

# YEAR 2 (2021) MONITORING REPORT Linnton Mill Restoration Site

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ACRONYMS AND ABBREVIATIONS

- ACM – ACTIVE CHANNEL MARGIN
CI – CONFIDENCE INTERVAL
DO – DISSOLVED OXYGEN
DSL – DEPARTMENT OF STATE LANDS
LWD – LARGE WOODY DEBRIS
OCH – OFF-CHANNEL HABITAT
ODA – OREGON DEPARTMENT OF AGRICULTURE
OHWM – ORDINARY HIGH WATER MARK
SSPP – SITE-SPECIFIC PERFORMANCE PLAN
USFWS – U.S. FISH AND WILDLIFE SERVICE
USGS – UNITED STATES GEOLOGICAL SURVEY

# 1. Introduction and Summary

This monitoring report describes the results of Year 2 performance monitoring at the Linnton Mill Restoration Site (Site, Figure 1). Construction of the Site was completed in the fall of 2019, and initial planting was completed in January 2020.

Table 1 presents a summary of elements monitored during 2021 and results compared to performance standards. A detailed discussion of methods is presented in Section 3, results are presented in Section 4, and discussion in Section 6. Adaptive management and maintenance actions conducted during 2021 are described in Section 7.

**Table 1. Summary of Performance Standards and Results**

Performance Standards	Standard Met
<b>Geomorphic/ Structural Habitat Elements</b>	
<b>A6. Off-Channel habitat and Active Channel Margin (ACM) within 10% of as-built area</b>	• N/A
<b>A7. Increase in elevation in Off-Channel habitat &lt;20%</b>	• YES (Section 4.1.1)
<b>A8. Increase in elevation in ACM &lt;20%</b>	• YES (Section 4.1.1)
<b>A9. Fish access:</b> <ul style="list-style-type: none"> <li>• No physical conditions that prevent fish access to the OCH</li> <li>• OCH channel gradient &lt; 4% slope</li> <li>• Jump heights will not exceed 6 inches</li> <li>• The Linnton Creek culvert discharge 11/1-6/30</li> <li>• Linnton Creek thalweg remain wetted during low water.</li> </ul>	<ul style="list-style-type: none"> <li>• NO (Section 4.1.2)</li> <li>• YES</li> <li>• YES</li> <li>• YES</li> <li>• YES</li> </ul>
<b>A10. Presence of at least 80% LWD</b>	• YES
<b>Hydrology and Hydraulics</b>	
<b>B1. Area of 50% inundation within 20% of as-built condition.</b>	• N/A
<b>Vegetation</b>	
<b><i>Riparian/Upland Forested</i></b> <ul style="list-style-type: none"> <li>• C8. ≥ 1,200 native woody stems per acre.</li> <li>• C9. ≥ 3 native tree species and 5 native shrub species.</li> <li>• C10. Cover:                             <ul style="list-style-type: none"> <li>○ ≥ 10% native herbaceous</li> <li>○ ≤ 30% non-native herbaceous</li> </ul> </li> </ul>	(Section 4.2.1) <ul style="list-style-type: none"> <li>• YES</li> <li>• YES</li> <li>○ YES</li> <li>○ YES</li> </ul>
<b><i>Off-Channel Shrub</i></b> <ul style="list-style-type: none"> <li>• C11. ≥ 1,200 native woody stems per acre.</li> <li>• C12. ≥ 5 native shrub species</li> <li>• C13. Cover:                             <ul style="list-style-type: none"> <li>○ ≥ 10% native herbaceous</li> <li>○ ≤ 30% non-native herbaceous</li> </ul> </li> </ul>	(Section 4.2.2) <ul style="list-style-type: none"> <li>• YES</li> <li>• YES</li> <li>○ YES</li> <li>○ YES</li> </ul>
<b><i>Off-Channel Emergent</i></b> <ul style="list-style-type: none"> <li>• C14. ≥ 5 native emergent/herbaceous species.</li> </ul>	(Section 4.2.3) <ul style="list-style-type: none"> <li>• YES</li> </ul>

<ul style="list-style-type: none"> <li>• C15. Cover:               <ul style="list-style-type: none"> <li>○ ≥ 30% native herbaceous</li> <li>○ ≤ 10% non-native herbaceous</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>○ NO (27.2%)</li> <li>○ YES</li> </ul>
Water Quality	Dissolved Oxygen and Temperature	Section 4.3
<b>Fish and Wildlife (No Performance Standards)</b>		
No fish monitoring required in Year 2.		N/A
No wildlife monitoring required in Year 2.		Incidental observations of wildlife included in Attachment 4.
Photographic Monitoring		Attachment 3

### 1.1 Geomorphic/ Structural Habitat Elements Monitoring

Below are the monitoring questions related to geomorphic/structural habitat, and following each question is the corresponding performance standard applicable for Years 1-5.

*Is the restoration site meeting its interim performance standards (IPSs)?*

**A6: Total area of Off-Channel habitat or ACM habitat within 10% of the as-built condition (minimum 0.5 foot)**

*Is the total quantity of Off-Channel and ACM habitat that was created being retained over time?*

**A7: Increase in elevation within the Off-Channel habitat of no greater than 20%**

**A8: Increase in elevation within the ACM habitat of no greater than 20%**

*Are the fish able to enter and exit the site?*

**A9: No physical conditions that prevent fish access to the Off-Channel habitat: The channel gradient throughout the Off-Channel habitat will not exceed 4% slope and jump heights will not exceed 6 inches. The Linnton Creek culvert outlet will discharge from November 1st through June 30th, when juvenile Chinook are likely present in the Willamette River, and the channel thalweg downstream of Linnton Creek will remain wetted during low water conditions in Years 1 through 10.**

*Are habitat elements being retained on site?*

**A10: Presence of at least 80% of the total number of large woody debris/structural habitat elements that were placed below the 100-year flood elevation, including any volunteer LWD ≥18-inch diameter and ≥30-foot length.**

## 2. Monitoring Activities and Performance Standards

The monitoring program is presented in the Site-Specific Performance Plan (SSPP) for the Site (Exhibit B of the Restoration Plan; Grette Associates 2018). Please refer to that document for full details on the monitoring plan. Below are the monitoring questions posed in the SSPP and the applicable performance standards to gauge success in

monitoring years 1-5. Note, some standards are only required in years 1,3,5,7, and 10; we do not provide detail on these standards. The focus of this report is on those standards applicable to Year 2 monitoring requirements listed below in bold.

## 2.1 Hydrology and Hydraulics

Below are the monitoring questions related to hydrologic/hydraulics, and following each question is the corresponding performance standard applicable for Years 1-5.

*What is the total area of the site that is inundated by the river during periods of high flow?*

**B1: Areal extent of the 50% inundation level within 20% relative to the as-built condition.**

## 2.2 Vegetation Monitoring

Vegetation monitoring is intended to track vegetational development to ensure that planted species are establishing as intended. Below are the monitoring questions related to vegetation establishment, and the applicable performance standards for Years 1-5.

*Is vegetation developing in a way that will ultimately generate a native assemblage of appropriate vegetation types?*

*Is the restoration site meeting its interim performance standards (IPSs)?*

### Riparian/Upland Forested

**C8: A minimum of 1,200<sup>1</sup> native woody stems per acre.**

**C9: At least 3 native tree species and 5 native shrub species.**

**C10: Cover (during the first 5 years, trees/shrubs will be excluded from percent cover):**

- **≥ 10% native herbaceous**
- **≤ 30% non-native herbaceous**
- **The remaining percentage of cover can be made up of bare ground, rocks or native herbaceous.**

### Off-Channel Shrub

**C11: A minimum of 1,200<sup>1</sup> native woody stems per acre.**

**C12: At least 5 native shrub species.**

**C13: Cover (during the first 5 years, shrubs will be excluded from percent cover):**

- **≥ 10% native herbaceous**
- **≤ 30% non-native herbaceous**
- **The remaining percentage of cover can be made up of bare ground, rocks or native herbaceous.**

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<sup>1</sup> The Oregon DSL Removal/Fill permit requires 1,600 stems/acre in riparian and forested areas.

## Off-Channel Emergent

**CI4:** At least 5 native emergent/herbaceous species.

**CI5:** Cover (during the first 5 years, trees/shrubs will be excluded from percent cover):

- $\geq 30\%$  native herbaceous
- $\leq 10\%$  non-native herbaceous
- The remaining percentage of cover can be made up of bare ground, rocks or native herbaceous.

### 2.3 Water Quality Monitoring

Below are the monitoring questions related to water quality. No performance standards are associated with this question, but the methods used to address the question are presented below.

*Is water quality at the site improving over time and comparable to an appropriate reference condition?*

*Conduct continuous water temperature monitoring and periodic dissolved oxygen level monitoring in the Off-Channel habitat.*

## 3. Monitoring Methods

### 3.1 Geomorphic Monitoring

Although geomorphic monitoring was not required in Year 2, due to differences between the as-built report and Year 1 monitoring, it was determined that an additional topographic survey should be used to compare elevation changes to Year 1 results. Note, some standards are only required in years 1,3,5,7, and 10; only those standards applicable to Year 2 monitoring are listed below.

#### 3.1.1 A7 and A8: Increase in Elevation within Off-Channel Habitat and ACM

To detect changes in elevation within the Off-Channel and ACM habitats, a topographic survey was conducted at pre-determined cross-section locations (Figure 2) using field surveying equipment, with elevations collected every 3 meters. Topographic data were compared to 2020 (Year 1) elevations. The performance standard allows for a change of less than 20%. Both increases (indicating accretion) and decreases (indicating erosion) in elevation are tracked and quantified by percent change over the entirety of the transect.

#### 3.1.2 A9: Fish Access

Changes in gradient will be measured using the topographic survey described above to ensure the Linnton Creek channel gradient does not exceed 4% slope. Jump heights were assessed through a low-tide visual survey, looking for any vertical drops greater than 15 centimeters (~6 inches). Photo points (Attachment 3) throughout the site are also used to identify vertical drops. In addition to jump heights, visual surveys were conducted to identify areas with the potential for stranding at low tide.

Linnton Creek discharge was visually checked periodically throughout the year to determine if the channel continues flowing at least through June 30 and begins flowing again by November 1. Photo point photographs were used to document flow. The Linnton Creek thalweg downstream outfall was also visually inspected throughout the year to document the presence of freshwater inputs. Photo point photographs, as well as dissolved oxygen and temperature data collected from the probe placed in the Linnton Creek plunge pool were used to confirm flow during the dates between visual inspections.

### 3.1.1 A10: Structural Habitat Elements

All structural elements placed below the 100-year flood elevation will be visually surveyed to ensure retention. Volunteer large woody debris (LWD) greater than 18 inches diameter and 30 foot in length will be counted as additional elements.

## 3.2 Vegetation Monitoring (C8 Through C14)

Vegetation performance was assessed by sampling vegetation within established plots, analyzing and interpolating sample results, and comparing these to site performance standards. Pre-determined transects were established in the SSPP and spacing of monitoring plots varies by habitat type (Grette 2018). Although Grette established monitoring points in 2020, no permanent markers were placed, as such vegetation monitoring locations may vary slightly from 2020. RestorCap established permanent markers for each monitoring plot within the forested and scrub-shrub habitats (Figure 3). Within each plot, absolute cover of each species was recorded. Assessment differences by habitat type are described below.

After the field assessment, Daubenmire cover classes (Daubenmire 1958) were assigned to cover of each species and used for analyses in each habitat. Within each habitat, species were grouped by native, non-native (non-listed), noxious (listed<sup>2</sup>) species, and bare ground. The June 2016 version of the Portland Plant List and the Noxious Weed Policy and Classification System 2020 (Oregon Department of Agriculture; ODA) were used to determine noxious classifications. For each group, habitat cover averages were calculated, as well as 80% confidence intervals.

To determine native herbaceous species diversity within each habitat, the number of species were counted across all plots.

### 3.2.1 Riparian / Upland Forested Habitat

Upland monitoring plots were initially established every 50 meters, beginning at a randomly selected starting point (Grette 2021). At each data collection point (n=32), absolute cover and stem count were recorded by species for all trees and shrubs within a five-meter radius circle. Additionally, absolute cover of herbaceous species was sampled at two one-square-meter plots within the five-meter radius circle. For the herbaceous

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<sup>2</sup> Noxious species are defined as those found on the ODA noxious weed list or the Portland Plant List, ranks A, B, or C.



species cover analysis, cover was averaged by species and then converted into the cover classes listed above.

For stem counts, all stems below 0.5 meter above the ground are counted as individual plants (*i.e.*, a single shrub with multiple stems close to the ground is counted as multiple individuals; SSPP). In areas with a high density of stems, clumps were pin flagged prior and individual stems within each clump held together to ensure no double-counting.

### **3.2.2 Scrub-Shrub Habitat**

Scrub-shrub habitat was sampled along pre-determined transects that span across the Off-Channel Shrub and Emergent zones for a total of 16 sampling plots along eight transects (Figure 3). At each plot (n=16), a three-meter radius plot was used for determining cover and stem counts of woody species. One herbaceous plot was sampled in the middle of the shrub plot.

### **3.2.3 Emergent Habitat**

The emergent vegetation zone is located within the Off-Channel habitat, between the scrub-shrub sampling plots. These plots were not marked with permanent markers given their location within the ACM. Plots were established approximately six meters apart along each scrub-shrub transect (Figure 4). At each plot (n=22), absolute cover of vegetation was recorded within a one-meter quadrat.

## **3.3 Water Quality Monitoring**

Water quality parameters include temperature and dissolved oxygen (DO). Temperature was measured using data probes installed at the site, one near the downstream mouth of the Off-Channel habitat and one in the pool beneath the Linnton Creek outfall. Starting in March 2021, an additional probe was added within the upstream area of the Off-Channel habitat. DO was collected monthly rather than continuous probe data. On-site temperatures were generally recorded every 15 minutes and are presented as monthly averages.

## **4. Results**

### **4.1 Geomorphic Monitoring**

#### **4.1.1 A7 and A8: Increase in Elevation Within Off-Channel Habitat and ACM**

Topographic data were collected along established transects described in Section 3.1 (Attachment 2, Figure 1). As described above, although no geomorphic monitoring was required in Year 2, elevation changes were analyzed in Year 2 due to differences between Year 1 and the as-built report. Table 2 lists overall percent change by transect; figures indicating transect locations and elevations within each are included in Attachment 2. Positive percent change indicates aggradation, negative indicates erosion; blue indicates ACM transect and grey indicates Off-Channel transect. No transects exceeded 20% change, based on these data, the elevation performance standards A7 and A8 were met.

**Table 2. Percent Change in Each Topographic Transect from 2020**

Transect	% Change	Transect	% Change	Transect	% Change	Transect	% Change
A	0	K	-2	U	+2	AE	-2
B	+1	L	+1	V	+2	AF	-2
C	-1	M	+2	W	+2	AG	-1
D	0	N	+5	X	+1	AH	+1
E	-1	O	0	Y	+1	AI	-1
F	-3	P	0	Z	+2	AJ	-2
G	0	Q	0	AA	+2	AK	-1
H	+1	R	0	AB	-1	AL	-2
I	-1	S	+2	AC	+1		
J	-2	T	+1	AD	-2		

**4.1.2 A9: Fish Access**

Based on a visual survey, no physical conditions (*i.e.*, no jump heights above 15 cm) exist that prevent fish access to the Off-Channel habitat. As part of this monitoring, potential stranding risks within the Off-Channel habitat were visually assessed. A potential risk was identified at the upstream mouth of the Off-Channel habitat. This risk was identified during 2020 monitoring and was monitored further in 2021 using a time-lapse camera placed facing the mouth, as well as a temperature and depth gauge. Representative photos between April and December 2021 and the corresponding Morrison Street United States Geological Survey (USGS) gauge heights (14211720) are presented in Attachment 3 (starts page 27). The sand berm that was identified in 2020 has remained in place and the depression adjacent to the berm retains water after water levels recede. This depression may pose a stranding risk to smaller fish using the Off-Channel habitat and prevents direct access to the upstream portion in low-water conditions. Adaptive management recommendations for this area are described in Section 7.

Performance standard A9 also requires that Linnton Creek discharge from November 1 through June 30<sup>th</sup>. Site visits throughout the year and monthly DO and temperature monitoring indicate that Linnton Creek was flowing the entirety of year (see Section 4.3). Photographs of the Off-Channel habitat and Linnton Creek are included as Attachment 3.

Based on visual observations, performance standard A9 was not fully met.

**4.1.3 A10: Structural Habitat Elements**

All features placed below the 100-year flood elevation were retained from 2020 with the exception of one snag log that was felled by beaver. Since construction, two snags have been reduced by beaver. Performance standard A10 requires at least 80% of features be retained; 97% have been retained, thus this performance standard was met.

**4.2 Vegetation Monitoring**

Vegetation monitoring was conducted August 2-6, 2021, by RestorCap biologists. Monitoring results are presented below by habitat planting zone.

**4.2.1 Riparian / Upland Forested Habitat**

This zone includes all Upland and Riparian zones, and the area between the OHWM and +13 ft NAVD88, as established in the SSPP (Grette 2018). Within this zone, 32 plots (1F-32F) were permanently marked with rebar and locations recorded with GPS (Figure 3). Summary statistics for plots are included in Table 3 below; full tables of data are included in Attachment 4.

**Table 3. Average cover for herbaceous plots within Riparian/Upland Forested habitat**

Category		Habitat Average	Standard Error
<b>Cover of Native Herbaceous Species</b>		<b>62.6</b>	<b>4.5</b>
	Lower CI (80%)	56.8	
	Upper CI (80%)	68.4	
<b>Cover of Non-Native Herbaceous Species</b>		<b>5.8</b>	<b>2.1</b>
	Lower CI (80%)	3.0	
	Upper CI (80%)	8.5	
<b>Cover of Noxious Herbaceous Species</b>		<b>12.8</b>	<b>2.2</b>
	Lower CI (80%)	10.0	
	Upper CI (80%)	15.6	
<b>Cover of Native Shrubs and Trees in Herbaceous Plots</b>		<b>4.5</b>	<b>1.4</b>
	Lower CI (80%)	2.6	
	Upper CI (80%)	6.3	

### C8: Native Stem Density

Based on data collected at 32 forested plots, approximately 7,536 native stems per acre were recorded. The C8 performance standard requires at least 1,200 native stems per acre<sup>3</sup>, thus, this performance standard was met. Per plot, stem counts ranged from zero to 721 and averaged 146.

### C9: Native Species Diversity

Within the forested habitat, this performance standard requires at least three native tree and five native shrub species be present. In total, 41 native woody species were identified, 18 tree and 23 shrub species, thus, this performance standard was met. On average, plots contained 6 woody species.

