SR 240/I-182 to Columbia Center Interchange Mitigation Site

USACE 2004-00043

South Central Region

2015 MONITORING REPORT

Wetlands Program

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Author:
Tom Mohagen

Editor:
Doug Littauer

For additional information about this report or the WSDOT Wetlands Program, please contact:

Doug Littauer, Wetlands Program
WSDOT, Environmental Services Office
P. O. Box 47332, Olympia, WA 98504
Phone: 360-570-2579 E-mail: littaud@wsdot.wa.gov

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SR 240/I-182 to Columbia Center Interchange Mitigation Site

USACE 2004-00043

General Site Information		
USACE Number	2004-0-0043	
Mitigation Location	East and west side of SR 240 at MP 37 in Benton County	
LLID Number	1192477462437	
Construction Date	2005-2007	
Monitoring Period	2009-2018	
Year of Monitoring	7 of 10	
Area of Project Impact	9.65 acres	
Type of Mitigation[1]	Wetland Establishment	Wetland Enhancement
Area of Mitigation	10.19 acres	5.62 acres

[1] See Appendix 3 for a complete summary of proposed mitigation.

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Summary of Monitoring Results and Management Activities (2015)

Performance Standards	2015 Results[2]	Management Activities
In the wetland establishment and enhancement areas, soils will be inundated or saturated to the surface, or groundwater will be present within 12 inches of the surface at least 20 consecutive days during the growing season	Present	
Cover of native wetland trees and shrubs (planted and volunteer) will be at least 40 percent in the combined scrub-shrub and forested communities	See results section	
Cover of native wetland herbaceous plant species (planted and volunteer) will be at least 30 percent in the emergent communities.	See results section	Continued weed control
There will be at least 5 native tree and/or shrub species present in the scrub-shrub and forested wetlands.	6 native trees/shrubs present	
At least 3 native herbaceous species will be present in the emergent communities	3 native herbaceous species present	
Cover of native plant species (planted and volunteer) will be at least 30 percent in the upland buffer.	38% cover ($CI_{80\%}$ = 29-46%).	Continued weed control
There will be at least 3 native species present in the upland buffer.	15 native species present	
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.	None observed	
For the following weeds, combined cover will not exceed 15 percent across the mitigation site: See Appendix 3 for invasive list.	East: 13% cover ($CI_{80\%}$ = 6-20%) West: 7% cover ($CI_{80\%}$ = -2-15%) Buffer: 11% cover ($CI_{80\%}$ = 5-16%)	Continued weed control

Report Introduction

This report summarizes final-year (Year-7) monitoring activities at the State Route (SR) 240 Columbia Causeway 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, photo-documentation, and a wetland delineation. Vegetation monitoring and photo documentation occurred on August 23-25, 2015.

[2] Estimated values are presented with their corresponding statistical confidence interval. For example, 38% ($CI_{80\%}$ = 29-46% cover) means we are 80% confident that the true cover value is between 29% and 46%.

What is the SR 240/I-182 to Columbia Center Mitigation Site?

This 15.81-acre mitigation site (Figure 1) is 10.19 acres of wetland establishment and 5.62 acres of wetland enhancement located on both sides of State Route (SR) 240 just south of the Yakima River. This site was created to compensate for the loss of 9.65 acres of wetlands due to the addition of lanes and a pedestrian/bike path from MP 63.26 and 37.59 and MP 37.84 and 38.71 along the SR 240 corridor between Richland and Kennewick in Benton County, WA. The recently established and enhanced emergent, scrub-shrub and forested wetlands are designed to provide mitigation for lost wetland functions including wildlife habitat, flood flow alteration, and contaminant buffering.

