 15 feet )				Number of Dominant Species That are OBL, FACW, or FAC: <u>0</u> (A)  Total Number of Dominant Species Across All Strata: <u>2</u> (B)  Percent of dominant Species That Are OBL, FACW, or FAC: <u>0.0%</u> (A/B)
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
3. _____	_____	<input type="checkbox"/> 0.0%	_____	
4. _____	_____	<input type="checkbox"/> 0.0%	_____	
0 = Total Cover				<b>Prevalence Index worksheet:</b> Total % Cover of: Multiply by OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>10</u> x 3 = <u>30</u> FACU species <u>15</u> x 4 = <u>60</u> UPL species <u>12</u> x 5 = <u>60</u> Column Totals: <u>37</u> (A) <u>150</u> (B)  Prevalence Index = B/A = <u>4.054</u>
<b>Sapling/Shrub Stratum</b> (Plot size: 15 x 15 feet )				
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
3. _____	_____	<input type="checkbox"/> 0.0%	_____	
4. _____	_____	<input type="checkbox"/> 0.0%	_____	
5. _____	_____	<input type="checkbox"/> 0.0%	_____	
0 = Total Cover				
<b>Herb Stratum</b> (Plot size: 5 x 5 feet )				
1. Salsola tragus	10	<input checked="" type="checkbox"/> 27.0%	FACU	
2. Chenopodium album	5	<input type="checkbox"/> 13.5%	FACU	
3. Melilotus albus	2	<input type="checkbox"/> 5.4%	UPL	
4. Bassia scoparia	5	<input type="checkbox"/> 13.5%	FAC	
5. Bromus tectorum	10	<input checked="" type="checkbox"/> 27.0%	UPL	
6. Hordeum jubatum	5	<input type="checkbox"/> 13.5%	FAC	
7. _____	0	<input type="checkbox"/> 0.0%	_____	
8. _____	0	<input type="checkbox"/> 0.0%	_____	
9. _____	0	<input type="checkbox"/> 0.0%	_____	
10. _____	0	<input type="checkbox"/> 0.0%	_____	
11. _____	0	<input type="checkbox"/> 0.0%	_____	
37 = Total Cover				
<b>Woody Vine Stratum</b> (Plot size: 5 x 5 feet )				
1. _____	_____	<input type="checkbox"/> 0.0%	_____	
2. _____	_____	<input type="checkbox"/> 0.0%	_____	
0 = Total Cover				
<b>% Bare Ground in Herb Stratum:</b> <u>63</u>		<b>% Cover of Biotic Crust:</b> <u>0</u>		

**Remarks:**

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

**Soil**

Sampling Point: w1-sp3

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-1	2.5YR	4/2	100				Silt Loam	gravels and cobbles present

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

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

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

- Histosol (A1)
- 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)

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

<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present.

**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)

Secondary Indicators (2 or more required)

- 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 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

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## 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.

	Long-term rainfall records <sup>a</sup>			Rain fall <sup>a</sup>	Condition dry, wet, normal <sup>b</sup>	Condition Value	Month weight value	Product of previous two columns	
	Month	3 yrs. in 10 less than	Average						3 yrs. in 10 more than
1 <sup>st</sup> prior month	July	0.06	0.25	0.30	0.02	D	1	3	3
2 <sup>nd</sup> prior month	June	0.18	0.41	0.51	0.00	D	1	2	2
3 <sup>rd</sup> prior month	May	0.30	0.61	0.75	1.21	W	3	1	3
<b>Sum</b>									<b>8</b>

<sup>a</sup> NRCS 2015

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

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.**

		Long-term rainfall records <sup>a</sup>							
	Month	3 yrs. in 10 less than	Average	3 yrs. in 10 more than	Rain fall <sup>a</sup>	Condition dry, wet, normal <sup>b</sup>	Condition Value	Month weight value	Product of previous two columns
4 <sup>th</sup> prior month	Apr	0.28	0.57	0.70	0.03	D	1	3	3
5 <sup>th</sup> prior month	Mar	0.35	0.71	0.86	0.73	N	2	2	4
6 <sup>th</sup> prior month	Feb	0.43	0.75	0.92	0.64	N	2	1	2
								<b>Sum</b>	<b>9</b>

<sup>a</sup> NRCS 2015

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

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 for the entire growing season prior to the field visit.

## Appendix B-2. Daily Precipitation 10 days preceding field work, Richland, Washington

Date (2015)	Daily Precipitation (inches) <sup>a</sup>
Aug 2	0.00
Aug1	0.00
Jul 31	0.00
Jul 30	0.00
Jul 29	0.00
Jul 28	0.00
Jul 27	0.00
Jul 26	0.00
Jul 25	0.00
Jul 24	0.00

<sup>a</sup> NRCS 2015

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