### C10: Herbaceous Cover

Calculated herbaceous cover within the 64 forested plots constitutes approximately 62.6% (80% CI 56.8, 68.4). Eleven noxious species were detected, skeletonweed (*Chondrilla juncea*), prickly lettuce (*Lactuca serriola*), Scotch broom (*Cytisus scoparius*), broad-leaved sweet pea (*Lathyrus latifolius*), bird’s foot trefoil (*Lotus corniculatus*), white sweetclover (*Melilotus albus*), rabbitsfoot clover (*Trifolium arvense*), red clover (*T. pratense*), white clover (*T. repens*), reed canarygrass (*Phalaris arundinacea*), and hairy vetch (*Vicia villosa*). An additional seven non-native, non-listed species were observed within these plots (Attachment 4). Plots within

<sup>3</sup> The DSL permit requires 1,600 stems per acre or 50% coverage for two years before determining the site to be successful.

the forested zone exceed 10% native herbaceous cover and have less than 30% noxious weed cover, therefore standard C10 was met.

#### 4.2.2 Scrub-Shrub Habitat

The established scrub-shrub zone includes the portions of the Off-Channel habitat between approximately +13 ft and +10.5 ft NAVD88. Within this zone, 16 plots (1S-16S) were permanently marked with rebar and locations recorded with GPS (Figure 3). Summary statistics for plots are included in Table 4 below; full tables of data are included in Attachment 4.

Table 4. Average cover for herbaceous plots within Scrub-Shrub habitat

Category		Habitat Average	Standard Error
Cover of Native Herbaceous Species		38.1	4.8
	Lower CI (80%)	31.9	
	Upper CI (80%)	44.3	
Cover of Non-Native Herbaceous Species		6.4	2.6
	Lower CI (80%)	3.1	
	Upper CI (80%)	9.8	
Cover of Noxious Herbaceous Species		7.0	4.3
	Lower CI (80%)	1.6	
	Upper CI (80%)	12.5	
Cover of Bare Ground		67.7	5.4
	Lower CI (80%)	60.7	
	Upper CI (80%)	74.6	
Cover of Native Trees and Shrubs		8.4	3.4
	Lower CI (80%)	4.1	
	Upper CI (80%)	12.8	
Average Weighted Prevalence Index (All Strata)		2.8	

#### C11: Native Stem Density

Based on data collected at 16 plots, average native stems per plot was 204, totaling approximately 29,198 stems per acre (Attachment 4). The drastic increase in stem counts within this zone over 2020 monitoring is largely due to the increase in willow (*Salix* spp.) growth, which comprised approximately 79% of stems. The C11 performance standard requires at least 1,200 native stems per acre<sup>3</sup>, thus, this performance standard was met.

#### C12: Native Species Diversity

Diversity within the scrub-shrub zone requires at least five native shrub species. In total, 14 native woody species were identified, six tree and eight shrub species; thus, this performance standard was met.

#### C13: Herbaceous Cover

Native herbaceous vegetation average cover was approximately 38% (80% CI 31.9, 44.3) and every plot had vegetation present. Within these plots, seven noxious species were detected, prickly lettuce, garlic mustard (*Alliaria petiolata*), bird's foot trefoil, red and

white clovers, pennyroyal (*Mentha pulegium*), and water purslane (*Lythrum portula*). Noxious species cover was 7% (80% CI 1.6, 12.5).

Performance standard C13 requires >10% native herbaceous cover and <30% noxious cover, thus this performance standard was met.

### 4.2.3 Emergent Habitat

The Off-Channel emergent zone was defined as the area between +10.5 ft and +8.5 ft NAVD88 and includes 22 plots (Figure 3). Herbaceous vegetation was not present in 2020 but was during monitoring in 2021. Incidental observations of vegetation growth after the August 2021 monitoring event indicate that later season monitoring may be necessary for this zone to accurately reflect diversity and cover of herbaceous species. This is discussed further in Section 6.2.3. Summary statistics for plots are included in Table 5 below; full tables of data are included in Attachment 4.

**Table 5. Average cover for herbaceous plots within Off-Channel Emergent habitat**

Category		Habitat Average	Standard Error
<b>Cover of Native Herbaceous Species</b>		<b>27.2</b>	<b>8.2</b>
	Lower CI (80%)	16.6	
	Upper CI (80%)	37.7	
<b>Cover of Non-Native Herbaceous Species</b>		<b>0.7</b>	<b>0.4</b>
	Lower CI (80%)	0.2	
	Upper CI (80%)	1.2	
<b>Cover of Noxious Herbaceous Species</b>		<b>0.9</b>	<b>0.7</b>
	Lower CI (80%)	0.0	
	Upper CI (80%)	1.8	
<b>Cover of Bare Ground</b>		<b>79.1</b>	<b>5.6</b>
	Lower CI (80%)	71.9	
	Upper CI (80%)	86.2	
<b>Cover of Native Shrubs and Trees in Herbaceous Plots</b>		<b>1.1</b>	<b>0.7</b>
	Lower CI (80%)	0.2	
	Upper CI (80%)	2.0	
<b>Average Weighted Prevalence Index</b>			<b>1.5</b>
<b>Count of Native Herbaceous Species</b>			<b>27</b>

#### C14: At least five native emergent/herbaceous species

Within the emergent zone, 27 native herbaceous species were observed, and plot richness ranged from zero to 11 native species. The most common species was marsh seedbox (*Ludwigia palustris*), which accounted for 52% of total cover within this zone. The next most abundant species were fireweed (*Chamerion angustifolium*; 4.6%), Californian lobelia (*Downingia elegans*; 3%), creeping spikerush (*Eleocharis obtusa*; 4.6%), sword-leaved rush (*Juncus ensifolius*; 3.8%), and American speedwell (*Veronica peregrina*; 3.4%). This performance standard requires at least five native herbaceous species; therefore, this standard was met.

C15: Herbaceous Cover

Within this zone, native herbaceous cover was approximately 27.2% (80% CI 16.6, 37.7). Three noxious species were detected, prickly lettuce, pennyroyal, and spotted jewelweed (*Impatiens capensis*) and represented approximately 0.9% (80% CI 0.0, 1.8) cover. Performance standard C15 requires 30% cover of native herbaceous species, which was not met; the standard was met for cover of noxious species.

4.3 Water Quality Monitoring

Monthly average temperatures of the three probe locations are included in Table 6. Linnton Creek is consistently colder than the Willamette River at the mouth of the Off-Channel habitat (average = 6.4°). No performance standard was established for this parameter. Two sensors were lost, Willamette main channel after July 2021 and the side channel in November; new ones will be installed for 2022 monitoring.

Table 6. Monthly average temperatures (°F) for three on-site probes.

Month	Linnton Creek Outfall	Side Channel	Willamette River Mouth
January	45.2	-	45.4
February	42.3	-	44.5
March	43.8	52.1	47.1
April	47.8	60.7	54.2
May	52.8	65.1	61.3
June	58.6	74.5	68.8
July	61.9	77.3	76.2
August	63.4	72.8	N/R
September	60.7	66.9	N/R
October	54.6	56.7	N/R
November	49.5	N/R	N/R
December	45.1	N/R	N/R

Monthly dissolved oxygen readings are reported in Table 7. Due to issues with the probe, there were no readings in March, likewise September readings may be off. These readings were originally recorded in percent saturation and converted to mg/L using the monthly average temperature at each location. Future readings will be recorded in mg/L.

Table 7. Monthly dissolved oxygen (mg/L) measurements at each location.

Month	Linnton Creek Outfall	Side Channel	Willamette River Mouth	Downstream Willamette
January	11.19	-	10.42	10.77
February	12.09	-	11.36	11.05
March	N/R	-	N/R	N/R
April	10.06	-	9.52	9.41
May	10.23	-	9.95	9.54
June	8.70	-	9.27	9.10
July	8.72	5.81	7.86	8.21
August	7.48	5.18	6.37	6.86
September	8.51	4.41	9.96	8.01
October	12.11	9.74	9.59	9.57

November	N/R	N/R	N/R	N/R
December	11.38	10.57	10.70	10.34

## 5. Goals and Performance Standards

The goals and objective of the project are presented below, with notes regarding whether each objective was met (Goals 1 and 2 were met at construction).

### Goal 3: Ensure the long-term success of the restored habitat through monitoring, maintenance and stewardship.

*Objective 3a: Conduct select pre-construction baseline lamprey and wildlife monitoring.*

**Completed:** Baseline wildlife monitoring was conducted by the applicant’s representative prior to construction, and results were included in the HDP. Baseline lamprey monitoring was conducted by USFWS prior to construction.

*Objective 3b: Implement a site-specific performance plan with performance standards to track the development of the site.*

**On track:** Ongoing annual monitoring follows methods outlined in SSPP.

*Objective 3c: Minimize colonization of the site by noxious species, as defined in the performance standards.*

**On track:** The site was seeded with native species, and on-going monitoring and maintenance is being conducted to prevent colonization of non-native weeds. Adaptive management activities are described below in Section 7. The site passes the performance standards for non-native weed coverage.

*Objective 3d: Maintain fish access to the Off-Channel habitat.*

**On track:** Year 2 monitoring indicates the upstream berm represents an obstruction to fish access during low-water periods, freshwater inputs into the Off-Channel habitat are present year-round, no jump heights greater than 6 inches are present, and the Off-Channel gradient remains less than 4%. However, potential stranding hazards were noted. These are addressed below.

*Objective 3e: Identify and rectify obstacles to habitat development or use, as defined in the performance standards.*

**On track:** Objective 3e is being met through implementation of the post-construction performance plan.

*Objective 3f: After the Performance Period, implement a long-term stewardship program.*

**On track:** The Long-Term Stewardship Plan has been preliminarily approved and will be implemented after the 10-year monitoring period.

**Goal 4: Support human enjoyment of the site.**

*Objective 4a: Construct a view platform and path, which connects to the City of Portland Greenway Trail that is mapped as passing by the site.*

Completed: This overlook was opened to the public in July 2021.

*Objective 4b: Discourage human use of the habitat site through fences and signage.*

On track: A fence has been installed around the site and will be continually maintained. No trespassing and habitat restoration signage was placed around the site in early 2021. Trespass issues are discussed in section 7.3.

*Objective 4c. Place educational signage on site that informs the public about the habitat site, as well as the history of the site as a lumber and plywood mill.*

Completed: Educational signage was installed adjacent to the publicly accessible trail in November 2021.

## 6. Discussion

### 6.1 Geomorphic/Structural Habitat Elements

#### 6.1.1 A7 and A8: Increase in Elevation within Off-Channel Habitat and ACM

As discussed above, although no geomorphic monitoring was required in Year 2, elevation changes were analyzed due to issues related to the as-built surveys. Updated elevation profiles indicated only minor changes ( $<\pm 3$  percent) in the majority of the transects. No transect exceeded the 20% change threshold, and as such, the elevation performance standards A7 and A8 were met. Future monitoring in this area will conform to the monitoring timeline described in the SSPP.

#### 6.1.2 A9: Fish Access

The site is physically accessible to the target fish species and life history stages—no jump heights or steep slopes are present, and cold-water discharge was present from both the Linnton Creek culvert and from hillside seeps year-round as anticipated.

The only potential concern to fish access is the ponded area which developed at the upstream end of the Off-Channel habitat in 2020, which can be seen in transect AH (Attachment 2). This sand berm has remained stable since monitoring in 2020 (1% change) and represents an obstruction to access the Off-Channel habitat in low-water conditions. As discussed in the 2020 monitoring report, there is potential for the ponded area to strand fish when the river levels recede. RestorCap, in coordination with the Trustee Council, have identified adaptive management actions to alleviate ponding in this area. These actions are described in Section 7 below.



## 6.2 Vegetation Monitoring

As mentioned above, vegetation monitoring in 2021 was conducted by RestorCap biologists. Although the plots were in the same relative locations, the lack of permanent markers could contribute to slight differences in monitoring results as compared to 2020. All plots within the forested and shrub zones have been marked with rebar and cap markers, and locations have been recorded for future monitoring.

### 6.2.1 Riparian / Upland Forested Habitat

All three performance standards (stem density, species diversity, and herbaceous cover) were met within the forested habitat. The increase in stem density from 2020 monitoring is largely due to the increase in growth in willow (*Salix* spp.) and cottonwood (*Populus balsamifera* ssp. *trichocarpa*) (Attachment 4). Cottonwood, swamp rose (*Rosa pisocarpa*), and snowberry (*Symphoricarpos albus*) were the most commonly observed woody species. The high species diversity (18 tree and 23 shrub) indicates that both the original plantings and those added in early 2021 have survived, though many of the species that prefer shade (e.g., snowberry, maples (*Acer* spp.)) were visibly stressed during the summer heat wave. These late succession plants are expected to be stressed until the forest habitat matures, providing the necessary shade for optimal growth of understory species.

Every plot within this zone had woody vegetation, though cover within the forested area was higher in the lower elevations. Like observations in 2020, the most successful plots were those that occurred near the Off-Channel scrub-shrub habitat where water was most abundant. See Section 7 for adaptive management recommendations.

### 6.2.2 Scrub-Shrub Habitat

The scrub-shrub habitat met all three performance standards (stem density, species diversity, and herbaceous cover). Based on monitoring data and qualitative observations, most of the scrub-shrub habitat is thriving, though a few areas had slower growth than those in the seep wetland areas south of Linnton Creek (see Section 7 for adaptive management discussion). Plots located on beach sand and mudflat areas had lower cover and fewer species than those within the seep wetland, as would be expected for highly functioning, frequently inundated habitat in areas of shifting sediment. In the drier, sandy areas, species such as Douglas spirea (*Spirea douglasii*) and Scouler's willow (*Salix scouleriana*) were the most abundant.

### 6.2.3 Emergent Habitat

Herbaceous vegetation was not present within the Off-Channel emergent zone in 2020 but was during monitoring in 2021. Approximately 27 native species were encountered in emergent monitoring plots during the survey and 10 species had cover above 5% in these plots. Incidental observations of vegetation growth after the August 2021 monitoring event indicate that later season monitoring may be necessary for this zone to accurately reflect diversity and cover of herbaceous species. Photographs of two plots (9-10B and 13-14A) from August and late October (approximate locations) are included as photographs 101-104 in Attachment 3. These photographs illustrate the majority of emergent vegetation growth in the Off-Channel habitat is generally later season. Using a floristic approach for vegetation sampling (multiple visits to capture early season, mid-season,

and late season annual emergence and maturation) will be important to capture vegetation diversity and cover in future years.

## 7. Adaptive Management

As outlined in the SSPP, the adaptive management framework provides a plan for acting if it is determined the restoration site is not on track to meet interim performance standards, or if contingency actions are needed to respond to physical or biological conditions. As monitoring data are collected, they will be evaluated relative to performance standards, and if necessary, consultation between the Trustee Council and RestorCap will determine if ongoing monitoring or remedial action is necessary.

### 7.1 Off-Channel Habitat

As discussed with the Trustee Council in early 2021, the area within the upstream mouth of the Off-Channel habitat has been identified as a possible stranding risk for fishes, including lamprey. Waterways and RestorCap developed a remedial solution but were unable to complete the work before the close of the work window due to weather and high water. As requested by the Trustee Council, starting no later than April 2022, RestorCap will monitor this area with continuous depth and temperature monitoring and time-lapse imagery to assess the situation. The planned work includes moving up to approximately 35 cubic yards of accumulated beach sand from the berm into the ponded area, raising the elevation to prevent ponding and disconnection with Linnton Creek. Additionally, hand tools will be used to deepen the channel that drains the ponded area to the north towards Linnton Creek. Depending on the conditions, the adaptive management plan for this area may be implemented once the work window opens, in coordination with the Trustee Council and appropriate permitting agencies.

### 7.2 Vegetation

Vegetation monitoring in 2021 identified low cover of woody plants, primarily within the upland and riparian zones. Although woody cover is not a monitoring requirement until Year 5, potential for ongoing heat stress and slow growth may lead to woody cover performance standards not being met in future years. To address potential issues RestorCap proposed to plant additional vegetation, including trees and shrubs, to meet performance standards C17 and C23 (woody vegetation performance standards), and C13 and C15 (Off-Channel performance standards). Initial planting of bulbs and shrubs was completed in October 2021. Additional planting of trees and shrubs will be completed in January and February 2022, as plants are available. Descriptions of all additional planting will be included in the 2022 monitoring report.

#### 7.2.1 Vegetation Management

Weed spraying and vegetation maintenance (i.e., mowing and hand removal) was conducted by Ash Creek in April, July, August, and October of 2021. Ongoing vegetation maintenance in 2022 will target non-native white and yellow sweetclovers (*Melilotus* sp.), and listed noxious weeds including red and white clovers, reed canarygrass, and Scotch broom. Within the emergent wetland area, small patches of floating primrose (*Ludwigia*

*peplodes*), purple loosestrife (*Lythrum salicaria*), and Japanese knotweed (*Reynoutria japonica*) were observed. Individuals were removed during each visit observed, and ongoing vegetation management will address patches, as necessary.

### 7.3 Trail Monitoring

Monitoring of the trail area in 2021 included visual observations during site visits and installation of a camera near the edge of the hillside in November. Due to observations of trail users going around the gabion at the end of the paved trail, additional fencing was installed in October 2021 near the river overlook. This trespass caused impacts to vegetation and erosion along the hillside where pedestrians were walking down the hill to the beach. Additional planting along the hillside was conducted in October 2021 to stabilize and prevent further erosion. The camera placed near the hillside has continued to capture pedestrians going over the gabion and has been tampered with multiple times. Additional fencing in this area continuous with other fencing along the trail may be necessary to prevent pedestrian access to the hillside and beach strand. No vandalism or other maintenance needs were observed within this area.

### 7.4 Arco Bulk Terminal Plume

No visual signs of surface contamination were observed within the petroleum hydrocarbon plume remediation area during visits to the Site. RestorCap was notified that on December 13, 2021, a petroleum sheen was observed along an approximately 50-foot stretch of the riverbank adjacent to the terminal. The terminal's emergency response contractor installed triple absorbent boom to contain the sheen within the existing permanent hard booms. It was determined there was a failure of the bentonite seals for the lower tiebacks anchoring the sheet pile seawall. Repairs were conducted between January 24, 2022, and February 11, 2022, and permitted by the U.S. Army Corps of Engineers and Department of State Lands. The adjacent area of the Site will be monitored by RestorCap during 2022 site visits and additional information will be provided in the 2022 monitoring report.

## 8. References

Daubenmire, R. 1959. A Canopy-coverage method of vegetation analysis. Northwest Sd. 33:46-64.

Grette Associates. 2018. Linnton Mill Restoration Site. Site Specific Performance Plan (Final HDP – December 4, 2018).