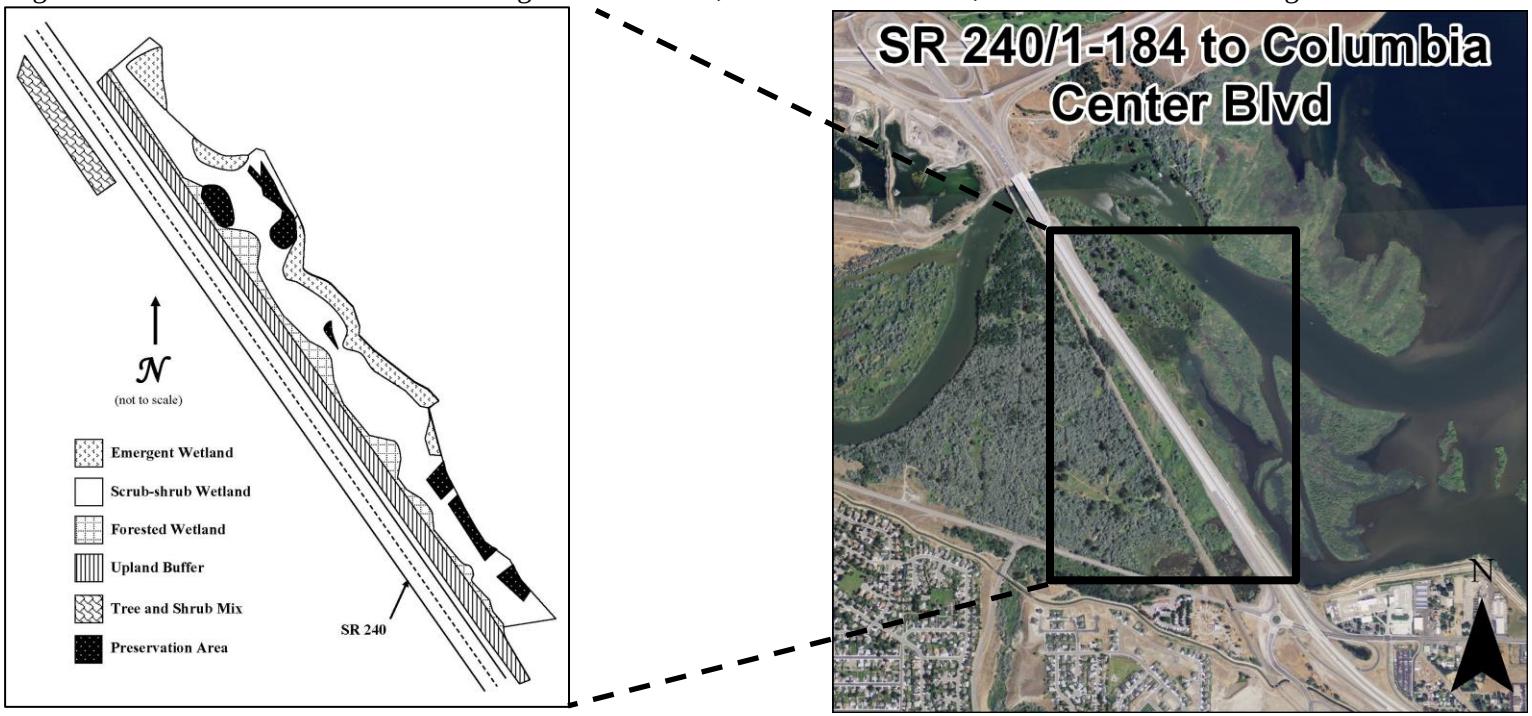


Figure 1 Site Sketch

The SR 240/I-182 to Columbia Center Blvd. Mitigation Site is comprised of two sections on either side of SR 240. The long portion on the east side of the SR is located adjacent to the confluence of the Yakima River and the Columbia River (East Unit). A conveyance (wildlife tunnel) structure connects this portion of the site with a canal enhancement area on the west side of the SR (West Unit). In addition, a land purchase of 15.59 acres on Amon Creek compensates for an additional 3.2 credits of mitigation. Appendix 2 contains directions to the site.

Performance Standard 1
In the wetland establishment and enhancement areas, soils will be inundated or saturated to the surface, or groundwater will be present within 12 inches of the surface at least 20 consecutive days during the growing season in years when precipitation is equal to or greater than the 30-year average at the weather station nearest to the SR 240 mitigation site. Hydrology will be measured at 10 or more locations at or near the upland/wetland boundary.

Performance Standard 2
Cover of native wetland trees and shrubs (planted and volunteer) will be at least 40 percent in the combined scrub-shrub and forested communities.

Performance Standard 3
Cover of native wetland herbaceous plant species (planted and volunteer) will be at least 30 percent in the emergent communities.

Performance Standard 4
There will be at least 5 native tree and/or shrub species present in the scrub-shrub and forested wetlands.

Performance Standard 5
At least 3 native herbaceous species will be present in the emergent communities.

Performance Standard 6
Cover of native plant species (planted and volunteer) will be at least 30 percent in the upland buffer.

Performance Standard 7
There will be at least 3 native species present in the upland buffer.

Performance Standard 8
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.

The following Class B and Class C weeds have been designated for control by the Benton County Noxious Weed Control Board (BCNWCB 2010). If any of the following species are found on the site during the monitoring period, occurrences shall be immediately reported to the site manager and control measures will be initiated within 30 days of the report (Appendix 3).

Performance Standard 9

For the following weeds, combined cover will not exceed 15 percent across the mitigation site:

a) Class B weeds:

burningbush	(*Bassia [Kochia] scoparia*)
puncturevine	(*Tribulus terrestris*)
common reed	(*Phragmites australis*)

b) Other invasive species:

prickly Russian thistle	(*Salsola tragus*)
Russian olive	(*Elaeagnus angustifolia*)

Appendix 1 shows the planting plan (Davari 2006).

How were the performance standards evaluated?

WSDOT staff made visual observations of inundation during the growing season and consulted water level readings from the McNary Locks and Dam to make a determination on the presence or absence of hydrology on the site (Performance Standard 1). See Appendix 3 (Figure 1) for daily water elevations at the dam and Appendix 3 (Table 3) for monthly precipitation for the months of February - May.

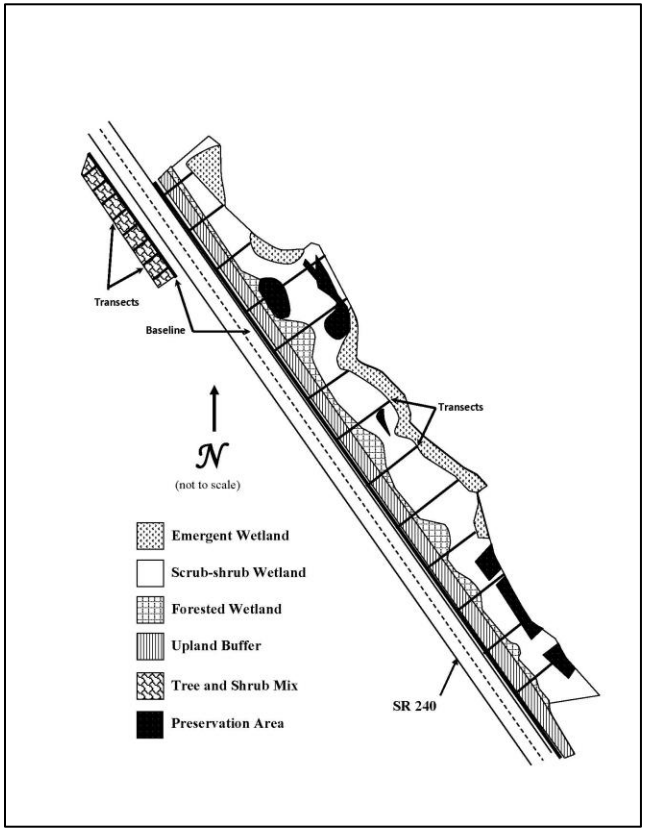


Figure 2 Site Sampling Design (2015)

Appendix 3, Table 2 documents the sampling methodology utilized for 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 Baseline: A 1,040-meter baseline was established parallel to the walking trail at the East Unit and a 320-meter baseline was established parallel to the canal at the West Unit (Figure 2).

How is the site developing?

The site's progress toward meeting success standards was challenged in 2013 when it was discovered the cover of native emergent species was much less than previously estimated, due to the fact that a majority of cover in this zone was being provided by narrowleaf cattail (*Typha angustifolia*). Native cover estimates dropped from an estimated 90 percent cover in 2011 to 10 percent in 2013. A similar challenge occurred this season with the realization that the majority of the *Populus sp.* on site are most likely a hybrid *Populus*. The hybrid *Populus sp* had been identified as quaking aspen (*Populus tremuloides*) during previous years of monitoring as these were listed on the planting plan and have a similar leaf configuration with a flexible flattened petiole. There is the possibility that some of the cover is actually provided by the quaking aspen however a majority is likely the unknown poplar. The identification of this species will be confirmed during qualitative monitoring in 2016.

The intended functions for the West Unit include flood flow alteration, sediment removal, erosion control, wildlife and fish habitat, as well as nutrient and toxicant removal. The intended functions for the East Unit include flood flow alteration, water quality, erosion control, transport and storage, wildlife habitat, as well as production export. These functions are being provided despite the site not meeting the native species cover performance standards. The newly established wetlands with increased flood storage deliver sediment removal and flood flow aleration. The increase in tree and shrub species are providing production export and wildlife habitat. Over twenty species of birds have been observed on site including passerines, water fowl, wading birds, and hawks. A pair of osprey have been observed nesting on an installed perch pole for the past three seasons with young (Photo 1). Beaver sign is evident in the form of harvested tree limbs and slides. Deer, elk and raccoon tracks were observed.

Photo 1
Osprey nest (August 2015)

Results for Performance Standard 1
(Hydrology present):

Inundation was visibly observed during the growing season. This site is strongly influenced by operation of the McNary Lock and Dam. The water elevation measured at the dam since 2005 has measured an average 338.78 feet with a variance of 0.35 feet through 2010 (CBR 2016). Appendix 3 Figure 1 shows the daily elevation variance during the growing season of 2016 as being within the normal variance. As these measurements are similar to those in the past it is highly probable that hydrology was present during growing season based on the strongly correlated water levels at the site. Appendix 3 (Table 3) shows that the rainfall in February-May was close to the 10-year average across each of the four months.

Results for Performance Standard 2
(40 percent cover of native wetland trees and shrubs; 5 species present):

Native woody cover in the West Unit is estimated to be 38% ($CI_{80\%}$ = 22-53%) (Photo 2). If the *Populus sp.* is included the cover would increase to 56% ($CI_{80\%}$ = 44-67%). Native woody cover in the East Unit is estimated at 28% ($CI_{80\%}$ = 21-35%) (Photo 3). If the *Populus sp.* is included the cover would increase to 46% ($CI_{80\%}$ = 37-55%).

Photo 2
Woody cover in the West Unit (August 2015)

Photo 3
Woody cover in the East Unit (August 2015)

Results for Performance Standard 3
(30 percent native cover in the emergent communities):

The cover of native wetland herbaceous species is estimated at 24% ($CI_{80\%}$ = 12-36%). If narrowleaf cattail (*Typha angustifolia*) and hybrid cattail species were included in this estimate the cover increases to virtually 100 percent.

Results for Performance Standard 4
(There will be at least 5 native tree and/or shrub species present in the scrub-shrub and forested wetlands):

The following native species are present in the forested and scrub-shrub wetland:

Black hawthorn (*Crataegus douglasii*), Pacific willow (*Salix lasiandra*), sandbar willow (*Salix exigua*), Lewis' mock orange (*Philadelphus lewisii*), Nootka rose (*Rosa nutkana*), and golden currant (*Ribes aureum*).

Results for Performance Standard 5
(At least 3 native herbaceous species will be present in the emergent communities):

Broadleaf cattail (*Typha latifolia*), soft-stem bulrush (*Schoenoplectus tabernaemontani*), jointleaf rush (*Juncus articulatus*), and Northwest territory sedge (*Carex utriculata*) are four native species that are present in the emergent zone (Photo 4) .

Photo 4
Emergent cover (August 2015)

Photo 5
Native cover in the buffer (August 2015)

Results for Performance Standard 6
(Cover of native plant species (planted and volunteer) will be at least 20 percent in the upland buffer):

The cover of native plant species in the buffer is estimated at 38% ($CI_{80\%}$ = 29-46%). If the *Populus sp*. is included the cover would increase to 53% ($CI_{80\%}$ = 43-62%).

Results for Performance Standard 7
(There will be at least 3 native species present in the upland buffer.):

There are sixteen species of native plants documented in the buffer (Photo 5). This consists of a mixture of herbaceous and woody species. Dominant species include Pacific willow (*Salix lasiandra*), inland saltgrass (*Distichlis spicata*), basin wildrye (*Leymus cinereus*), and bluebunch wheatgrass (*Pseudoroegneria spicata*).