Grette Associates. 2021. Linnton Mill Restoration Site, Year 1 (2020) Monitoring Report. Revised April 6, 2021.

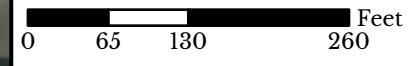
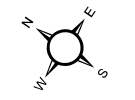
ATTACHMENT 1. FIGURES

Willamette River  
←

**Figure 1. Linnton  
Habitat Types**

**Linnton Mill  
Restoration Site  
Portland, Oregon  
Multnomah County**

-  Upland / Forested (4.98 ac)
-  Riparian (9.37 ac)
-  Off-Channel (4.45 ac)
-  Active Channel Margin (3.19 ac)
-  Shallow (5.57 ac)
-  Linnton Boundary



Base Source: Maxar, Microsoft  
 Data Source(s): RestorCap LLC, Grette Associates  
 The information on this map is from a digital database using GIS. RestorCap LLC cannot guarantee the accuracy of the information on this map. Each user of this map is responsible for determining its suitability for their intended use or purpose.

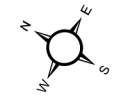
Willamette River  
←

**Figure 2. Topographic  
Transects**

**Linnton Mill  
Restoration Site  
Portland, Oregon  
Multnomah County**

➔ Off-Channel  
Monitoring

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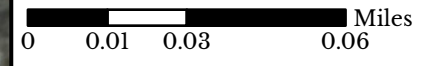
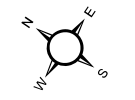
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The information on this map is from a digital database using GIS. RestorCap LLC cannot guarantee the accuracy of the information on this map. Each user of this map is responsible for determining its suitability for their intended use or purpose.

**Figure 3.**  
HDP Monitoring Plots

Linnton Mill  
Restoration Site  
Portland, Oregon  
Multnomah County

-  Linnton Boundary
- Plot Type**
-  Forest
-  Scrub-shrub



Base Source: Maxar, Microsoft  
Data Source(s): RestorCap LLC, Grette Associates  
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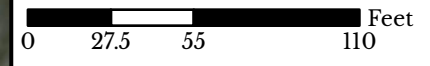
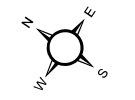


Willamette River  
←

**Figure 4. Off-Channel Emergent Monitoring Plots**

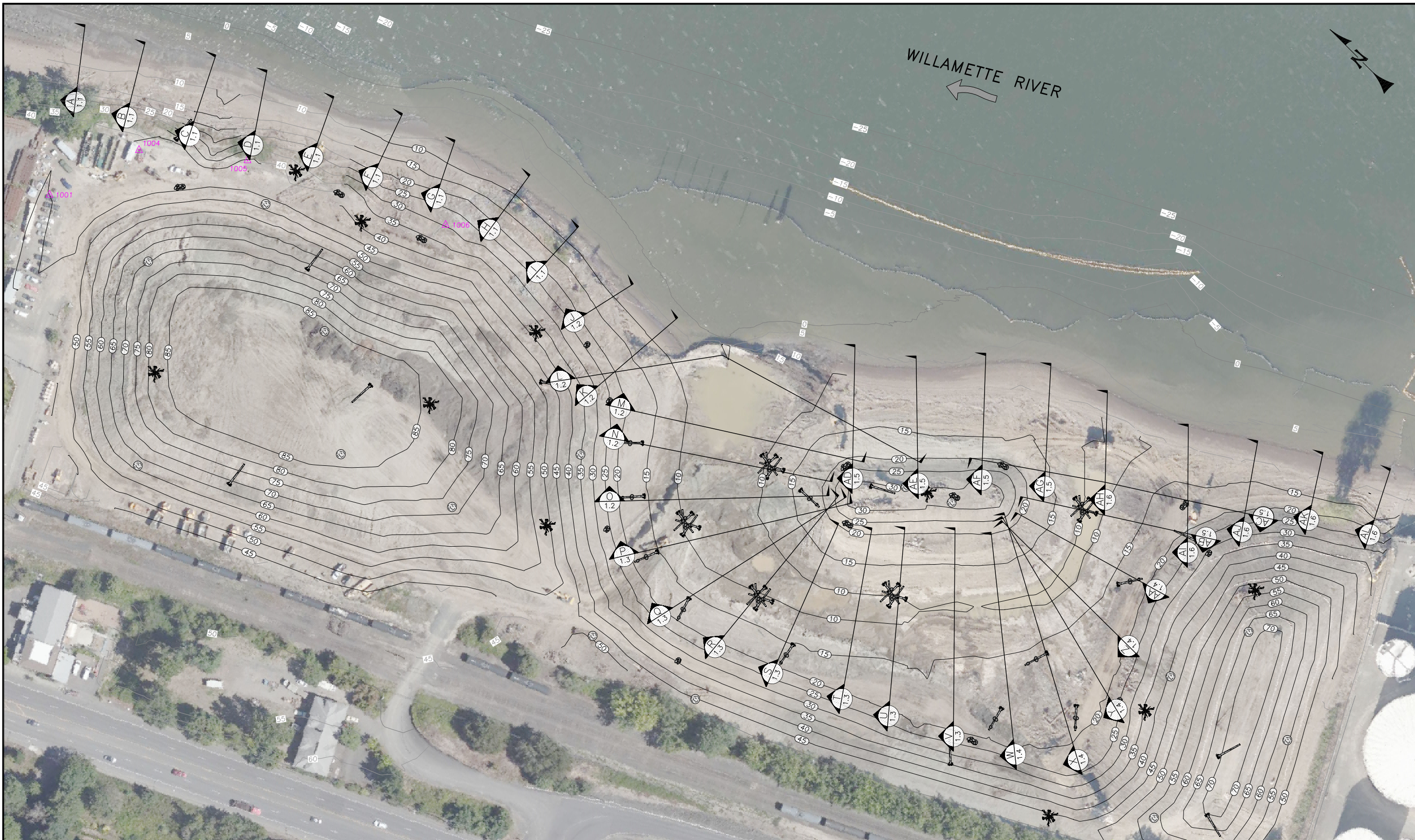
Linnton Mill  
Restoration Site  
Portland, Oregon  
Multnomah County

-  Off-Channel (4.45 ac)
- Plot Type**
-  Herbaceous



Base Source: Maxar, Microsoft  
 Data Source(s): RestorCap LLC, Grette Associates  
 The information on this map is from a digital database using GIS. RestorCap LLC cannot guarantee the accuracy of the information on this map. Each user of this map is responsible for determining its suitability for their intended use or purpose.

ATTACHMENT 2. ELEVATION CROSS SECTION COMPARISONS



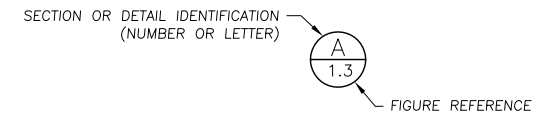
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**TOPOGRAPHIC CROSS SECTION MONITORING PLAN**  
**2021**

**ANNUAL MONITORING SITE PLAN**  
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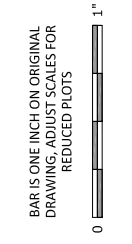
**LEGEND**

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	PRE-CONSTRUCTION SURVEY CONTOURS (5' INTERVAL)
	SURVEY CONTROL POINT

**SECTION AND DETAIL CONVENTION**



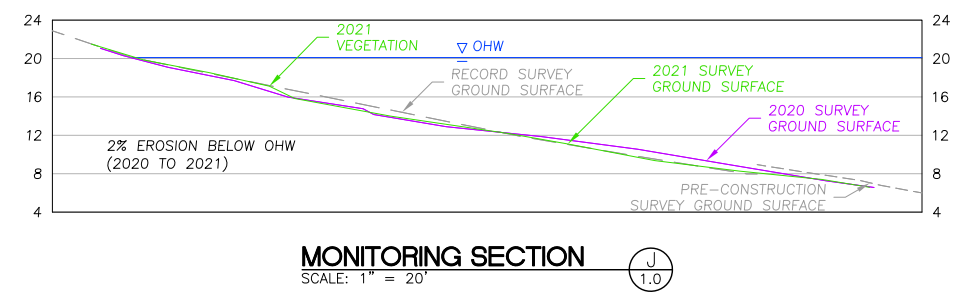
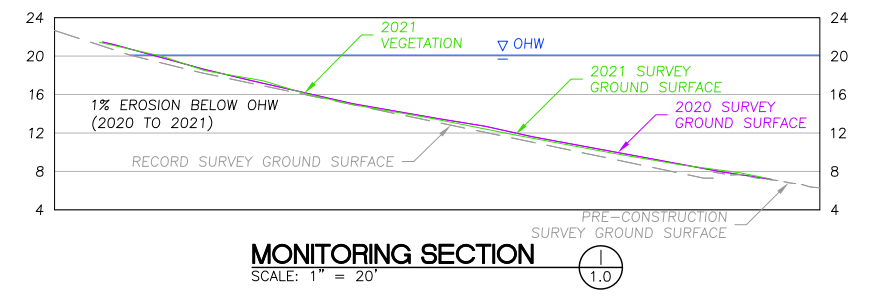
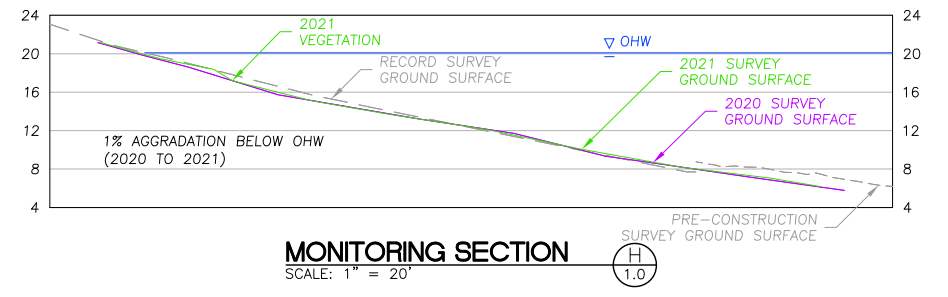
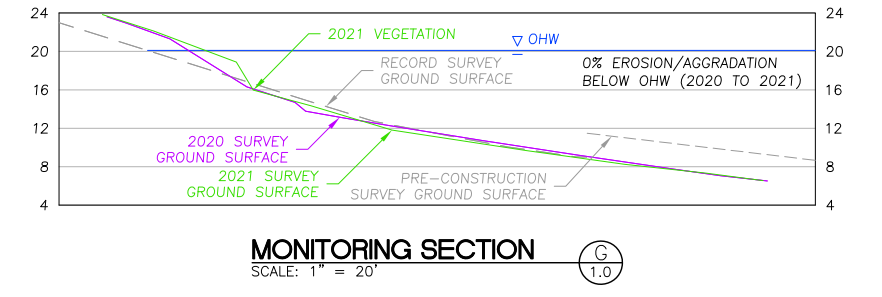
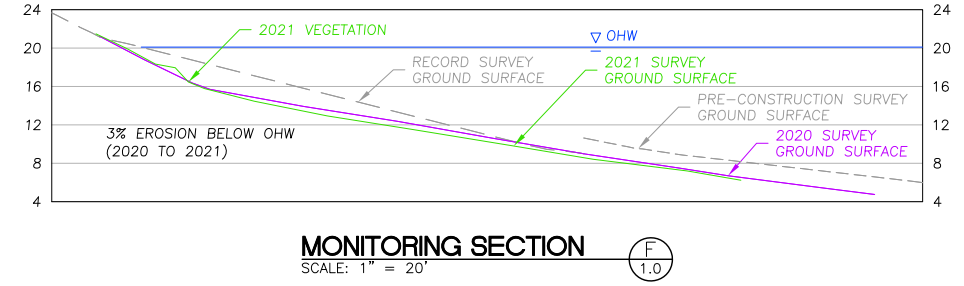
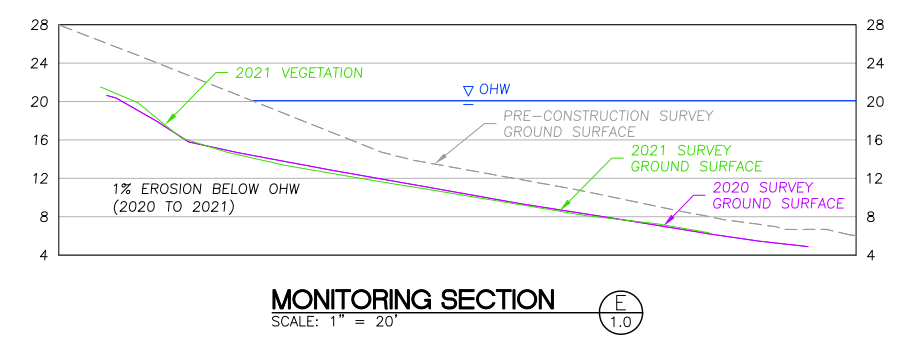
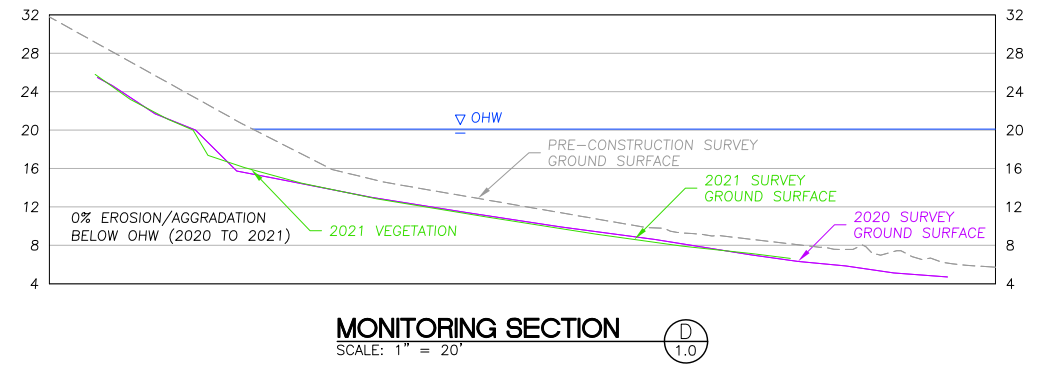
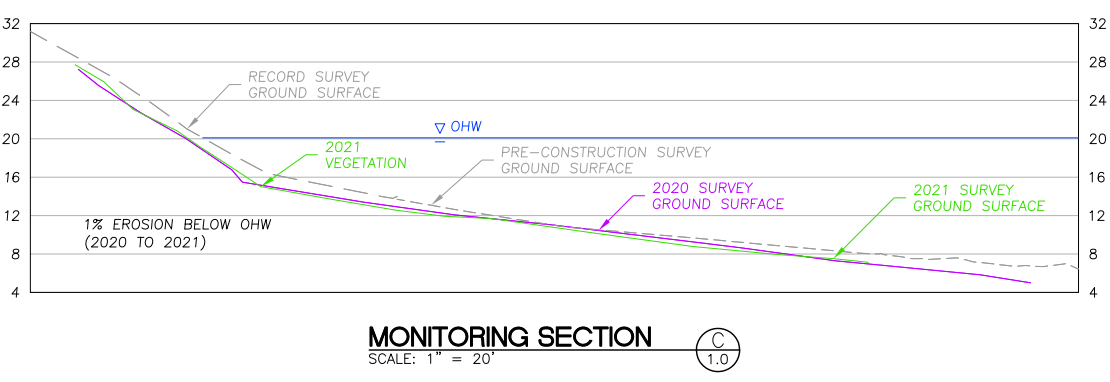
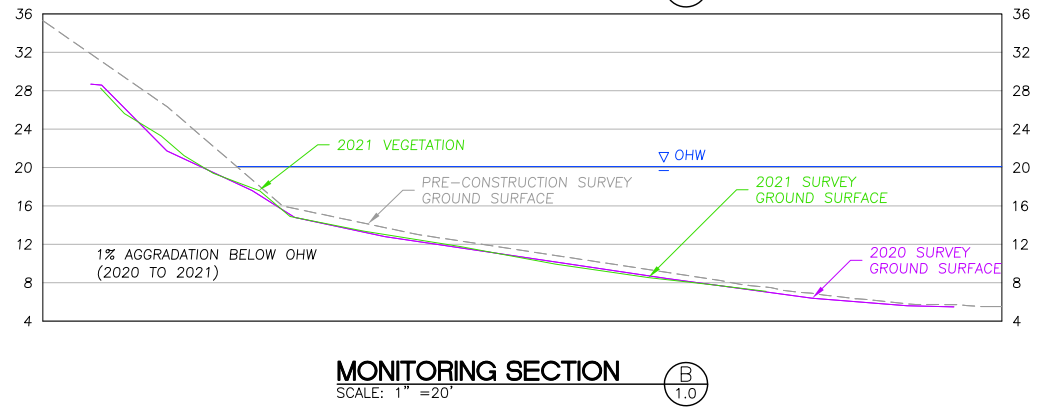
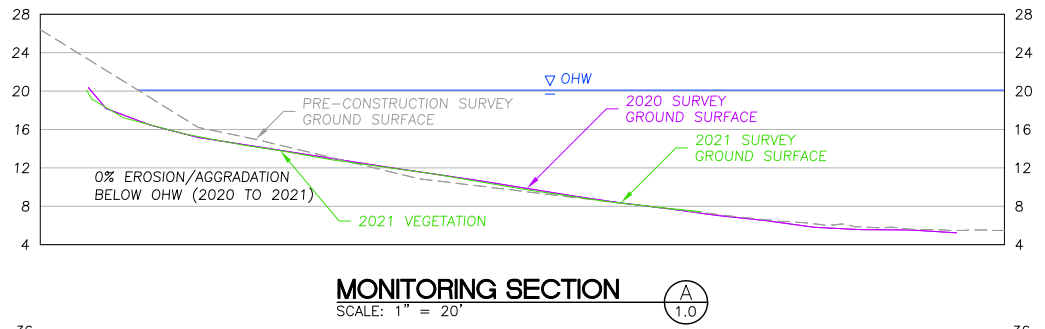
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  2. RECORD SURVEY FOR PROJECT CONSTRUCTION COMPLETED BY WATERWAYS CONSULTING, INC. IN JANUARY 2020.
  3. YEAR 1 CROSS SECTION MONITORING COMPLETED BY WATERWAYS CONSULTING, INC. IN OCTOBER 2020.
  4. YEAR 2 CROSS SECTION MONITORING COMPLETED BY WATERWAYS CONSULTING, INC. IN JUNE 2021