Results for Performance Standard 8
(Washington State-listed or county-listed weeds will be eradicated):

No Washington State A-listed weeds were observed on site during monitoring activities.

Results for Performance Standard 9

(Maximum 15% cover of listed invasive species):

The cover of species listed as invasive is estimated as follows:

- West Unit: 7% ($CI_{80\%}$ = -2-15%)
- East Unit: 13% ($CI_{80\%}$ = 6-20%)
- Buffer: 11% ($CI_{80\%}$ = 5-16%)

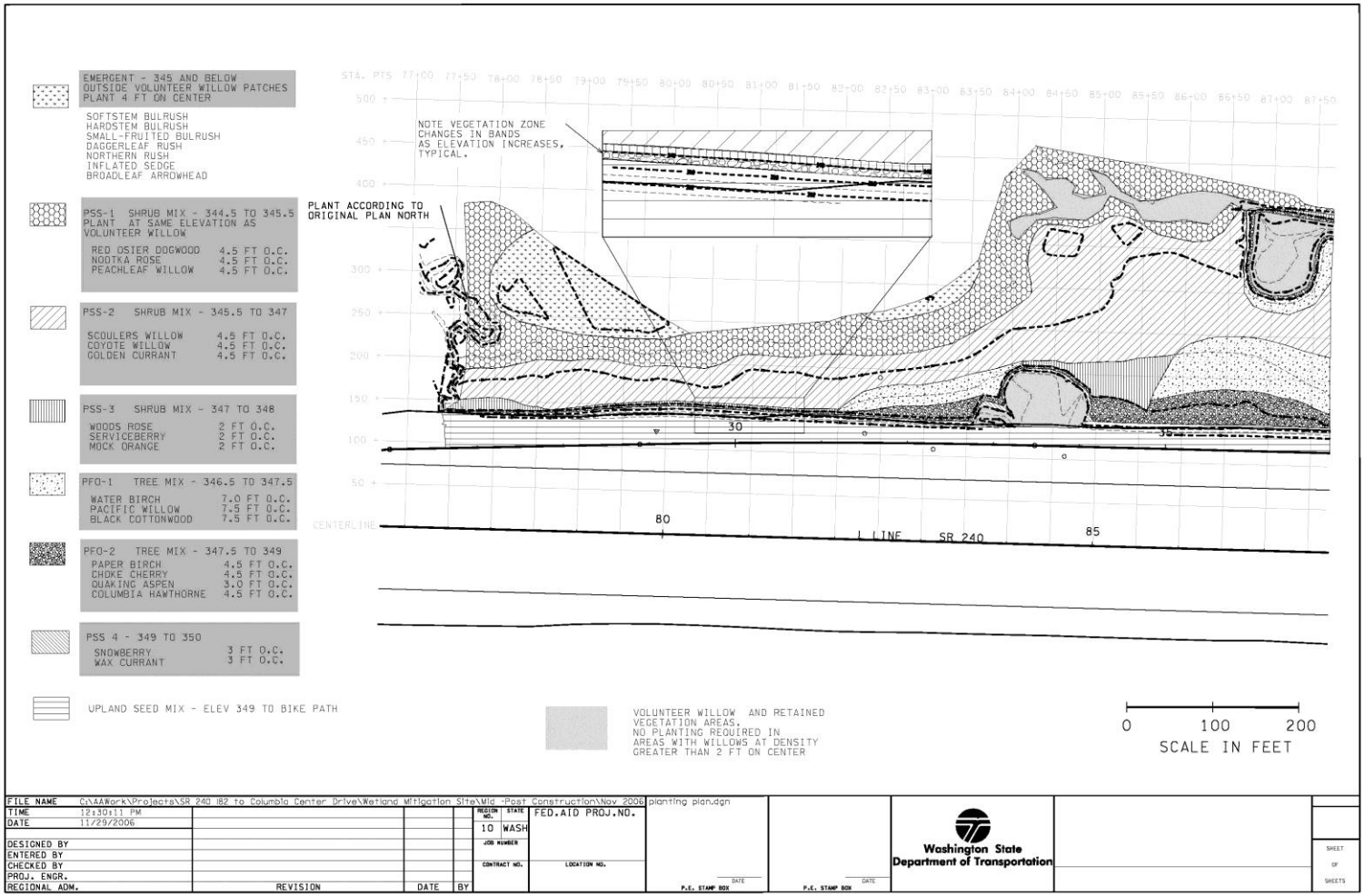
The dominant species in the West sample is Russian olive (*Elaeagnus angustifolia*), in the East sample it is common reed (*Phragmites australis*), and in the buffer it is kochia (*Bassia scoparia*).