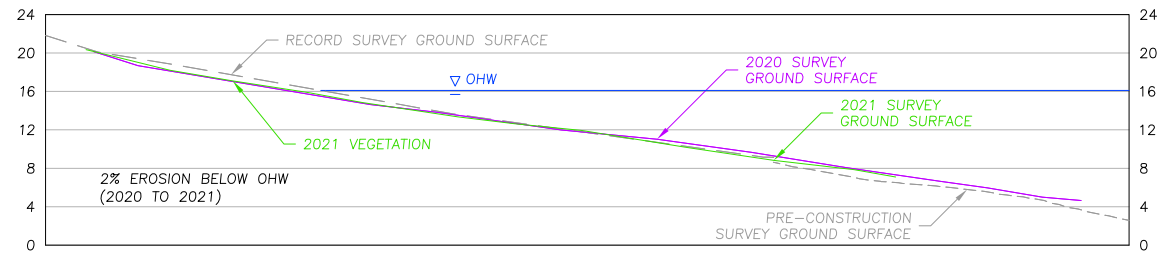


**LINLTON MITIGATION PROJECT  
 TOPOGRAPHIC CROSS SECTION MONITORING PLAN  
 2021**

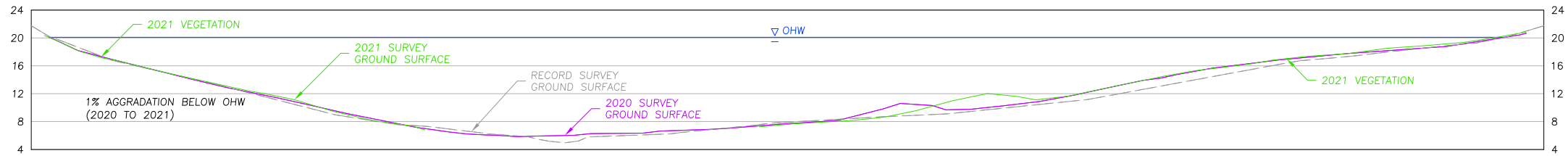
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**FIGURE 1.1**

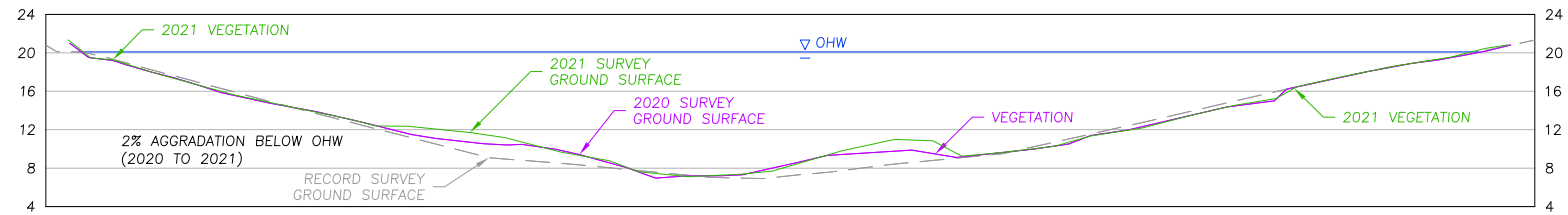




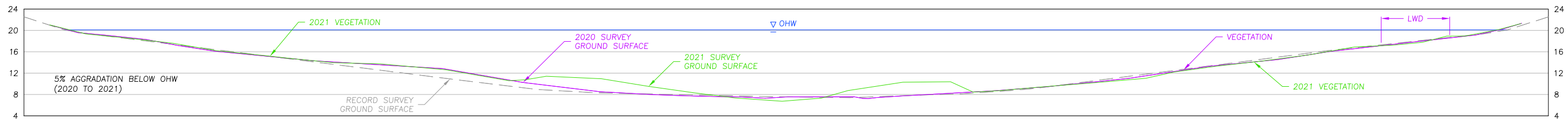
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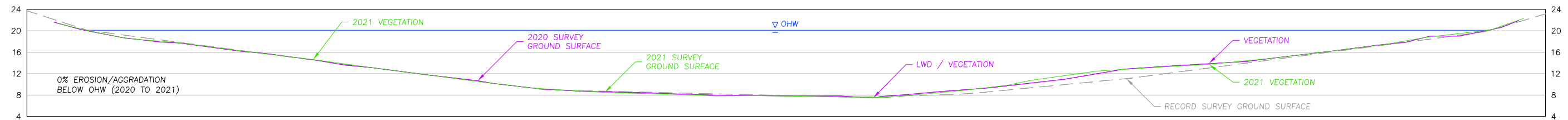
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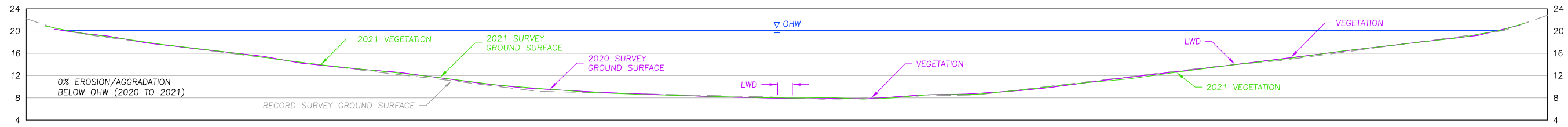


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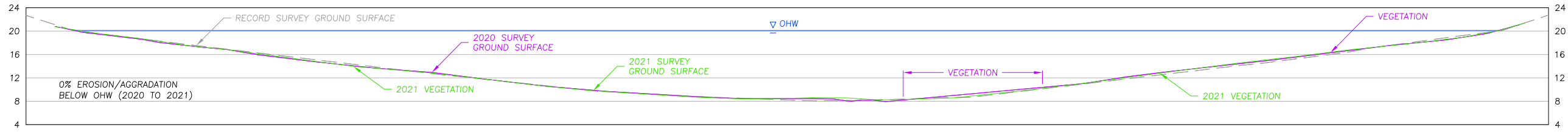


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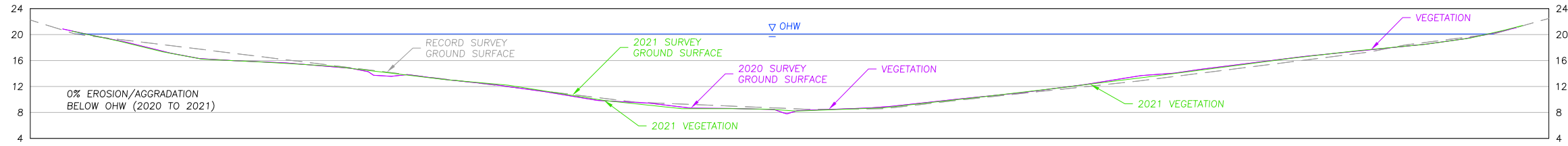
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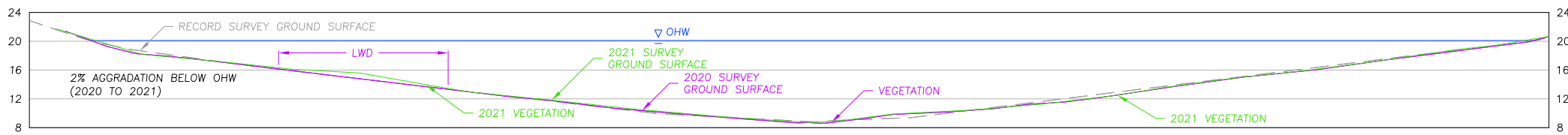
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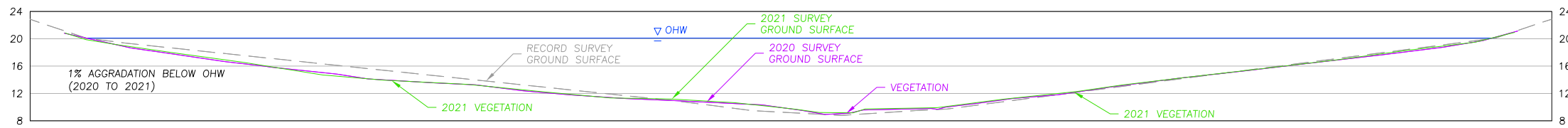
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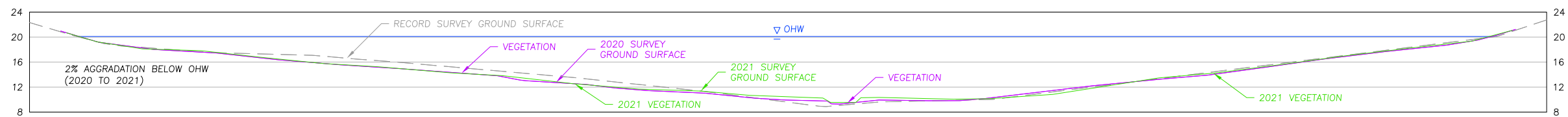
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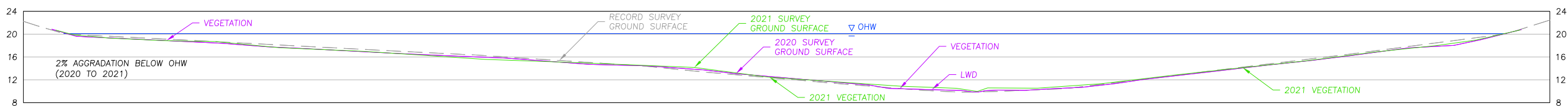
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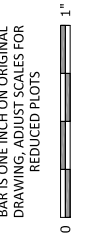
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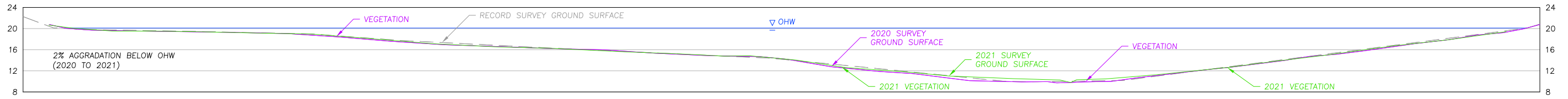


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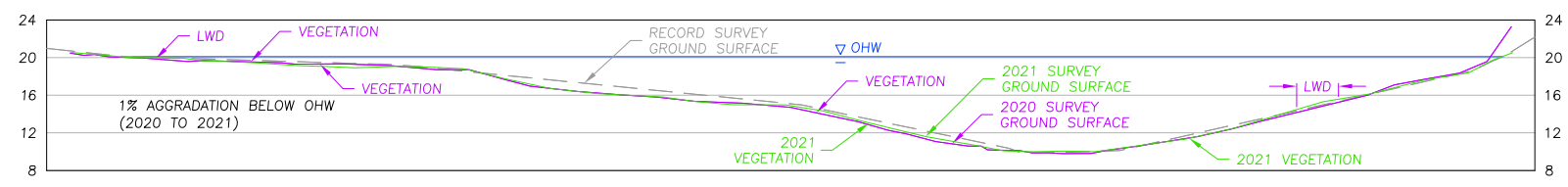


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 SCALE: 1" = 20'

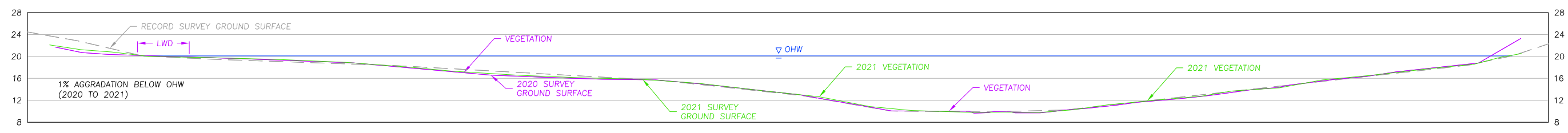




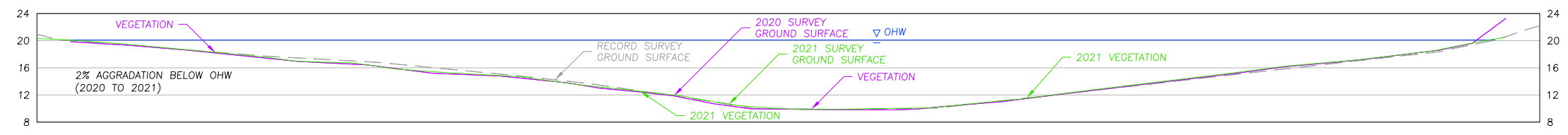
**MONITORING SECTION** (W)  
SCALE: 1" = 20'



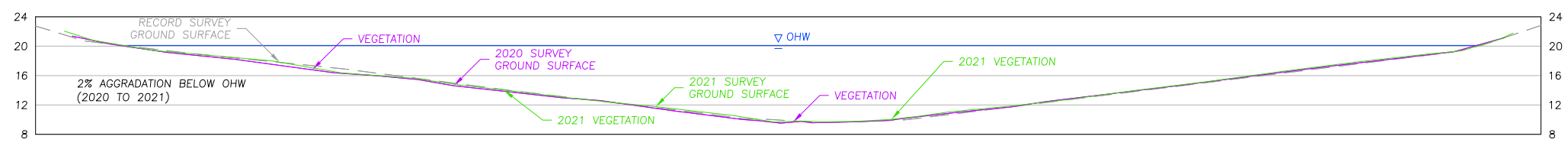
**MONITORING SECTION** (X)  
HORZ SCALE: 1" = 40' VERT: 1" = 20'



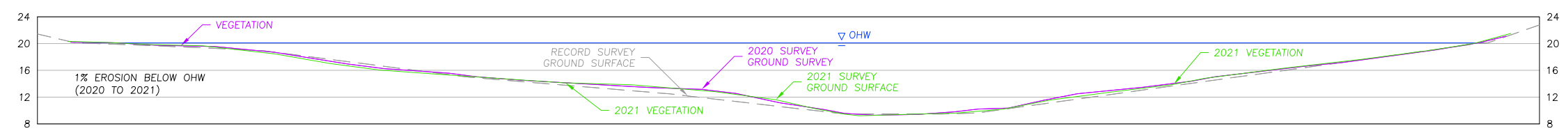
**MONITORING SECTION** (Y)  
SCALE: 1" = 20'



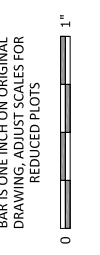
**MONITORING SECTION** (Z)  
SCALE: 1" = 20'

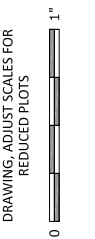
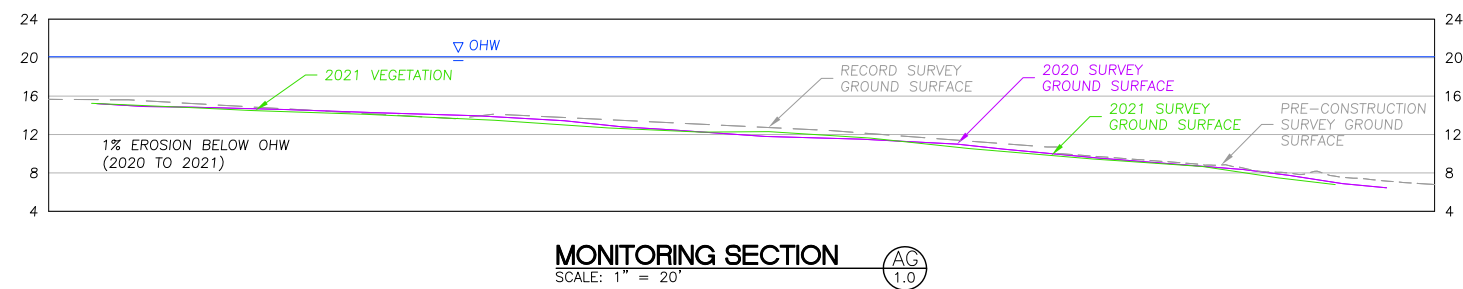
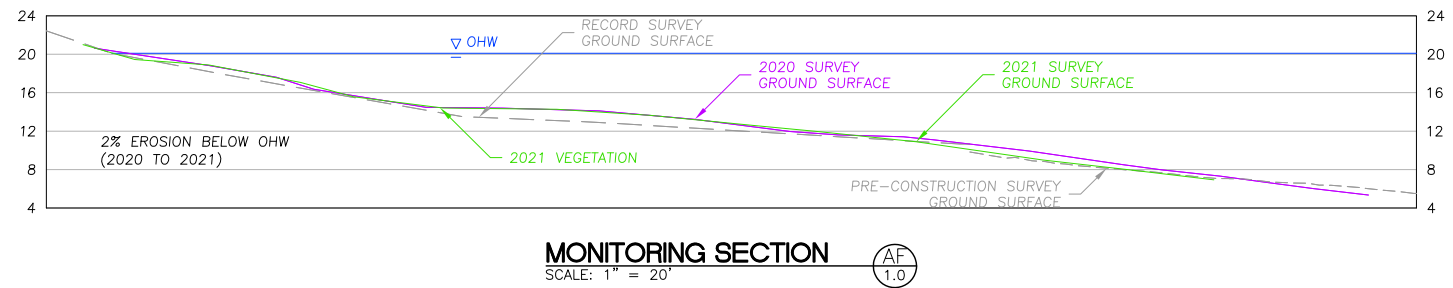
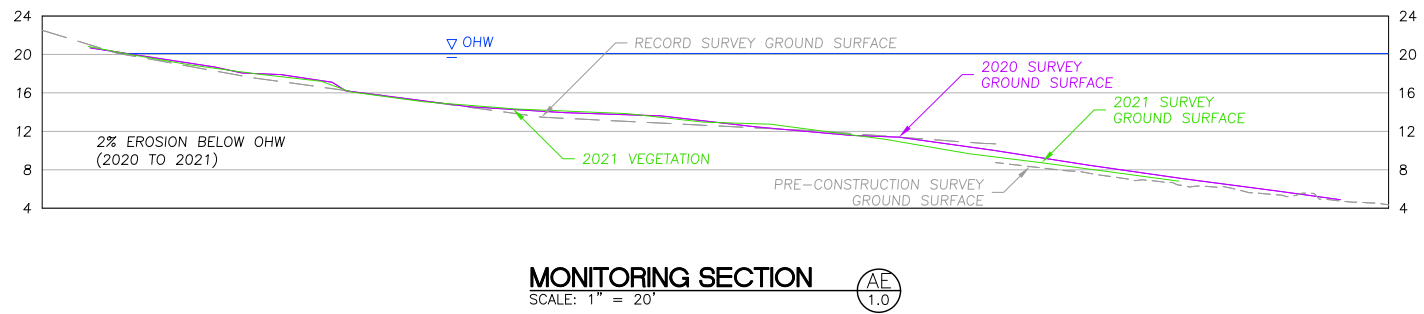
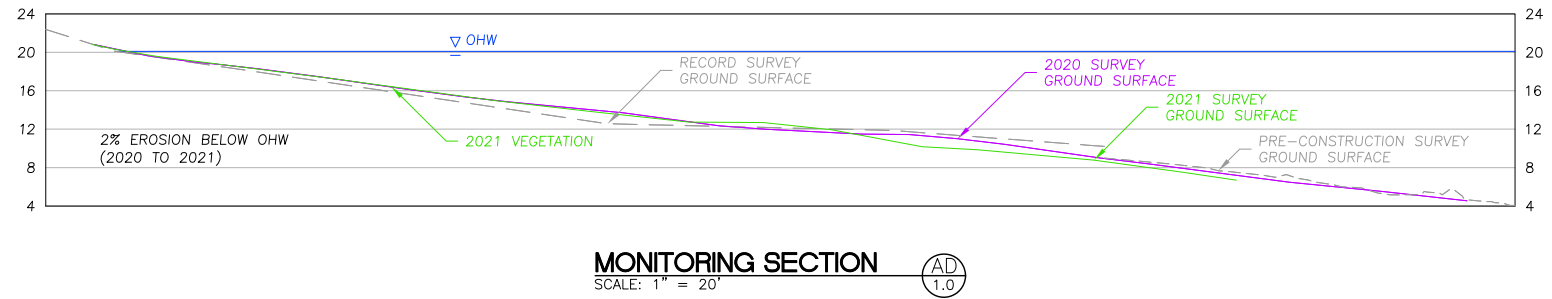
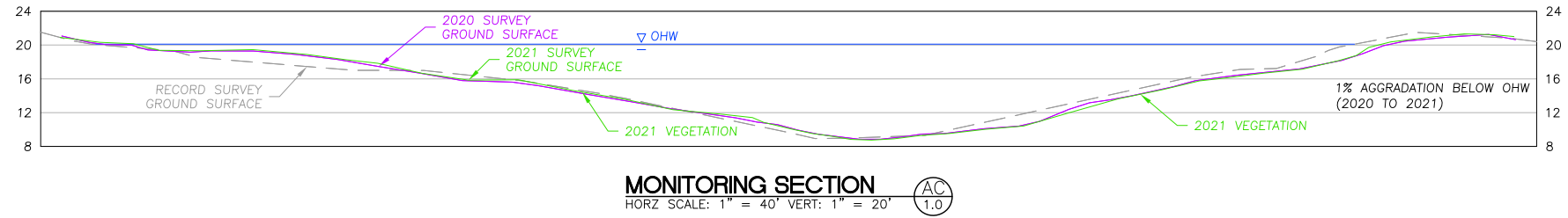