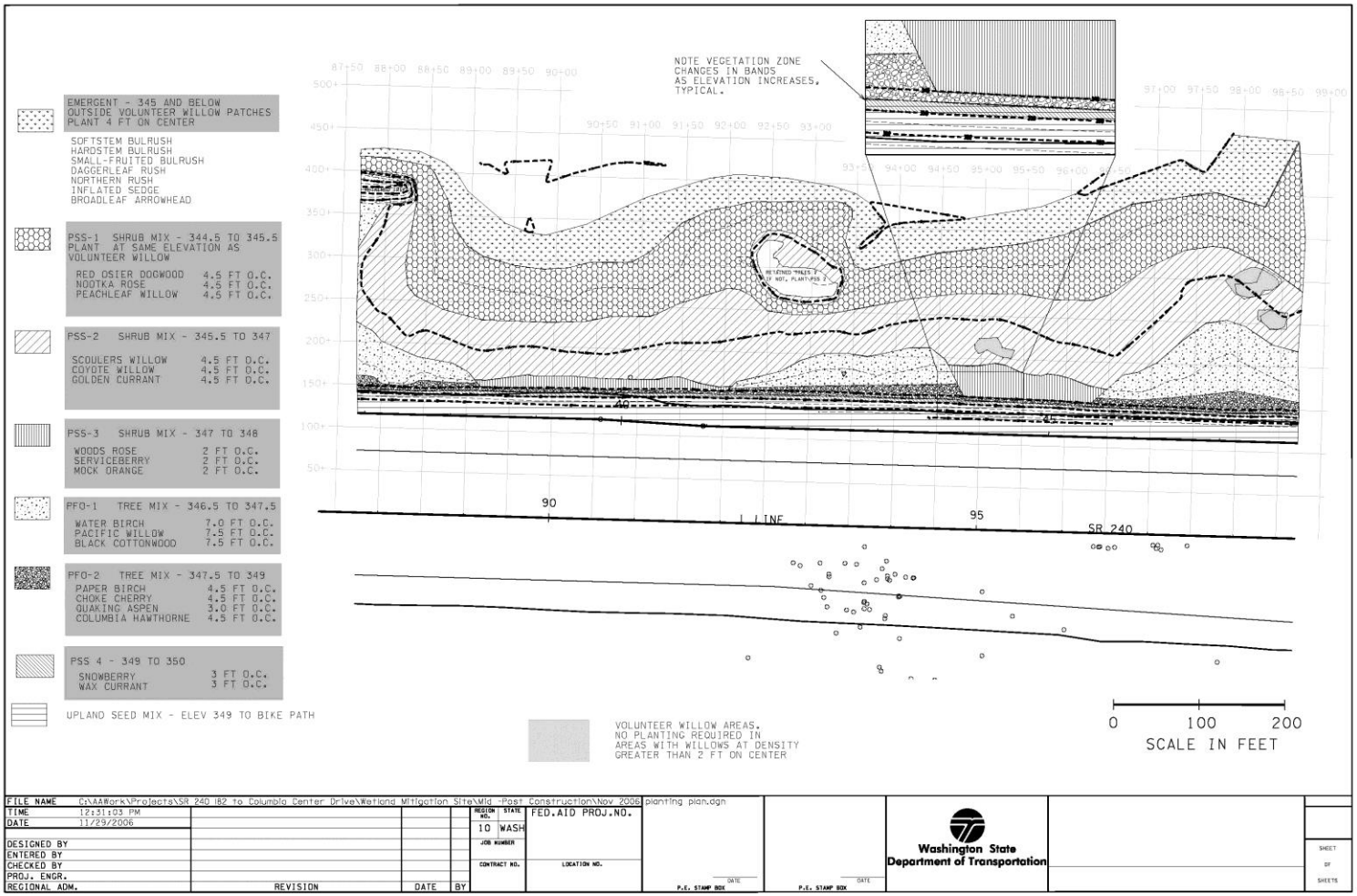
What is planned for this site?

Continued weed control.

Appendix 1 – Planting Plan

(from Davari 2006)