**MONITORING SECTION** (AA)  
SCALE: 1" = 20'

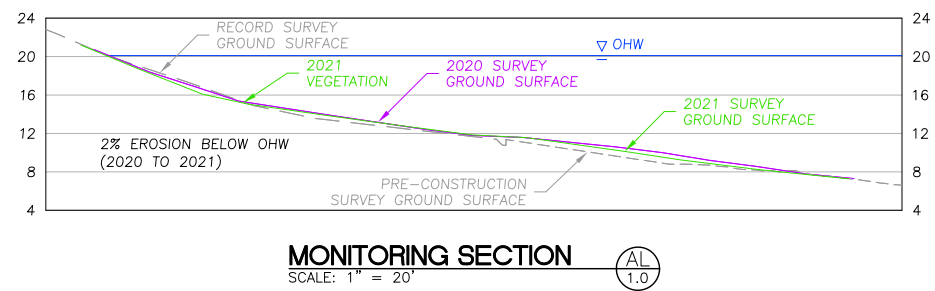
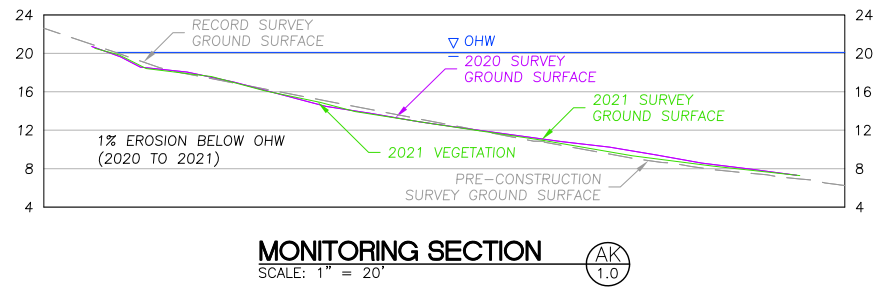
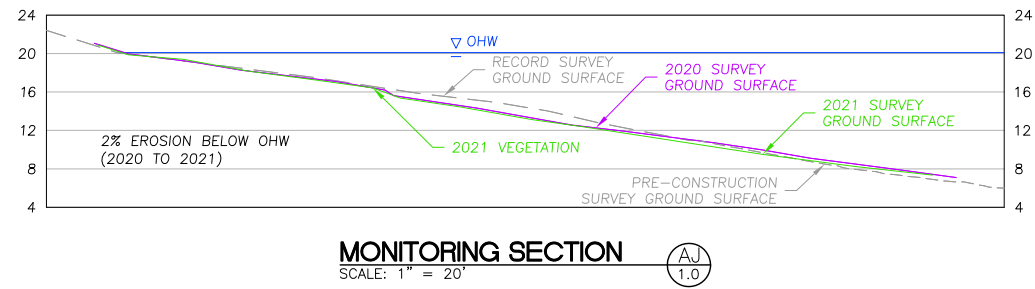
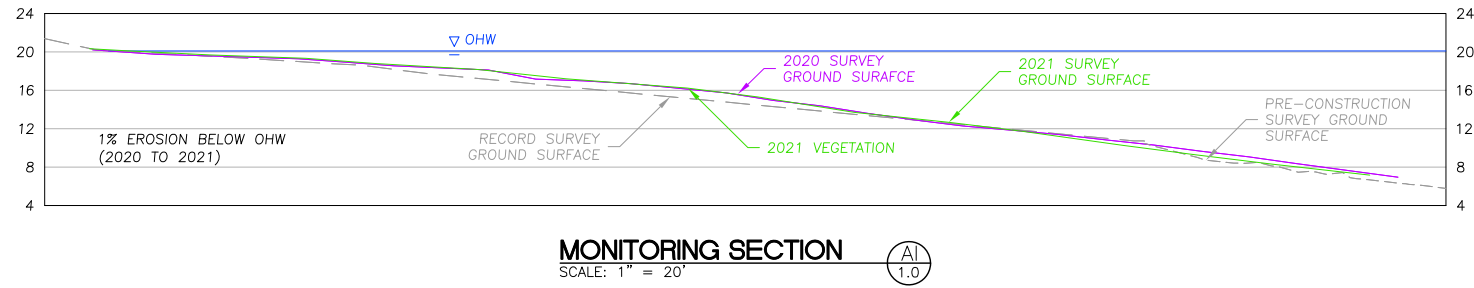
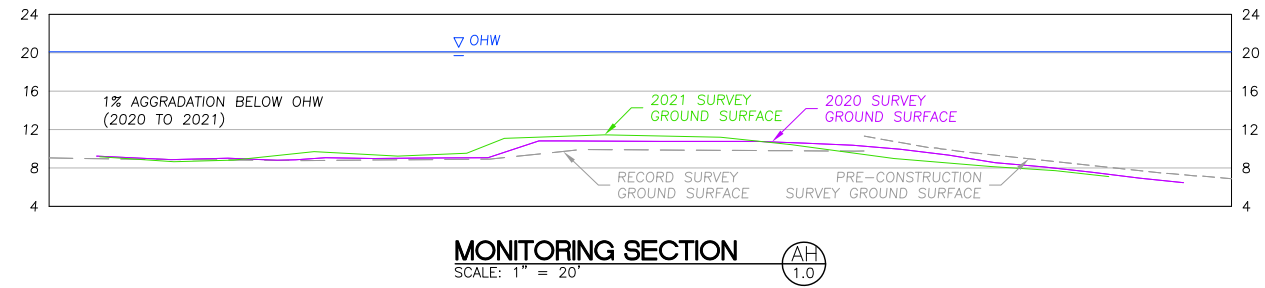


**MONITORING SECTION** (AB)  
SCALE: 1" = 20'









BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

ATTACHMENT 3. PHOTO POINT PHOTOGRAPHS



View looking north.



View looking south.



View looking east.



View looking west.

Photographs 5-8. Photo Monitoring Point 2, photos taken August 3, 2021.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.





View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.





View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.





View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.



View looking north.



View looking south.



View looking east.



View looking west.

Photographs 101-104. Early and late season photographs of two Off-Channel monitoring points.



Emergent vegetation within plot 9-10B, photo taken August 3, 2021.



Photo near plot 9-10B, taken October 26, 2021



Emergent vegetation within plot 13-14A, photo taken August 3, 2021.



Approximate location of plot 13-14A, photo taken October 26, 2021.



04:04 04/29/2021 69 °F ● CameraName

Water surface elevation 9.12 ft



07:07:03 04/30/2021 46 °F ● CameraName

Water surface elevation 10.14 ft



06:00:03 05/06/2021 44 °F ● CameraName

Water surface elevation 8.93 ft



20:00:04 06/22/2021 69 °F ● CameraName

Water surface elevation 7.99 ft



Water surface elevation 6.75 ft



Water surface elevation 6.23 ft



Water surface elevation 6.42 ft



Water surface elevation 7.14 ft



Water surface elevation 5.06 ft



Water surface elevation 5.17 ft



Water surface elevation 6.43 ft



Water surface elevation 4.77 ft; previous 48-hour rainfall total 1.31 inches



11:11:03 09/19/2021 53 °F CameraNa

Water surface elevation 5.56 ft; previous 48-hour rainfall total 2.45 inches



18:18:03 10/23/2021 44 °F CameraNa

Water surface elevation 8.91 ft; previous 48-hour rainfall total 1.58 inches



13:09:30 12/09/2021 35 °F Off-Cha

Water surface elevation 8.99 ft; previous 48-hour rainfall total 0.22 inches



12:37:04 12/14/2021 33 °F Off-Cha

Water surface elevation 11.16 ft; previous 48-hour rainfall total 0.82 inches



ATTACHMENT 4. VEGETATION MONITORING TABLES

**Upland / Riparian Forest Plot - Native Stem Counts**

Latin	Common	Form	Forest Plot																																				
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32					
<i>Abies grandis</i>	Grand fir	Tree																			7							8	3										
<i>Acer circinatum</i>	Vine maple	Shrub			7																	1								16									
<i>Acer macrophyllum</i>	Big leaf maple	Tree			3			1												2		3							8										
<i>Alnus rhombifolia</i>	White alder	Tree																		8											7								
<i>Alnus rubra</i>	Red alder	Tree								1																													
<i>Amelanchier alnifolia</i>	Serviceberry	Shrub		2	46			2						7			1			7		20									5								
<i>Baccharis pilularis</i>	Coyote brush	Shrub			4																																		
<i>Cornus stolonifera</i>	Red osier dogwood	Shrub								28						26								9		84					4	5	5						
<i>Cornus nuttallii</i>	Mountain dogwood	Shrub								1																													
<i>Crataegus douglasii</i>	Black hawthorn	Tree	4		3	5			3										6																				
<i>Frangula purshiana</i>	Cascara	Tree																			2																		
<i>Fraxinus latifolia</i>	Oregon ash	Tree							2	13	35					8					2				4		2				8	1							
<i>Holodiscus discolor</i>	Oceanspray	Shrub								3													2	3									3						
<i>Mahonia nervosa</i>	Oregon grape	Shrub						8											2	6																			
<i>Malus fusca</i>	Crab apple	Tree				3																				2													
<i>Oemleria cerasiformis</i>	Indian plum	Shrub																							7	15	1					2							
<i>Philadelphus lewisii</i>	Mock orange	Shrub				6																												7					
<i>Physocarpus capitatus</i>	Pacific ninebark	Shrub						1	2	2						10									1									7					
<i>Pinus ponderosa</i>	Ponderosa pine	Tree						11	23											4	11																		
<i>Populus balsamifera ssp trichocarpa</i>	Black cottonwood	Tree			1			122																1	104	193			15			2	38	27		3			
<i>Prunus emarginata</i>	Bitter cherry	Tree				5																												18					
<i>Prunus virginiana</i>	Choke cherry	Tree						5												5	2	1																	
<i>Pseudotsuga menziesii</i>	Douglas fir	Tree						4	10																														
<i>Quercus garryana</i>	Oregon white oak	Tree						2	5																											5			
<i>Ribes sanguineum</i>	Red flowering currant	Shrub				48				14																													
<i>Rosa pisocarpa</i>	Swamp rose	Shrub						2			55			12																						21	8		
<i>Rubus leucodermis</i>	Blackcap raspberry	Shrub																																					
<i>Rubus parviflorus</i>	Thimbleberry	Shrub	1			7				6	8																										12		
<i>Rubus ursinus</i>	Trailing blackberry	Shrub	3			1	3																																
<i>Rubus spectabilis</i>	Salmon berry	Shrub																																		2	9		
<i>Salix fluviatilis</i>	Columbia willow	Shrub																																					
<i>Salix lucida var lasiandra</i>	Pacific willow	Tree																																		287	18	111	
<i>Salix prolixa</i>	Mackenzie's willow	Tree																																					
<i>Salix scouleriana</i>	Scouler's willow	Tree																																		84	65	143	
<i>Salix sitchensis</i>	Sitka willow	Shrub																																			241	132	280
<i>Sambucus caerulea</i>	Blue elderberry	Shrub	5																																				
<i>Sambucus racemosa</i>	Red elderberry	Shrub																																					
<i>Spiraea douglasii</i>	Douglas spirea	Shrub																																				31	
<i>Symphoricarpos albus</i>	Snowberry	Shrub	1	4	5																																29	3	
<i>Thuja plicata</i>	Western red cedar	Tree				4				6																													
<i>Viburnum ellipticum</i>	Oregon viburnum	Shrub																																				6	
			14	6	129	22	162	63	135	212	202	217	136	21	13	45	23	516	66	19	49	5	52	305	444	145	0	23	15	95	721	275	547	3					

Native Upland / Riparian Forest Statistics	
Total Native Tree Species	18
Total Native Shrub Species	23
Average Stems / Plot	146.3
Acre per Plot	0.019
Approximate Stems / Acre	7,535.7

**Scrub-Shrub Plot - Native Stem Counts**

Latin	Common	Form	Scrub-Shrub Plot															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Acer circinatum</i>	Vine maple	Shrub								1								
<i>Cornus stolonifera</i>	Red osier dogwood	Shrub	5			3				9		8		2				
<i>Fraxinus latifolia</i>	Oregon ash	Tree								11		3						
<i>Lonicera involucrata</i>	Twinberry	Shrub	2															
<i>Malus fusca</i>	Crab apple	Tree								4								
<i>Oemleria cerasiformis</i>	Indian plum	Shrub										18						
<i>Populus balsamifera</i> ssp <i>trichocarpa</i>	Black cottonwood	Tree		122						1		11		11				
<i>Rubus ursinus</i>	Trailing blackberry	Shrub							3									
<i>Salix fluviatilis</i>	Columbia willow	Shrub			3		8				1						1	
<i>Salix lucida</i> var <i>lasiandra</i>	Pacific willow	Tree	38		62	38	38	13	64	37	2	7	42	12	16			9
<i>Salix prolixa</i>	Mackenzie's willow	Tree											14					
<i>Salix scouleriana</i>	Scouler's willow	Tree		37	90			83		140	50		312	6	139	2		166
<i>Salix sitchensis</i>	Sitka willow	Shrub	86		60				306				212	26	92			377
<i>Spiraea douglasii</i>	Douglas spirea	Shrub					5								3	213	232	8
			131	159	215	41	51	99	396	178	92	7	591	46	250	216	232	560

Native Scrub-Shrub Statistics	
Total Native Tree Species	6
Total Native Shrub Species	8
Average Stems / Plot	204
Acre per Plot	0.007
Approximate Stems / Acre	29,198.12



Upland / Riparian Vegetation Cover Monitoring Statistics																	Forested Plot																						
Scientific Name	Common Name	Family	Origin	Portland Plant Noxious Rank	ODA Rank	Wetland Status	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
<i>Poa secunda</i>	pine bluegrass	Poaceae	native	-	-	-										15						15	15					15	15						2.5				
<i>Azolla filiculoides</i>	mosquito fern	Salviniaceae	native	--	--	OBL																													2.5				
<i>Typha angustifolia</i>	narrow-leaf cattail	Typhaceae	native	--	--	OBL																														15			
Unknown moss			native	--	--	-			2.5																														
<i>Helminthotheca echoides</i>	bristly ox tongue	Asteraceae	non-native	-	-	-																																2.5	
<i>Medicago lupulina</i>	black medic	Fabaceae	non-native	--	--	FAC				2.5																													
<i>Melilotus officinalis</i>	yellow sweetclover	Fabaceae	non-native	W	--	FACU							2.5	37.5	37.5	2.5	2.5	2.5				2.5																	
<i>Bellardia viscosa</i>	yellow glandweed	Orobanchaceae	non-native	--	--	-														2.5	2.5						2.5												
<i>Plantago lanceolata</i>	ribwort	Plantaginaceae	non-native	--	--	FAC																															2.5		
<i>Agrostis stolonifera</i>	creeping bentgrass	Poaceae	non-native	D	-	FAC*										15	15																				37.5		
<i>Rumex obtusifolius</i>	bitter dock	Polygonaceae	non-native	-	-	FAC											15																						
<i>Chondrilla juncea</i>	skeletonweed	Asteraceae	invasive	B	B	-																															2.5		
<i>Lactuca serriola</i>	prickly lettuce	Asteraceae	invasive	C	--	FACU	2.5															2.5															2.5		
<i>Cytisus scoparius</i>	Scotch broom	Fabaceae	invasive	C	B	-			2.5																												15		
<i>Lathyrus latifolius</i>	broad-leaved sweet pea	Fabaceae	invasive	W	B	-		2.5																															
<i>Lotus corniculatus</i>	bird's foot trefoil	Fabaceae	invasive	C	--	FAC										15	2.5																		2.5	15			
<i>Melilotus albus</i>	white sweetclover	Fabaceae	invasive	C	--	-	15	2.5		2.5											2.5	15					15	15							2.5		2.5		
<i>Trifolium arvense</i>	rabbitsfoot clover	Fabaceae	invasive	C	--	-				2.5	2.5											2.5																	
<i>Trifolium pratense</i>	red clover	Fabaceae	invasive	C	--	FACU				2.5	15	2.5				2.5					2.5				15	15				2.5									
<i>Trifolium repens</i>	white clover	Fabaceae	invasive	C	--	FAC*			2.5		15	2.5							37.5	15	15						2.5	15						15	15		2.5	2.5	
<i>Phalaris arundinacea</i>	reed canarygrass	Poaceae	invasive	C	--	FACW	15	37.5																															
<i>Vicia villosa</i> var. <i>villosa</i>	hairy vetch	Fabaceae	invasive	C	--	-																																	
<b>Bare Ground / Gravel / Leaf</b>							62.5	62.5	37.5	37.5		37.5	37.5	37.5	37.5	62.5	37.5	37.5	15	37.5	37.5	62.5	85	62.5	37.5	37.5	37.5	85	15	2.5	37.5	15	15	62.5	37.5	15	62.5	37.5	
<b>Tree Cover in Forested Herbaceous Plots</b>																																							
<i>Prunus virginiana</i> var. <i>demissa</i>	western choke cherry	Rosaceae	native	-	-	FACU																																	
<i>Salix lasiandra</i> (var. <i>lasiandra</i> )	Pacific willow	Salicaceae	native	-	-	FACW+																																	