EMERGENT - 345 AND BELOW
OUTSIDE VOLUNTEER WILLOW PATCHES
PLANT 4 FT ON CENTER
SOFTSTEM BULRUSH
HARDSTEM BULRUSH
SMALL-FRUITED BULRUSH
DAGGERLEAF RUSH
NORTHERN RUSH
INFLATED SEDGE
BROADLEAF ARROWHEAD
PSS-1 SHRUB MIX - 344.5 TO 345.5
PLANT AT SAME ELEVATION AS VOLUNTEER WILLOW
RED OSIER DOGWOOD 4.5 FT O.C.
NOOTKA ROSE 4.5 FT O.C.
PEACHLEAF WILLOW 4.5 FT O.C.
PSS-2 SHRUB MIX - 345.5 TO 347
SCOULERS WILLOW 4.5 FT O.C.
COYOTE WILLOW 4.5 FT O.C.
GOLDEN CURRANT 4.5 FT O.C.
PSS-3 SHRUB MIX - 347 TO 348
WOODS ROSE 2 FT O.C.
SERVICEBERRY 2 FT O.C.
MOCK ORANGE 2 FT O.C.
PFO-1 TREE MIX - 346.5 TO 347.5
WATER BIRCH 7.0 FT O.C.
PACIFIC WILLOW 7.5 FT O.C.
BLACK COTTONWOOD 7.5 FT O.C.
PFO-2 TREE MIX - 347.5 TO 349
PAPER BIRCH 4.5 FT O.C.
CHOKE CHERRY 4.5 FT O.C.
QUAKING ASPEN 3.0 FT O.C.
COLUMBIA HAWTHORNE 4.5 FT O.C.
PSS 4 - 349 TO 350
SNOWBERRY 3 FT O.C.
WAX CURRANT 3 FT O.C.
UPLAND SEED MIX - ELEV 349 TO BIKE PATH
NOTE VEGETATION ZONE CHANGES IN BANDS AS ELEVATION INCREASES, TYPICAL.
90
95
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SR 240
VOLUNTEER WILLOW AREAS. NO PLANTING REQUIRED IN AREAS WITH WILLOWS AT DENSITY GREATER THAN 2 FT ON CENTER
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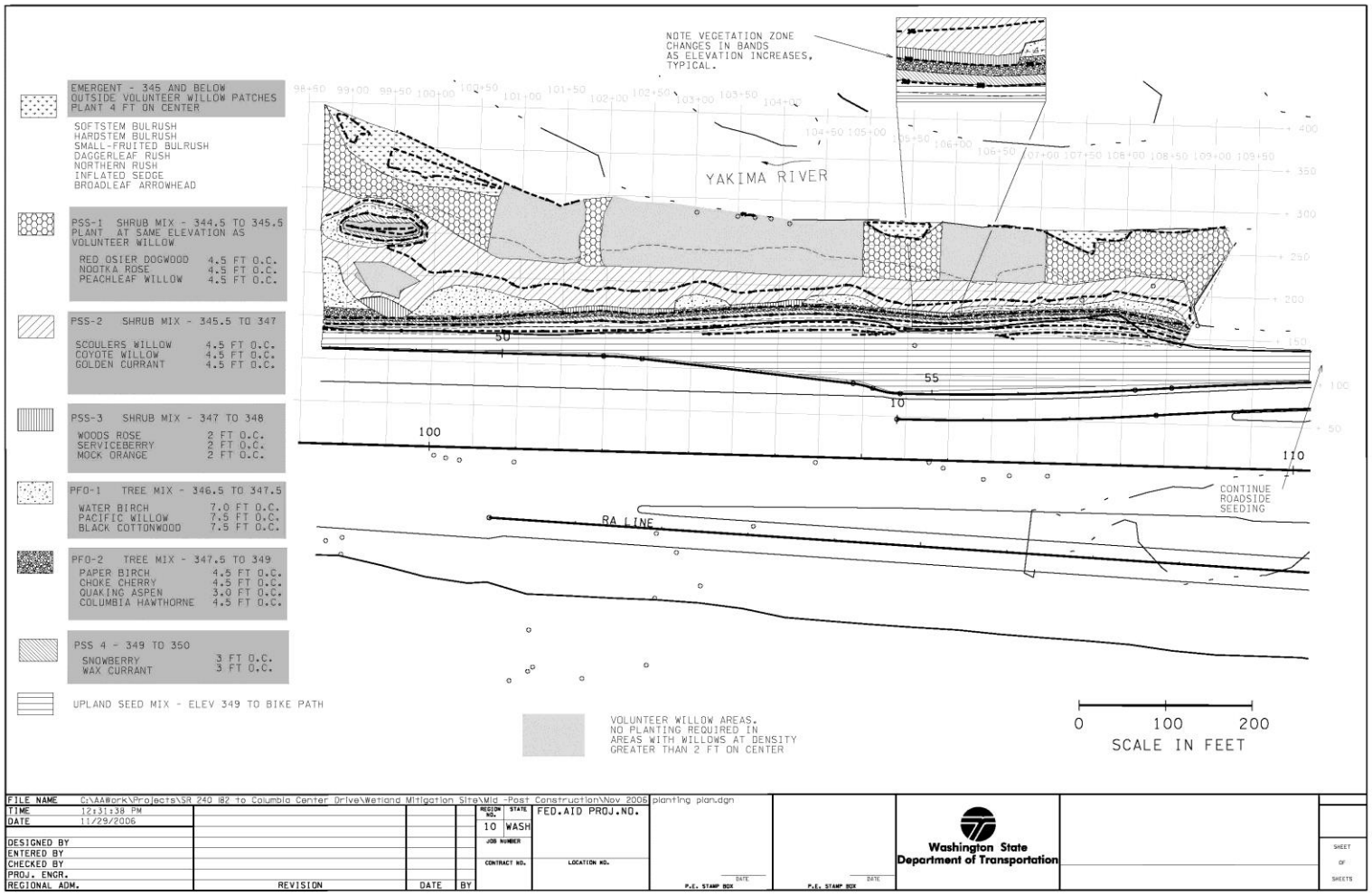
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PSS-2 SHRUB MIX - 345.5 TO 347
SCOULERS WILLOW 4.5 FT O.C.
COYOTE WILLOW 4.5 FT O.C.
GOLDEN CURRANT 4.5 FT O.C.
PSS-3 SHRUB MIX - 347 TO 348
WOODS ROSE 2 FT O.C.
SERVICEBERRY 2 FT O.C.
MOCK ORANGE 2 FT O.C.
PFO-1 TREE MIX - 346.5 TO 347.5
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UPLAND SEED MIX - ELEV 349 TO BIKE PATH
NOTE VEGETATION ZONE CHANGES IN BANDS AS ELEVATION INCREASES, TYPICAL.
YAKIMA RIVER
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CONTINUE ROADSIDE SEEDING
VOLUNTEER WILLOW AREAS. NO PLANTING REQUIRED IN AREAS WITH WILLOWS AT DENSITY GREATER THAN 2 FT ON CENTER
0 100 200
SCALE IN FEET
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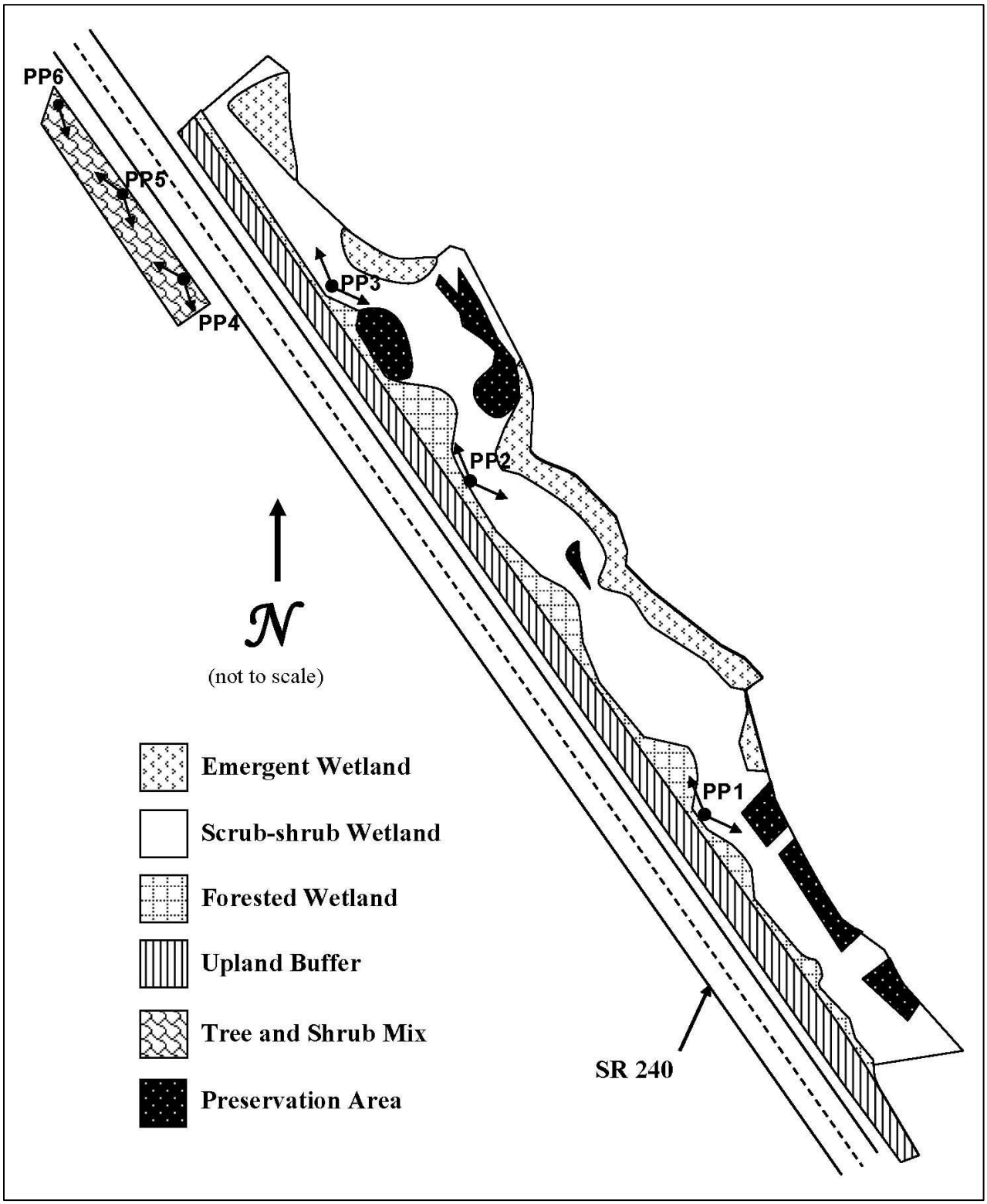
Appendix 2 – Photo Points



Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on August 5, 2015 and document current site development.

Photo Point 1a – East Unit

Photo Point 1b – East Unit

Photo Point 2a East Unit

Photo Point 2b – East Unit

Photo Point 3a – East Unit

Photo Point 3b – East Unit

Photo Point 4a- West Unit

Photo Point 4b West Unit

Photo Point 5a – West Unit

Photo Point 6 – West Unit

Photo Point 5b – West Unit

Driving Directions:
From I-5 take SR 12 to the Tri-Cities area. From 182/12 west, take 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 Tables

Table 1 Proposed Mitigation

Proposed Mitigation using Ecology Ratios		
Mitigation Site	**Actual Area (ac)**	**Credit (ac)**
Creation Area	10.19	10.19
Enhancement Area	5.60 @ 1:4	1.40
Conveyance Structure	*Out of Kind	3.00
Upland Habitat Preservation (Cottonwoods\Roses)	0.7 @ 1:4	0.20
Financial Assistance to WDFW – Amon Creek Off-site Mitigation		3.20
Total		17.99

Table 2 Sampling Design by Performance Standard (PS) (2015)

	PS 2	**PS 3**	**PS 4**	**PS 5**	**PS 6**	**PS 7**	**PS 8**	**PS 9**
Attribute	Cover	Cover	Presence/ Absence	Presence/ Absence	Cover	Presence/ Absence	Presence/ Absence	Cover
Target Pop.	Native Woody	Herbaceous	Native Woody	Herbaceous	Native Species	Native Species	Noxious Weeds	Invasive sp.
Zone	SS/PFO	Emergent	SS/PFO	Emergent	Buffer	Buffer	Entire site	Entire site
Sample Method	Line Intercept	Point Frame	Qualitative	Qualitative	Point Line	Qualitative	Point Line	Point Line
SU Length	East: 20 m West: 5m	1	N/A	N/A	10 m	N/A		East: 10 m West: 5 m
SU Width	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
Points per SU	N/A	25	N/A	N/A	20	N/A		East: 20 West: 20
Total # of SU	East: 15 West: 13	3	N/A	N/A	20	N/A		East: 20 West: 13
Other			5 species	3 species		3 species		