Native Upland / Riparian Vegetation Cover Monitoring Statistics																																	Forested Plot																																
Scientific Name	Common Name	Family	Origin	Portland Plant Noxious Rank	ODA Rank	Wetland Status	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32																											
<i>Cornus nuttallii</i>	mountain dogwood	Cornaceae	native	--	--	-							2.5																																																				
<i>Fraxinus latifolia</i>	Oregon ash	Oleaceae	native	--	--	FACW									2.5																																																		
<i>Philadelphus lewisii</i>	wild mock orange	Hydrangeaceae	native	--	--	-																				2.5																																							
<i>Populus trichocarpa</i>	black cottonwood	Salicaceae	native	--	--	FAC																						2.5																																					
<i>Quercus garryana</i>	Oregon oak	Fagaceae	native	--	--	-						2.5															2.5																																						
<i>Rosa pisocarpa</i>	swamp rose	Rosaceae	native	--	--	FAC							2.5										2.5																																										
<i>Rubus parviflorus</i>	thimbleberry	Rosaceae	native	--	--	FAC-							2.5																																																				
<i>Salix fluviatilis</i>	Columbia willow	Salicaceae	native	--	--	OBL											2.5																																																
<i>Salix scouleriana</i>	Scouler willow	Salicaceae	native	--	--	FAC																2.5	15																		2.5																								
<i>Salix sitchensis</i>	Sitka willow	Salicaceae	native	--	--	FACW								2.5																												15			15																				
<i>Spiraea douglasii</i>	Douglas spiraea	Rosaceae	native	--	--	FACW											2.5																																																
<i>Symphoricarpos albus</i>	common snowberry	Caprifoliaceae	native	--	--	FACU			15						2.5																																																		
<b>Upland / Riparian Forested Routine Performance Standards</b>																																	<b>Habitat Average</b>	<b>Standard Error</b>																															
Cover of Native Herbaceous Species							0	17.5	60	77.5	60	80	100	55	52.5	30	32.5	70	67.5	57.5	72.5	42.5	35	55	47.5	85	52.5	47.5	92.5	120	87.5	92.5	80	45	45	95	77.5	70	<b>62.6</b>	<b>4.5</b>																									
Lower CI (80%)																																				56.8																													
Upper CI (80%)																																				68.4																													
Cover of Non-Native Herbaceous Species							0	0	0	2.5	0	0	2.5	37.5	37.5	17.5	32.5	2.5	0	2.5	2.5	2.5	0	0	0	2.5	0	0	0	0	0	5	0	0	0	37.5	0	0	0			5.8	2.1																						
Lower CI (80%)																																				3.0																													
Upper CI (80%)																																				8.5																													
Cover of Noxious Herbaceous Species							32.5	42.5	5	7.5	32.5	5	0	0	5	0	17.5	5	37.5	17.5	20	20	0	17.5	15	2.5	30	17.5	0	0	20	17.5	15	2.5	2.5	5	17.5	0			<b>12.8</b>	<b>2.2</b>																							
Lower CI (80%)																																				10.0																													
Upper CI (80%)																																				15.6																													
Cover of Native Shrubs and Trees within Herbaceous Plots							0	15	0	0	0	5	5	2.5	5	0	5	0	2.5	0	0	5	15	0	2.5	5	0	2.5	5	0	0	0	2.5	0	32.5	2.5	30	0			4.5	1.4																							
Lower CI (80%)																																				2.6																													
Upper CI (80%)																																				6.3																													

Scrub-Shrub Vegetation Cover Monitoring Statistics							Scrub-Shrub Plot																
Scientific Name	Common Name	Family	Origin	Portland Plant Noxious Rank	ODA Rank	Wetland Status	1SA	2SA	3SA	4SA	5SA	6SA	7SA	8SA	9SA	10SA	11SA	12SA	13SA	14SA	15SA	16SA	
<i>Oenanthe sarmentosa</i>	water parsley	Apiaceae	native	--	--	OBL											2.5						
<i>Achillea millefolium</i>	yarrow	Asteraceae	native	--	--	FACU			2.5	2.5		2.5	2.5		15								
<i>Coreopsis tinctoria</i>	calliopsis	Asteraceae	native	--	--	FACU					2.5			2.5		2.5		15					
<i>Pseudognaphalium stramineum</i>	cotton batting cudweed	Asteraceae	native	--	--	--											2.5						
<i>Rorippa palustris</i>	bog yellowcress	Brassicaceae	native	-	-	OBL												2.5	2.5				
<i>Eleocharis palustris</i>	creeping spikerush	Cyperaceae	native	--	--	OBL							2.5										
<i>Cyperus erythrorhizos</i>	redroot flatsedge	Cyperaceae	native	--	--	OBL													2.5				
<i>Equisetum arvense</i>	field horsetail	Equisetaceae	native	--	--	FAC					2.5												
<i>Acmispon americanus</i>	Spanish clover	Fabaceae	native	--	--	-														15			
<i>Acmispon parviflorus</i>	Spanish clover	Fabaceae	native	--	--	-	37.5	2.5	37.5			15											
<i>Lupinus bicolor</i>	miniature lupine	Fabaceae	native	--	--	-			2.5						2.5								
<i>Lupinus polyphyllus</i>	bog lupine	Fabaceae	native	--	--	FAC+																	
<i>Juncus bufonius</i>	toad rush	Juncaceae	native	--	--	FACW		2.5		2.5	15		2.5	2.5	15	2.5	2.5						
<i>Juncus patens</i>	common rush	Juncaceae	native	--	--	FACW		2.5	2.5	2.5													
<i>Lycopus uniflorus</i>	northern bugleweed	Lamiaceae	native	--	--	OBL	2.5	2.5					2.5				2.5		2.5			15	
<i>Epilobium brachycarpum</i>	tall willowherb	Onagraceae	native	--	--	UPL														15			
<i>Epilobium ciliatum</i>	slender willow herb	Onagraceae	native	--	--	FACW-		2.5		2.5	2.5			15		15	15	2.5	2.5				
<i>Epilobium densiflorum</i>	dense flowered willow	Onagraceae	native						2.5														
<i>Epilobium minutum</i>	little willowherb	Onagraceae	native	--	--	-					2.5		2.5										
<i>Ludwigia palustris</i>	water purslane	Onagraceae	native	--	--	OBL		15	2.5	15	37.5	2.5	15				15	2.5					
<i>Veronica peregrina</i>	American speedwell	Plantaginaceae	native	--	--	OBL		2.5						2.5								2.5	



Scrub-Shrub Vegetation Cover Monitoring Statistics							Scrub-Shrub Plot																
Scientific Name	Common Name	Family	Origin	Portland Plant Noxious Rank	ODA Rank	Wetland Status	1SA	2SA	3SA	4SA	5SA	6SA	7SA	8SA	9SA	10SA	11SA	12SA	13SA	14SA	15SA	16SA	
<i>Agrostis exarata</i>	bentgrass	Poaceae	native	--	--	FACW													15				
<i>Elymus glaucus</i>	blue wildrye	Poaceae	native	--	--	FACU							2.5										
<i>Festuca idahoensis</i>	blue fescue	Poaceae	native	--	--	FACU*							2.5		15		2.5	15		62.5			
<i>Poa secunda</i>	pine bluegrass	Poaceae	native									2.5	15	2.5	2.5	2.5				15			
<i>Persicaria amphibia</i>	longroot smartweed	Polygonaceae	native	--	--	-														2.5			
<i>Polygonum paronychia</i>	beach knotweed	Polygonaceae	native	-	-	-												2.5					
<i>Matricaria discoidea</i>	pineappleweed	Asteraceae	non-native	--	--	-		2.5															
<i>Taxacum officinale</i>	common dandelion	Asteraceae	non-native	-	-	-									2.5								
<i>Chenopodium album</i>	common lamb's-quarters	Chenopodiaceae	non-native	--	--	FAC										2.5							
<i>Euphorbia maculata</i>	spotted spurge	Euphorbiaceae	non-native	--	--	UPL			2.5			2.5								2.5			
<i>Medicago lupulina</i>	black medic	Fabaceae	non-native	--	--	FAC					2.5												
<i>Lycopus europaeus</i>	European water-horehound	Lamiaceae	non-native	--	--	-												2.5					
<i>Bellardia viscosa</i>	yellow glandweed	Orobanchaceae	non-native	--	--	-			2.5														
<i>Plantago major</i>	broadleaf plantain	Plantaginaceae	non-native	--	--	FACU+				2.5		2.5					2.5						
<i>Agrostis stolonifera</i>	creeping bentgrass	Poaceae	non-native	D	-	FAC*	2.5		2.5		15				37.5								
<i>Holcus lanatus</i>	common velvetgrass	Poaceae	non-native	D	--	-							2.5										
<i>Panicum dichotomiflorum</i>	fall panicgrass	Poaceae	non-native	--	--	FACW											2.5	2.5					
<i>Polypogon monspeliensis</i>	rabbitsfoot grass	Poaceae	non-native	--	--	FACW					2.5												
<i>Persicaria maculosa</i>	spotted lady's thumb	Polygonaceae	non-native	--	--	FACW					2.5												
<i>Ranunculus muricatus</i>	creeping buttercup	Ranunculaceae	non-native	--	--	FACW		2.5															
<i>Lactuca serriola</i>	prickly lettuce	Asteraceae	invasive	C	--	FACU							2.5			2.5							
<i>Alliaria petiolata</i>	garlic mustard	Brassicaceae	invasive	B	B	NI										2.5							

Scrub-Shrub Vegetation Cover Monitoring Statistics							Scrub-Shrub Plot																			
Scientific Name	Common Name	Family	Origin	Portland Plant Noxious Rank	ODA Rank	Wetland Status	1SA	2SA	3SA	4SA	5SA	6SA	7SA	8SA	9SA	10SA	11SA	12SA	13SA	14SA	15SA	16SA				
<i>Lotus corniculatus</i>	bird's foot trefoil	Fabaceae	invasive	C	--	FAC						15							15							
<i>Trifolium pratense</i>	red clover	Fabaceae	invasive	C	--	FACU			2.5										37.5							
<i>Trifolium repens</i>	white clover	Fabaceae	invasive	C	--	FAC*					2.5															
<i>Mentha pulegium</i>	pennyroyal	Lamiaceae	invasive	C	--	OBL						2.5							15							
<i>Lythrum portula</i>	water purslane	Lythraceae	invasive	B	--	NI								15												
<b>Bare Ground / Gravel / Leaf Litter</b>							62.5	85	62.5	85	37.5	85	85	85	37.5	62.5	62.5	62.5	37.5	37.5	97.5	97.5				
<b>Tree / Shrub Cover in Shrub Herbaceous Plots</b>																										
<i>Populus trichocarpa</i>	black cottonwood	Salicaceae	native	--	--	FAC		2.5																		
<i>Salix lasiandra</i> (var. <i>lasiandra</i> )	Pacific willow	Salicaceae	native	-	-	FACW+	37.5			2.5																
<i>Salix scouleriana</i>	Scouler willow	Salicaceae	native	--	--	FAC						15		15	15		2.5	15								
<i>Salix sitchensis</i>	Sitka willow	Salicaceae	native	--	--	FACW	15																	15		

Scrub-Shrub Routine Performance Standards																			Habitat Average	Standard Error						
Cover of Native Herbaceous Species							40	30	50	25	62.5	22.5	47.5	25	50	22.5	42.5	40	57.5	77.5	15	2.5	<b>38.1</b>	4.8		
Lower CI (80%)																							31.9			
Upper CI (80%)																								44.3		
Cover of Non-Native Herbaceous Species							2.5	5	7.5	2.5	22.5	5	2.5	0	40	2.5	5	5	2.5	0	0	0	0	6.4	2.6	
Lower CI (80%)																								3.1		
Upper CI (80%)																								9.8		
Cover of Noxious Herbaceous Species							0	0	2.5	0	2.5	17.5	2.5	15	0	5	0	0	67.5	0	0	0	0	<b>7.0</b>	4.3	
Lower CI (80%)																								1.6		
Upper CI (80%)																								12.5		
Cover of Bare Ground							62.5	85	62.5	85	37.5	85	85	85	85	37.5	62.5	62.5	62.5	37.5	37.5	97.5	97.5	67.7	5.4	
Lower CI (80%)																								60.7		
Upper CI (80%)																									74.6	
Cover of Native Shrubs and Trees							52.5	2.5	0	2.5	0	15	0	15	15	0	2.5	15	0	0	0	0	15	8.4	3.4	
Lower CI (80%)																								4.1		
Upper CI (80%)																								12.8		
Weighted Prevalence Index (All Strata)							3.2	1.9	4.5	1.8	1.8	3.6	3.1	3.3	2.9	2.9	2.0	3.4	3.3	4.2	1.0	1.9	2.8			

Off-Channel Emergent Herbaceous Vegetation Cover Monitoring Statistics																												
Herbaceous Plot																												
Scientific Name	Common Name	Family	Origin	Portland Plant Noxious Rank	ODA Rank	Wetland Status	1-2SA	1-2SB	1-2SC	1-2SD	1-2SE	1-2SF	3-4Sa	3-4SB	3-4SC	3-4SD	3-4SE	5-6SA	5-6SB	5-6SC	7-8SA	7-8SB	9-10SA	9-10SB	11-12SA	13-14SA	13-14SB	15-16SA
<i>Oenanthe sarmentosa</i>	water parsley	Apiaceae	native	--	--	OBL																2.5						
<i>Eriophyllum lanatum</i>	Oregon sunshine	Asteraceae	native	-	-	-						2.5																
<i>Pseudognaphalium stramineum</i>	cotton batting cudweed	Asteraceae	native	--	--	-																	2.5					
<i>Rorippa palustris</i>	bog yellowcress	Brassicaceae	native	-	-	OBL																2.5						
<i>Downingia elegans</i>	Californian lobelia	Campanulaceae	native	--	--	OBL																	15	2.5	2.5			
<i>Cyperus erythrorhizos</i>	redroot flatsedge	Cyperaceae	native	--	--	OBL							2.5									2.5	2.5		2.5			
<i>Eleocharis obtusa</i>	blunt spikesedge	Cyperaceae	native	-	-	OBL																2.5						
<i>Eleocharis palustris</i>	creeping spikerush	Cyperaceae	native	--	--	OBL																15				15		
<i>Equisetum arvense</i>	field horsetail	Equisetaceae	native	--	--	FAC																2.5						
<i>Juncus bufonius</i>	toad rush	Juncaceae	native	--	--	FACW						2.5											2.5	2.5				
<i>Juncus ensifolius</i>	sword-leaved rush	Juncaceae	native	--	--	FACW						2.5		2.5								2.5	15	2.5				
<i>Juncus patens</i>	common rush	Juncaceae	native	--	--	FACW								2.5			2.5											
<i>Juncus tenuis</i>	slender rush	Juncaceae	native	--	--	FACW-							2.5												15			
<i>Lycopus uniflorus</i>	northern bugleweed	Lamiaceae	native	--	--	OBL						2.5											2.5					
<i>Lindernia dubia</i>	false pimpernel	Linderniaceae	native	--	--	OBL																2.5						
<i>Chamerion (Epilobium) angustifolium</i>	fireweed	Onagraceae	native	-	-	FACU+																	15	15				
<i>Epilobium ciliatum</i>	slender willow herb	Onagraceae	native	--	--	FACW-						2.5										15						
<i>Ludwigia palustris</i>	water purslane	Onagraceae	native	--	--	OBL	2.5					37.5		2.5			37.5		2.5	15	85	62.5	2.5	37.5	37.5	2.5	15	2.5
<i>Erythranthe guttata</i>	yellow monkeyflower	Phrymaceae	native	--	--	OBL																2.5						
<i>Veronica peregrina</i>	American speedwell	Plantaginaceae	native	--	--	OBL						2.5										15		2.5		2.5		
<i>Festuca occidentalis</i>	western fescue	Poaceae	native	--	--	FACU						2.5																

Off-Channel Emergent Herbaceous Vegetation Cover Monitoring Statistics							Herbaceous Plot																								
Scientific Name	Common Name	Family	Origin	Portland Plant Noxious Rank	ODA Rank	Wetland Status	1-2SA	1-2SB	1-2SC	1-2SD	1-2SE	1-2SF	3-4Sa	3-4SB	3-4SC	3-4SD	3-4SE	5-6SA	5-6SB	5-6SC	7-8SA	7-8SB	9-10SA	9-10SB	11-12SA	13-14SA	13-14SB	15-16SA			
<i>Leersia oryzoides</i>	rice cutgrass	Poaceae	native	--	--	OBL																2.5									
<i>Persicaria amphibia</i>	longroot smartweed	Polygonaceae	native	--	--	OBL																							15		
<i>Polygonum paronychia</i>	beach knotweed	Polygonaceae	native	-	-	-																		15		2.5					
<i>Rumex salicifolius</i>	willow dock	Polygonaceae	native	--	--	FACW																			2.5						
<i>Ranunculus sceleratus</i>	cursed buttercup	Ranunculaceae	native	-	-	-																									
<i>Limosella aquatica</i>	mudwort	Scrophulariaceae	native	--	--	OBL																									
<i>Matricaria discoidea</i>	pineappleweed	Asteraceae	non-native	--	--	-																									
<i>Plantago lanceolata</i>	ribwort	Plantaginaceae	non-native	--	--	FAC																									
<i>Plantago major</i>	broadleaf plantain	Plantaginaceae	non-native	--	--	FACU+						2.5																			
<i>Veronica anagallis-aquatica</i>	water speedwell	Plantaginaceae	non-native	--	--	OBL																									
<i>Rumex obtusifolius</i>	bitter dock	Polygonaceae	non-native	-	-	FAC																									
<i>Mentha pulegium</i>	pennyroyal	Lamiaceae	invasive	C	--	OBL						2.5																			
<i>Lactuca serriola</i>	prickly lettuce	Asteraceae	invasive	C	--	FACU																									
<i>Impatiens capensis</i>	spotted jewelweed	Balsaminaceae	invasive	C	--	FACW	15																								
<b>Bare Ground / Gravel / Leaf</b>							85	97.5	97.5	97.5	97.5	62.5	97.5	97.5	97.5	97.5	62.5	97.5	97.5	85	15	15	85	37.5	62.5	85	85	85			
								sand	mud flat	sand cobble																					
<b>Trees and Shrubs within Herbaceous Plots</b>																															
<i>Salix lasiandra</i> var. <i>lasiandra</i>	Pacific willow	Salicaceae	native	-	-	FACW+						2.5																			
<i>Salix scouleriana</i>	Scouler willow	Salicaceae	native	--	--	FAC																									
<i>Salix sitchensis</i>	Sitka willow	Salicaceae	native	--	--	FACW							2.5																		