Table 3 Listed invasive species associated with Performance Standard 8

a) Class B weeds:	
houndstongue	*(Cynoglossum officinale)*
diffuse knapweed	*(Centaurea diffusa)*
spotted knapweed	*(Centaurea stoebe)*
yellow starthistle	*(Centaurea solstitialis)*
non-native knotweeds	*(Polygonum cuspidatum, P. polystachyum, P. sachalinense, and P. bohemicum)*
purple loosestrife	*(Lythrum salicaria)*
yellow nutsedge	*(Cyperus esculentus)*
rush skeletonweed	*(Chondrilla juncea)*
perennial sowthistle	*(Sonchus arvensis)*
poison hemlock	*(Conium maculatum)*
Scotch thistle	*(Onopordum acanthium)*
musk thistle	*(Carduus nutans)*
Dalmatian toadflax	*(Linaria dalmatica)*
butterfly bush	*(Buddleja davidii)*
Eurasian watermilfoil	*(Myriophyllum spicatum)*
b) Class C weeds:	
babysbreath	*(Gypsophila paniculata)*
jointed goatgrass	*(Aegilops cylindrica)*
common groundsel	*(Senecio vulgaris)*
yellow-flag iris	*(Iris pseudacorus)*
hairy willow-herb	*(Epilobium hirsutum)*
cereal rye	*(Secale cereale)*
bull thistle	*(Cirsium vulgare)*
Canada thistle	*(Cirsium arvense)*

Figure 1 Daily water elevation at McNary Forebay (Washington) (Columbia River) (CBR 2016).

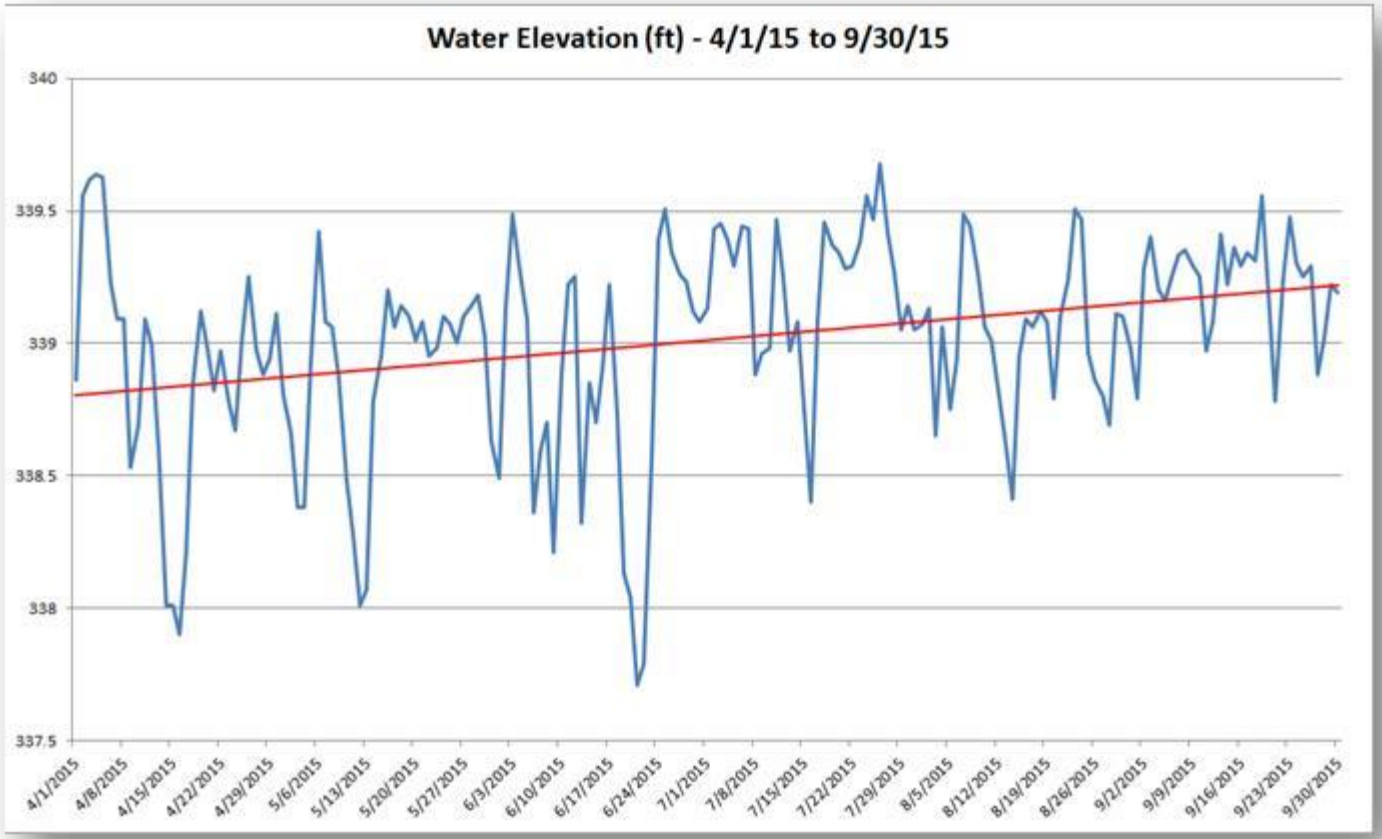


Table 3. Monthly precipitation data for Kennewick, Washington.

	Long-term rainfall records[a]				
Month	**3 yrs. in 10 less than**	**Average**	**3 yrs. in 10 more than**	**Rain fall[a]**	**Condition dry, wet, normal[b]**
Feb	0.47	0.79	0.96	0.66	N
Mar	0.42	0.77	0.94	0.34	D
April	0.2	0.52	0.63	0.15	D
May	0.34	0.65	0.8	0.99	W

[a]NRCS 2015
[b] Conditions are considered normal if they fall within the low and high range around the average.

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