Off-Channel Emergent Herbaceous Vegetation Cover Monitoring Statistics							Herbaceous Plot																																
Scientific Name	Common Name	Family	Origin	Portland Plant Noxious Rank	ODA Rank	Wetland Status	1-2SA	1-2SB	1-2SC	1-2SD	1-2SE	1-2SF	3-4Sa	3-4SB	3-4SC	3-4SD	3-4SE	5-6SA	5-6SB	5-6SC	7-8SA	7-8SB	9-10SA	9-10SB	11-12SA	13-14SA	13-14SB	15-16SA											
<b>Off-Channel Emergent Routine Performance Standards</b>																										<b>Habitat Average</b>	<b>Standard Error</b>												
Cover of Native Herbaceous Species							2.5	0	0	0	0	55	5	7.5	0	0	40	0	2.5	15	135	103	40	97.5	40	22.5	15	17.5	<b>27.2</b>	<b>8.2</b>									
Lower CI (80%)																																	16.6						
Upper CI (80%)																																		37.7					
Cover of Non-Native Herbaceous Species							0	0	0	0	0	2.5	0	0	0	0	0	0	0	0	0	2.5	0	7.5	2.5	0	0	0	0	0	0	0	0	0	0.7	0.4			
Lower CI (80%)																																			0.2				
Upper CI (80%)																																			1.2				
Cover of Noxious Herbaceous Species							15	0	0	0	0	2.5	0	0	0	0	0	0	0	0	0	0	0	0	2.5	0	0	0	0	0	0	0	0	0	0	<b>0.9</b>	0.7		
Lower CI (80%)																																				0.0			
Upper CI (80%)																																				1.8			
Cover of Bare Ground							85	97.5	97.5	97.5	97.5	62.5	97.5	97.5	97.5	97.5	62.5	97.5	97.5	85	15	15	85	37.5	62.5	85	85	85	85	85	85	85	85	85	85	79.1	5.6		
Lower CI (80%)																																					71.9		
Upper CI (80%)																																					86.2		
Cover of Native Shrubs and Trees							0	0	0	0	0	2.5	2.5	0	0	0	0	0	0	0	0	0	15	0	5	0	0	0	0	0	0	0	0	0	0	1.1	0.7		
Lower CI (80%)																																						0.2	
Upper CI (80%)																																						2.0	
Weighted Prevalence Index							1.9					1.5	1.5	1.7				1.1		1.0	1.0	1.2	1.0	3.3	2.5	1.0	1.4	1.0	1.0	1.0	1.5								

ATTACHMENT 5. VEGETATION AND WILDLIFE SPECIES LISTS

Scientific Name	Common Name	Family	Origin	Form	Portland Plant Native list	Portland Plant Noxious Rank	ODA Rank	Wetland Status (Oregon)
<i>Sambucus cerulea</i> ( <i>Sambucus nigra</i> ssp. <i>caerulea</i> )	blue elderberry	Adoxaceae	native	shrub	Y	-	-	FACU
<i>Sambucus racemosa</i>	red elderberry	Adoxaceae	native	shrub	Y	--	--	FACU
<i>Viburnum ellipticum</i>	Oregon viburnum	Adoxaceae	native	shrub	Y	--	--	-
<i>Alisma lanceolatum</i>	lanceleaf water plantain	Alistamaceae	non-native	--	No	--	--	OBL
<i>Alisma triviale</i>	northern water plantain	Alistamaceae	native	--	No	--	--	OBL
<i>Sagittaria latifolia</i>	broadleaf arrowhead	Alistamaceae	native	herbaceous perennial	Y	--	--	OBL
<i>Daucus carota</i>	wild carrot	Apiaceae	invasive	Herbaceous forb	No	C	--	-
<i>Oenanthe sarmentosa</i>	water parsley	Apiaceae	native	herbaceous forb	Y	--	--	OBL
<i>Lemna minor</i>	common duckweed	Araceae	native	aquatic herb	Y	--	--	OBL
<i>Hydrocotyle ranunculoides</i>	floating pennywort	Araliaceae	native	herbaceous forb				OBL
<i>Achillea millefolium</i>	yarrow	Asteraceae	native	perennial herb	Y	--	--	FACU
<i>Arctium lappa</i>	greater burdock	Asteraceae	non-native	biennial forb	No	--	--	-
<i>Baccharis pilularis</i>	coyote brush	Asteraceae	native	shrub	No	--	--	-
<i>Chondrilla juncea</i>	skeletonweed	Asteraceae	invasive	herbaceous forb	No	B	B	-
<i>Cirsium arvense</i>	creeping thistle	Asteraceae	invasive	annual heb	No	C	B	FACU+
<i>Cirsium vulgare</i>	bull thistle	Asteraceae	invasive	annual herb	No	C	B	FACU
<i>Conyza</i> ( <i>Erigeron</i> ) <i>canadensis</i>	horseweed	Asteraceae	native	annual herb	No	-	-	FACU
<i>Coreopsis tinctoria</i>	Calliopsis	Asteraceae	native	annual herb	Y	--	--	FACU
<i>Echinops sphaerocephalus</i>	glandular globe-thistle	Asteraceae	non-native	perennial herb	No	--	--	--
<i>Eriophyllum lanatum</i>	Oregon sunshine	Asteraceae	native	annual herb				
<i>Grindelia integrifolia</i>	Puget Sound gumweed	Asteraceae	native	perennial subshrub	Y	--	--	FACW
<i>Helminthotheca echioides</i>	bristly ox tongue	Asteraceae	non-native	herbaceous forb	No	-	-	-
<i>Lactuca serriola</i>	Prickly lettuce	Asteraceae	invasive	annual herb	No	C	--	FACU
<i>Matricaria discoidea</i>	pineappleweed	Asteraceae	non-native	herbaceous forb	No	--	--	-
<i>Matricaria recutita</i>	German chamomile	Asteraceae	non-native	annual herb	No	-	-	-
<i>Pseudognaphalium stramineum</i>	cotton batting cudweed	Asteraceae	native	herbaceous forb	No	-	-	-

Scientific Name	Common Name	Family	Origin	Form	Portland Plant Native list	Portland Plant Noxious Rank	ODA Rank	Wetland Status (Oregon)
<i>Solidago canadensis</i>	California goldenrod	Asteraceae	native	herbaceous forb	No	--	--	FACU
<i>Symphotrichum subspicatum</i> ( <i>Aster subspicatus</i> )	Douglas aster	Asteraceae	native	herbaceous forb	Y	-	-	-
<i>Tanacetum vulgare</i>	tansy	Asteraceae	invasive	perennial herb	No	C	--	NI
<i>Taxacum officinale</i>	common dandelion	Asteraceae	non-native	perennial herb	No	-	-	-
<i>Xanthium strumarium</i>	rough cocklebur	Asteraceae	native	perennial herb	No	--	--	FAC
<i>Impatiens capensis</i>	spotted jewelweed	Balsaminaceae	invasive	herbaceous forb	No	C	--	FACW
<i>Mahonia aquifolium</i>	tall Oregon grape	Berberidaceae	native	shrub	Y	-	-	-
<i>Alnus rhombifolia</i>	white alder	Betulaceae	native	tree	No	--	--	FACW
<i>Alnus rubra</i>	red alder	Betulaceae	native	tree, shrub	Y	--	--	FAC
<i>Cryptantha intermedia</i>	clearwater cryptantha	Boraginaceae	native	herbaceous forb	Y	--	--	-
<i>Phacelia tanacetifolia</i>	lacy phacelia	Boraginaceae	native	annual herb	No	--	--	-
<i>Plagiobothrys nothofulvus</i>	rusty popcornflower	Boraginaceae	native	annual herb	No	--	--	FAC
<i>Plagiobothrys scouleri</i>	Scouler's popcornflower	Boraginaceae	native		No	--	--	FACW
<i>Alliaria petiolata</i>	garlic mustard	Brassicaceae	invasive	herbaceous forb	No	B	B	NI
<i>Cardamine flexuosa</i>	wavy bittercress	Brassicaceae	non-native	--	No	--	--	-
<i>Hirschfeldia incana</i>	shortpod mustard	Brassicaceae	non-native	--	No	--	--	-
<i>Lepidium virginicum</i>	least pepperwort	Brassicaceae	native	herbaceous forb	No	-	-	FACU
<i>Rorippa palustris</i>	bog yellowcress	Brassicaceae	native	perennial forb	No	-	-	OBL
<i>Rorippa sylvestris</i>	creeping yellowcress	Brassicaceae	invasive	perennial forb	NO	-	B	OBL
<i>Downingia elegans</i>	Californian lobelia	Campanulaceae	native	herbaceous forb	Y	--	--	OBL
<i>Dipsacus laciniatus</i>	wild teasel	Caprifoliaceae	invasive	biennial forb	No	-	B	-
<i>Lonicera involucrata</i>	coast twinberry	Caprifoliaceae	native	shrub	Y	--	--	FAC+*
<i>Symphoricarpos albus</i>	common snowberry	Caprifoliaceae	native	shrub	Y	--	--	FACU
<i>Honckenya peploides</i>		Caryophyllaceae	native	perennial herb	No	--	--	-
<i>Chenopodium album</i>	common lamb's-quarters	Chenopodiaceae	non-native	annual herb	No	--	--	FAC



Scientific Name	Common Name	Family	Origin	Form	Portland Plant Native list	Portland Plant Noxious Rank	ODA Rank	Wetland Status (Oregon)
<i>Calystegia sp.</i>	bindweed	Convulvulaceae	non-native	perennial herb	-	-	-	-
<i>Cornus nuttallii</i>	mountain dogwood	Cornaceae	native	deciduous tree	Y	--	--	-
<i>Cornus stolonifera</i>	red osier dogwood	Cornaceae	native	shrub	Y	--	--	FACW
<i>Sedum album</i>	white stonecrop	Crassulaceae	native	perennial herb	No	--	--	-
<i>Calocedrus decurrens</i>	Incense cedar	Cupressaceae	native	tree	Y	--	--	-
<i>Thuja plicata</i>	western redcedar	Cupressaceae	native	tree	Y	--	--	FAC
<i>Carex aperta</i>	Columbia sedge	Cyperaceae	native	herbaceous herb	Y	--	--	FACW
<i>Carex cusickii</i>	Cusick's sedge	Cyperaceae	native		Y	--	--	OBL
<i>Carex densa</i>	dense sedge	Cyperaceae	native		Y	--	--	OBL
<i>Carex obnupta</i>	Slough sedge	Cyperaceae	native	perennial grasslike herb	Y	--	--	OBL
<i>Carex pachystachya</i>	Thick headed sedge	Cyperaceae	native	perennial grasslike herb	No	--	--	FAC
<i>Carex scoparia</i>		Cyperaceae	native	perennial grasslike herb				
<i>Carex stipata</i>	Sawbeak sedge	Cyperaceae	native	perennial herb	Y	--	--	-
<i>Carex unilateralis</i>	one-sided sedge	Cyperaceae	native	perennial herb	Y	--	--	FACW
<i>Cyperus erythrorhizos</i>	redroot flatsedge	Cyperaceae	native	perennial herb	Y	--	--	OBL
<i>Eleocharis obtusa</i>	blunt spikesedge	Cyperaceae	native	perennial herb	Y	-	-	OBL
<i>Eleocharis palustris</i>	creeping spikerush	Cyperaceae	native	perennial herb	Y	--	--	OBL
<i>Schoenoplectus tabernaemontani</i>	soft-stemmed bulrush	Cyperaceae	native	perennial herb	No	--	--	OBL
<i>Scirpus microcarpus</i>	panicled bulrush	Cyperaceae	native	perennial herb	Y	--	--	OBL
<i>Polystichum munitum</i>	western sword fern	Dryopteridaceae	native	Perennial fern	Y	--	--	FACU
<i>Equisetum arvense</i>	field horsetail	Equisetaceae	native	perennial herb	Y	--	--	FAC
<i>Euphorbia maculata</i>	spotted spurge	Euphorbiaceae	non-native	--	No	--	--	UPL
<i>Acmispon americanus</i>	Spanish clover	Fabaceae	native	annual herb	Y	--	--	-
<i>Acmispon parviflorus</i>	Spanish clover	Fabaceae	native	perennial herb	Y	--	--	-
<i>Cytisus scoparius</i>	Scotch broom	Fabaceae	invasive	shrub	No	C	B	-

Scientific Name	Common Name	Family	Origin	Form	Portland Plant Native list	Portland Plant Noxious Rank	ODA Rank	Wetland Status (Oregon)
<i>Lathyrus latifolius</i>	broad-leaved sweet pea	Fabaceae	invasive	perennial vine	No	W	B	-
<i>Lotus corniculatus</i>	bird's foot trefoil	Fabaceae	invasive	Perennial herb	No	C	--	FAC
<i>Lupinus bicolor</i>	miniature lupine	Fabaceae	native	annual, perennial herb	Y	--	--	-
<i>Lupinus polyphyllus</i>	bog lupine (large-leaved lupine)	Fabaceae	native	perennial herb	Y	--	--	FAC+
<i>Medicago lupulina</i>	black medic	Fabaceae	non-native	--	No	--	--	FAC
<i>Melilotus albus</i>	white sweetclover	Fabaceae	non-native	--	No	C	--	-
<i>Melilotus officinalis</i>	yellow sweetclover	Fabaceae	non-native	annual, biennial herb	No	W	--	FACU
<i>Trifolium arvense</i>	rabbitsfoot clover	Fabaceae	invasive	herb	No	C	--	-
<i>Trifolium campestre</i>	hop trefoil	Fabaceae	non-native	annual, biennial herb	No	--	--	-
<i>Trifolium dubium</i>	lesser trefoil	Fabaceae	non-native	annual herb	No	--	--	UPL
<i>Trifolium hirtum</i>	rose clover	Fabaceae	non-native	annual herb	No	--	--	-
<i>Trifolium incarnatum</i>	crimson clover	Fabaceae	non-native	annual herb	No	--	--	-
<i>Trifolium pratense</i>	red clover	Fabaceae	invasive	herb	No	C	--	FACU
<i>Trifolium repens</i>	white clover	Fabaceae	invasive	herb	No	C	--	FAC*
<i>Vicia sativa</i>	common vetch	Fabaceae	non-native	annual herb	No	D	--	UPL
<i>Vicia villosa var. villosa</i>	hairy vetch	Fabaceae	non-native	annual herb	No	C	--	-
<i>Quercus garryana</i>	Oregon oak	Fagaceae	native	tree	Y	--	--	-
<i>Centaurium erythraea</i>	common centaury	Gentianaceae	non-native	missing	No	--	--	--
<i>Geranium dissectum</i>	common wild geranium	Geraniaceae	non-native	annual herb	No	--	--	-
<i>Geranium lucidum</i>	shiny geranium	Geraniaceae	invasive	annual herb	No	C	B	-
<i>Geranium oreganum</i>	western Geranium	Geraniaceae	native	annual herb	No	--	--	-
<i>Geranium purpureum</i>	little-robin	Geriaceae	non-native	annual herb	No	--	--	-
<i>Ribes sanguineum</i>	flowering currant	Grossulariaceae	native	shrub	Y	--	--	-
<i>Philadelphus lewisii</i>	wild mock orange	Hydrangeaceae	native	shrub	Y	--	--	-

Scientific Name	Common Name	Family	Origin	Form	Portland Plant Native list	Portland Plant Noxious Rank	ODA Rank	Wetland Status (Oregon)
<i>Elodea canadensis</i>	common waterweed	Hydrocharitaceae	native	aquatic herb	No	--	--	OBL
<i>Sisyrinchium idahoense</i>	blue-eyed Grass	Iridaceae	native	annual herb	No	--	--	FACW
<i>Juncus acuminatus</i>	sharp-fruited rush	Juncaceae	native	perennial grasslike herb	Y	--	--	OBL
<i>Juncus articulatus</i>	jointed rush	Juncaceae	native	perennial herb	Y	-	-	OBL
<i>Juncus bufonius</i>	toad rush	Juncaceae	native	perennial grasslike herb	Y	--	--	FACW
<i>Juncus effusus</i>	soft rush	Juncaceae	native	perennial grasslike herb	No	-	-	FACW
<i>Juncus ensifolius</i>	sword-leaved rush	Juncaceae	native	perennial grasslike herb	Y	--	--	FACW
<i>Juncus oxymers</i>	pointed rush	Juncaceae	native	perennial grasslike herb	Yes	-	-	FACW+
<i>Juncus patens</i>	common rush	Juncaceae	native	perennial grasslike herb	Y	--	--	FACW
<i>Juncus tenuis</i>	slender rush	Juncaceae	native	perennial herb	Y	--	--	FACW-
<i>Lycopus europaeus</i>	European water-horehound	Lamiaceae	non-native	perennial herb	No	--	--	-
<i>Lycopus uniflorus</i>	northern bugleweed	Lamiaceae	Native	perennial herb	Y	--	--	OBL
<i>Mentha pulegium</i>	pennyroyal	Lamiaceae	invasive	perennial herb	No	C	--	OBL
<i>Prunella vulgaris</i>	self heal	Lamiaceae	native	perennial herb	Y	--	--	-
<i>Stachys cooleyae</i>	hedge-nettle	Lamiaceae	native	herbaceous forb	Y	--	--	FACW
<i>Lindernia dubia</i>	false pimpernel	Linderniaceae	native	herbaceous forb	Y	--	--	OBL
<i>Lythrum portula</i>	water purslane	Lythraceae	invasive	perennial herb	No	B	--	NI
<i>Lythrum salicaria</i>	purple loosestrife	Lythraceae	invasive	perennial herb	No	B	B	FACW+
<i>Malva sylvestris</i>	common mallow	Malvaceae	non-native	perennial herb	No	--	--	-
<i>Malvella leprosa</i>	alkali mallow	Malvaceae	native	perennial herb	No	--	--	FACU
<i>Marchantia polymorpha</i>	common liverwort	Marchantiaceae	native	bryophyte	Y	-	-	-
<i>Fraxinus latifolia</i>	Oregon ash	Oleaceae	native	tree	Y	--	--	FACW

Scientific Name	Common Name	Family	Origin	Form	Portland Plant Native list	Portland Plant Noxious Rank	ODA Rank	Wetland Status (Oregon)
<i>Chamaenerion (Epilobium) angustifolium</i>	fireweed	Onagraceae	native	perennial herb	Y	-	-	FACU+
<i>Clarkia amoena</i>	farewell to Spring	Onagraceae	native		Y	--	--	-
<i>Epilobium brachycarpum</i>	tall willowherb	Onagraceae	native	--	No	--	--	UPL
<i>Epilobium ciliatum</i>	Slender willow herb	Onagraceae	native	perennial herb	Y (var)	--	--	FACW-
<i>Epilobium densiflorum</i>	dense-flowered willow herb	Onagraceae	native	perennial herb				
<i>Epilobium minutum</i>	little willowherb	Onagraceae	native	annual herb	No	--	--	-
<i>Ludwigia hexapetala</i>	Six petal water primrose	Onagraceae	invasive	perennial herb	No	A	B	-
<i>Ludwigia palustris</i>	water purslane	Onagraceae	native	aquatic perennial herb	Y	--	--	OBL
<i>Ludwigia peploides</i>	Marsh purslane	Onagraceae	invasive	perennial herb	No	-	B	-
<i>Oenothera biennis</i>	evening primrose	Onagraceae	native	herbaceous forb	Y	-	-	-
<i>Bellardia viscosa</i>	yellow glandweed	Orobanchaceae	non-native	annual herb	No	--	--	-
<i>Eschscholzia californica</i>	California poppy	Papaveraceae	native	perennial herb	Y	--	--	-
<i>Erythranthe guttata</i>	yellow monkeyflower	Phrymaceae	native	perennial herb	No	--	--	OBL
<i>Erythranthe moschata</i>	musk monkeyflower	Phrymaceae	native	--	No	--	--	OBL
<i>Phytolaca americana</i>	pokeweed	Phytolaccaceae	invasive	shrub	No	A	-	NI
<i>Abies grandis</i>	grand fir	Pinaceae	native	tree	Y	--	--	FACU-*
<i>Pinus ponderosa</i>	yellow pine	Pinaceae	native	tree	Y (var)	--	--	FACU-
<i>Pseudotsuga menziesii</i>	Douglas fir	Pinaceae	native	tree	Y	--	--	FACU*
<i>Callitriche sp.</i>	water starwort	Plantaginaceae		aquatic herb	-	-	-	OBL
<i>Plantago lanceolata</i>	ribwort	Plantaginaceae	non-native	perennial herb	No	--	--	FAC
<i>Plantago major</i>	broadleaf plantain	Plantaginaceae	non-native	--	No	--	--	FACU+
<i>Veronica anagallis-aquatica</i>	water speedwell	Plantaginaceae	non-native	rhizomatous perennial herb	No	--	--	OBL
<i>Veronica peregrina</i>	American speedwell	Plantaginaceae	native	--	No	--	--	OBL
<i>Agrostis exarata</i>	bentgrass	Poaceae	native	perennial grass	Y	--	--	FACW
<i>Agrostis stolonifera</i>	creeping bentgrass	Poaceae	non-native	perennial grass	No	D	-	FAC*

Scientific Name	Common Name	Family	Origin	Form	Portland Plant Native list	Portland Plant Noxious Rank	ODA Rank	Wetland Status (Oregon)
<i>Danthonia californica</i>	California oatgrass	Poaceae	native	perennial grass	Y	--	--	FACU*
<i>Deschampsia elongata</i>	hairgrass	Poaceae	native	perennial grass	Y	--	--	FACW-
<i>Elymus glaucus</i>	blue wildrye	Poaceae	native	perennial grass	Y ssp	--	--	FACU
<i>Eragrostis hypnoides</i>	teal lovegrass	Poaceae	native	perennial grass	No	--	--	OBL
<i>Festuca idahoensis</i>	blue fescue	Poaceae	native	perennial grass	No	--	--	FACU*
<i>Festuca occidentalis</i>	western fescue	Poaceae	native	perennial grass	Y	--	--	-
<i>Festuca roemerii</i>	Roemer's fescue	Poaceae	native	perennial bunchgrass	Y	--	--	-
<i>Glyceria elata</i>	tall mannagrass	Poaceae	native	perennial bunchgrass	Y	--	--	FACW+
<i>Glyceria x occidentalis</i>	western mannagrass	Poaceae	native	perennial bunchgrass	Y	-	-	OBL
<i>Holcus lanatus</i>	common velvetgrass	Poaceae	non-native	perennial grass	No	--	--	-
<i>Leersia oryzoides</i>	rice cutgrass	Poaceae	native	perennial grass	Y	--	--	OBL
<i>Panicum dichotomiflorum</i>	fall panicgrass	Poaceae	non-native	perennial grass	No	--	--	FACW
<i>Phalaris arundinacea</i>	reed canarygrass	Poaceae	invasive	perennial grass	No	C	--	FACW
<i>Poa secunda</i>	pine bluegrass	Poaceae	native	perennial grass	Y	--	--	-
<i>Polypogon monspeliensis</i>	rabbitsfoot grass	Poaceae	non-native	annual grass	No	--	--	FACW
<i>Gilia capitata</i>	bluehead gilia	Polemoniaceae	native	herbaceous forb	Y	--	--	-
<i>Navarretia intertexta</i>	needle-leaf navarretia	Polemoniaceae	native	herbaceous forb	Yes	-	-	FACW
<i>Persicaria amphibia</i>	longroot smartweed	Polygonaceae	native	aquatic herb	Y	--	--	OBL
<i>Persicaria maculosa</i>	spotted lady's thumb	Polygonaceae	non-native	--	No	--	--	FACW
<i>Polygonum aviculare</i>	doorweed	Polygonaceae	native	aquatic herb	Y	-	-	-
<i>Polygonum paronychia</i>	beach knotweed	Polygonaceae	native	shrub	No	-	-	-
<i>Reynoutria sachalinensis</i> ( <i>Fallopia sachalinensis</i> )	giant knotweed	Polygonaceae	non-native	herbaceous perennial	No	-	-	-
<i>Rumex obtusifolius</i>	bitter dock	Polygonaceae	non-native	perennial herb	No	-	-	FAC
<i>Rumex salicifolius</i>	willow dock	Polygonaceae	native	--	No	--	--	FACW
<i>Anagallis arvensis</i>	scarlet pimpernel	Primulaceae	non-native	missing	No	--	--	--

Scientific Name	Common Name	Family	Origin	Form	Portland Plant Native list	Portland Plant Noxious Rank	ODA Rank	Wetland Status (Oregon)
<i>Adiantum jordanii</i>	maiden hair fern	Pteridaceae	native	perennial fern	-	-	-	-
<i>Delphinium trolliifolium</i>	Columbian Larkspur	Ranunculaceae	native	herbaceous forb	No	--	--	-
<i>Ranunculus muricatus</i>	creeping buttercup	Ranunculaceae	non-native	--	No	--	--	FACW
<i>Ranunculus sceleratus</i>	cursed buttercup	Ranunculaceae	native	herbaceous forb				OBL
<i>Frangula purshiana</i>	cascara	Rhamnaceae	native	shrub	Y	-	-	-
<i>Amelanchier alnifolia</i>	serviceberry	Rosaceae	native	shrub	Y	--	--	FACU
<i>Crataegus douglasii</i>	Douglas' hawthorn	Rosaceae	native	tree, shrub	Y	--	--	FAC
<i>Holodiscus discolor</i>	oceanspray	Rosaceae	native	shrub	Y	--	--	-
<i>Malus fusca</i>	western crabapple	Rosaceae	native	tree	Y	--	--	FACW
<i>Oemleria cerasiformis</i>	Indian plum	Rosaceae	native	shrub	Y	--	--	FACU
<i>Physocarpus capitatus</i>	ninebark	Rosaceae	native	shrub	Y	--	--	FACW-
<i>Potentilla gracilis</i>	slender cinquefoil	Rosaceae	native	herbaceous forb	Y	--	--	FAC
<i>Prunus emarginata</i>	bitter cherry	Rosaceae	native	tree	Y	--	--	FACU*
<i>Prunus virginiana</i> var. <i>demissa</i>	western choke cherry	Rosaceae	native	tree, shrub	Y	-	-	FACU
<i>Rosa pisocarpa</i>	swamp rose	Rosaceae	native	shrub	Y	--	--	FAC
<i>Rubus discolor</i> ( <i>Rubus bifrons</i> )	Himalayan blackberry	Rosaceae	invasive	perennial vine	No	C	B	-
<i>Rubus leucodermis</i>	blackcap raspberry	Rosaceae	native	perennial vine	Y	--	--	-
<i>Rubus parviflorus</i>	thimbleberry	Rosaceae	native	perennial vine	Y	--	--	FAC-
<i>Rubus spectabilis</i>	salmonberry	Rosaceae	native	shrub	Y	--	--	FAC+
<i>Rubus ursinus</i>	trailing blackberry	Rosaceae	native	perennial vine	Y	--	--	FACU
<i>Spiraea douglasii</i>	Douglas spiraea	Rosaceae	native	shrub	Y	--	--	FACW
<i>Geum macrophyllum</i>	large-leaved geum	Roseaceae	native	herbaceous forb	Y	--	--	FACW-*
<i>Populus trichocarpa</i>	black cottonwood	Salicaceae	native	tree	Y	--	--	FAC
<i>Salix fluviatilis</i>	Columbia willow	Salicaceae	native	tree	No	--	--	OBL
<i>Salix lasiandra</i> var. <i>lasiandra</i>	Pacific willow	Salicaceae	native	tree	Y	-	-	FACW+
<i>Salix prolixa</i> (formerly <i>rigida</i> (var. <i>macrogemma</i> ))	Mackenzie's willow	Salicaceae	native	tree	Y	-	-	FACW+
<i>Salix scouleriana</i>	Scouler willow	Salicaceae	native	tree	Y	--	--	FAC
<i>Salix sitchensis</i>	Sitka willow	Salicaceae	native	tree	Y	--	--	FACW

Scientific Name	Common Name	Family	Origin	Form	Portland Plant Native list	Portland Plant Noxious Rank	ODA Rank	Wetland Status (Oregon)
<i>Azolla filiculoides</i>	mosquito fern	Salviniaceae	native	aquatic herbaceous	Y	--	--	OBL
<i>Acer circinatum</i>	vine maple	Sapindaceae	native	tree	Y	--	--	FAC-
<i>Acer macrophyllum</i>	bigleaf maple	Sapindaceae	native	tree	Y	--	--	FACU
<i>Buddleja davidii</i>	butterfly bush	Scrophulariaceae	non-native	shrub	No	--	--	-
<i>Limosella aquatica</i>	mudwort	Scrophulariaceae	native	herbaceous forb	Y	--	--	OBL
<i>Verbascum blattaria</i>	moth mullein	Scrophulariaceae	invasive	biennial forb	No	C	--	UPL
<i>Verbascum thapsus</i>	great mullein	Scrophulariaceae	invasive	biennial forb	No	C	-	-
<i>Typha angustifolia</i>	narrow-leaf cattail	Typhaceae	native	perennial herb	Y			OBL
<i>Typha latifolia</i>	broad-leaf cattail	Typhaceae	native	perennial herb	Y	-	-	OBL
<i>Urtica dioica</i>	stinging nettle	Urticaceae	native	--	No	--	--	FAC+

Scientific Name	Common Name	Family
<i>Buteo jamaicensis</i>	Red-tailed hawk	Accipitridae
<i>Haliaeetus leucocephalus</i>	Bald eagle	Accipitridae
<i>Megaceryle alcyon</i>	Belted kingfisher	Alcedinidae
<i>Anas platyrhynchos</i>	Mallard	Anatidae
<i>Branta canadensis</i>	Canada goose	Anatidae
<i>Ardea herodias</i>	Great blue heron	Ardeidae
<i>Butorides virescens</i>	Green heron	Ardeidae
<i>Charadrius vociferus</i>	Killdeer	Charadriidae
<i>Zenaida macroura</i>	Mourning dove	Columbidae
<i>Aphelocoma californica</i>	Western scrub jay	Corvidae
<i>Falco peregrinus</i>	Peregrine falcon	Falconidae
<i>Falco sparverius</i>	American kestrel	Falconidae
<i>Haemorrhous mexicanus</i>	House finch	Fringillidae
<i>Hirundo rustica</i>	Barn swallow	Hirundinidae
<i>Pandion haliaetus</i>	Osprey	Pandionidae
<i>Melospiza melodia</i>	Song sparrow	Passerellidae
<i>Zonotrichia leucophrys</i>	White-crowned sparrow	Passerellidae
<i>Colaptes auratus</i>	Northern flicker	Picidae
<i>Sayornis nigricans</i>	Black phoebe	Tyrannidae
<i>Misgurnus anguilicaudatus</i>	Oriental weatherfish	Cobitidae
<i>Fundulus diaphanus</i>	Banded killifish	Fundulidae
<i>Gasterosteus aculeatus</i>	Threespine stickleback	Gasterosteidae
<i>Gambusia affinis</i>	Mosquitofish	Poeciliidae
<i>Canis latrans</i>	Coyote	Canidae
<i>Castor canadensis</i>	Beaver	Castoridae
<i>Odocoileus hemionus</i>	Black-tailed deer	Cervidae
<i>Myodes californicus</i>	Western red-backed vole	Cricetidae
<i>Lontra canadensis</i>	River otter	Mustelidae
<i>Spermophilus beecheyi</i>	Ground squirrel	Sciuridae
<i>Thamnophis sirtalis concinnus</i>	Red-spotted garter snake	Colubridae
<i>Pseudacris regilla</i>	Pacific chorus frog	Hylidae
<i>Sceloporus occidentalis</i>	Western fence lizard	Phrynosomatidae
<i>Lithobates catesbeianus</i>	Bullfrog	Ranidae



ATTACHMENT 6. CREDIT LEDGER

Linnton Water Credits - Credit Ledger

12/9/2021

Credit Type	Max Approved	Credits Released to Date		Credits Currently Available		Credits Sold to Date	
			404 Approved		404 Approved		404 Approved
NRD Only	148.91	147.81		47.36		100.45	
Dual-Purpose Riverine	216.10	52.35	43.22	50.35	41.22	2	2
Dual-Purpose Palustrine	137.50	52.34	27.5	52.34	27.5	0	0
<b>Total</b>	<b>502.51</b>	<b>252.5</b>	<b>70.72</b>	<b>150.05</b>	<b>68.72</b>	<b>102.45</b>	<b>2</b>

Date	Transaction Type (Release/ Sale/ Deduction)	Credit Type	Serial No.	Purchaser/Permittee	Purchaser Address/ Phone/Permit No.	Credit Reduced	Credit Add	Notes
5/1/2019	Release	NRD-Only	LWC-NRD-001 through LWC-NRD-077(.62)	-	-		76.62	Release 1 - 4/25/19 letter from Portland Harbor NRD Trustee Council authorizing Release 1; 15% of the total. 404 credits not approved yet
5/2/2019	Sale	NRD-Only	LWC-NRD-001 through LWC-NRD-077(.62)	-	-	76.62		Sale of all available NRD single-purpose credits
8/20/2020	Release	NRD-Only	LWC-NRD-077 (.38) through LWC-NRD-147.81	-	-		79.48	Release 2 - 8/20/20 letter from Portland Harbor NRD Trustee Council authorizing Release 2; 35% of the total, NRD serial numbers adjusted to reflect the November 2020 updated total from Trustee Council and "adjustments" below. 404 credits not approved yet.
8/20/2020	Release	Dual-Purpose Riverine	LWC-Riverine-001 through LWC-Riverine-042.21	-	-		42.21	
8/20/2020	Release	Dual-Purpose Palustrine	LWC-Palustrine-001 through LWC-Palustrine-042.22	-	-		42.22	
8/27/2020	Sale	NRD-Only	LWC-NRD-077 (.38) through LWC-NRD-099	-	-	22.38		Sale of remainder of 99 single-purpose credits per agreement dated 7/31/2018
10/8/2020	Sale	NRD-Only	LWC-NRD-099 through LWC-NRD-099 (.75)	Foss Maritime Company	9030 NW St. Helens Rd, Portland OR, 97231	0.75		Sale of 0.75 single-purpose credits to Foss Maritime per agreement dated 9/29/20
11/2/2020	Adjustment	NRD-Only	N/A	(MRFSCV)	-	8.29		Adjusts relative allocation to three credit categories to match final total credits approved by Trustees' modified revised forecast settlement credit value (502.51), dated 11/2/20, and leaving the previous dual-purpose credit estimates unchanged. Final adjustment of relative totals to occur following MBI approval of dual-purpose credit totals.
11/2/2020	Release	Dual-Purpose Riverine	LWC-Riverine-042.21 through LWC-Riverine-052.35	(MRFSCV)	-		10.14	
11/2/2020	Release	Dual-Purpose Palustrine	LWC-Palustrine-042.22 through LWC-Palustrine-052.34	(MRFSCV)	-		10.12	
4/8/2021	Sale	NRD-Only	LWC-NRD-099.75 through LWC-NRD-100.35	Port of Portland	-	0.6		
10/20/2021	Sale	NRD-Only	LWC-NRD-100.35 through LWC-NRD-100.45	NW Natural	-	0.1		Sale of flood storage volume for Land Use Review number LUR 20-195001 GW
9/30/2021	Release	Dual-Purpose Riverine	LWC-Riverine-001 through LWC-Riverine-043.22	-	-		43.22	September 30, 2021 letters from DSL and Army Corps releasing a total of 70.72 dual-purpose credits
9/30/2021	Adjustment	Dual-Purpose Riverine	-	-	-	43.22		Adjustment used to account for dual approval ledger calculation

Linnton Water Credits - Credit Ledger

Date	Transaction Type (Release/ Sale/ Deduction)	Credit Type	Serial No.	Purchaser/Permittee	Purchaser Address/ Phone/Permit No.	Credit Reduced	Credit Add	Notes
9/30/2021	Release	Dual-Purpose Palustrine	LWC-Palustrine-001 through LWC-Palustrine-027.50	-	-		27.5	September 30, 2021 letters from DSL and Army Corps releasing a total of 70.72 dual-purpose credits
9/30/2021	Adjustment	Dual-Purpose Palustrine	-	-	-	27.5		Adjustment used to account for dual approval ledger calculation
10/14/2021	Sale	Dual-Purpose Riverine	LWC-Riverine-001 through LWC-Palustrine-002	SeaPort Midstream Partners	-	2		DSL Permit #60800-RF, NWP-2006-946-3, HUC 1709001203