

Crystal River Ranch Upland Erosion Control Project

November 2012 CRR Project Site Restoration Status

Reference:

PALS Permit No. 695650, Development Eng. File No. 56-15
WDFW Hydraulic Permit No. 112720-2
Pierce County parcels: 3360090210, 3360041404, 3360050800

Project Overview:

- December 2010 fourteen buried rock vanes installed.
- April 2011 plantings 767 individually wire cage to discourage elk damage and submittal of baseline report (RestorCRR_BaselineRpt_20110428) as required to Pierce County Planning & Land Services (PALS).
 - Sitka willow (*Salix sitchensis*), Birch (*Betula papyrifera*) planted in low terrace vane cluster sites V1, V2-4, V10-12 & V13-14.
 - Douglas fir (*Pseudotsuga menziesii*), Sitka spruce (*Picea sitchensis*), Western hemlock (*Tsuga heterophylla*) planted in high terrace vane sites V5-9.
- July 2011 PALS approved “as-built” construction.
- March - April 2012 Wire cages removed from Douglas fir, Hemlock and Spruce.
 - Cages, stakes and debris clean-up accomplished at high terrace vane site locations.
- August - October 2012 Majority of scotch broom pulled at all sites. Irrigation in operation at vanes V1, V5-7.

Definitions:

Vigor: “good” means the plant exhibits lots of new growth, flowers, vegetative growth

“fair” means the plant is green, erect without exhibiting new growth, little if any infestations

“poor” means no evidence of new growth such as shoots, sprouting branches, flowers



“dead” means there is no evidence of green cambium (Use thumb nail to scratch the base and upper portion of the main stem; if no green layer is observed, the plant is dead.

Live plants quantity may include volunteer trees also present in each site, e.g., Douglas fir and Alder.

Survival % calculation: Divide “Live plants” quantity by “Planted Apr 2011” quantity = survival % at each vane site.

Site Plant Status:

Vane 1 length 107 feet located inland shoreline CRR picnic area off Willow Tree Way.



Plant Type	Height	Vigor	Qty	Plant status as of Nov 2012	
Sitka willow	2 ft	Fair	1	Planted Apr 2011 = 40	
Sitka willow	2 ft	Poor	6		
Birch	5-6 ft	Fair	15		
Birch	3-4 ft	Fair	4		
Doug fir	1-3 ft	Fair	8		
Live plants:			34	Vane 1 plant survival exceeds 80%	
Birch	-	Dead	15		
Location: N 47° 06.654', W 121° 36.305' at shoreline vane stake (toe end).				Upstream #1347	
3 Foot approximate OHW (ordinary high water) bank height.					
154 Yards approximate cross channel to OHW bank distance.					

#1005

07.13.2012

Live plants quantity 34 divided by Planted April 2011 quantity 40 = +80% survival.



Vane 2 length 123 feet located inland downstream of old bridge abutment off Meadow Way.

Plant Type	Height	Vigor	Qty	Plant Status as of Nov 2012	
Doug fir	2 ft	Good	5		
Sitka willow	2 ft	Fair	1	Planted Apr 2011 = 49	
Birch	4-7 ft	Good	6		
Alder	< 5 in	Fair	28		
Live Plants:			40	Vane 2 plant survival exceeds 80%	
Sitka willow	-	Dead	9		
Birch	-	Dead	19		
Location: N 47° 06.518', W 121° 36.153' at shoreline vane stake.					
3 Foot approximate OHW bank height.					
41 Yards approximate cross distance to island shoreline cobble.					
				Upstream #1351	

#1349



Live plants quantity 40 divided by Planted April 2011 quantity 49 = +80% survival.

Vane 3 length 107 feet located inland downstream of old bridge abutment off Meadow Way.

Plant Type	Height	Vigor	Qty	Plant status as of Nov 2012	
Sitka willow	2-3 ft	Good	3	Planted Apr 2011 = 43	
Birch	4-7 ft	Good	27		
Alder	< 5 in	Good	63		
Doug fir	< 5 in	Good	2		
Live Plants:			95	Vane 3 plant survival exceeds 80%	
Sitka willow	-	Dead	6		
Birch	-	Dead	18		#1353
<p>Location: N 47° 06.560', W 121° 36.106' at shoreline stake (toe) of vane.</p> <p>3 Foot approximate OHW (ordinary high water) bank height.</p> <p>83 Yards approximate cross distance to cobble island shoreline.</p>				Upstream #1355	


Live plants quantity 95 divided by Planted April 2011 quantity 43 = +80% survival.

Vane 4 length 111 feet located inland downstream of old bridge abutment off Meadow Way.

Plant Type	Height	Vigor	Qty	Plant status as of Nov 2012	
Sitka willow	4 ft	Good	9	Planted Apr 2011 = 38	
Birch	4-7 ft	Good	31		
Alder	< 5 in	Good	13		
Live Plants:			53	Vane 4 plant survival exceeds 80%	
Birch	-	Dead	3		
<p>Location: N 47° 06.531', W 121° 36.072' at shoreline stake (toe) of vane.</p> <p>3 Foot approximate OHW (ordinary high water) bank height.</p> <p>109 Yards approximate cross distance to shoreline utility pole.</p>					
					Downstream #1358

Live plants quantity 53 divided by Planted April 2011 quantity 38 = +80% survival.


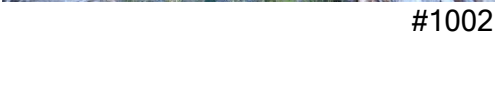
Access route to vanes 2-4 next to bridge abutment end of Meadow Way.

Access Route	Plant Type	Height	Vigor	Qty	Plant status as of Nov 2012	
V2 - 4	Birch	5-6 ft	Good	5	Planted Apr 2011 = 6	
Live Plants:				5	Access route plant survival exceeds 80%	
V2 - 4	Birch	-	Dead	3		

#1359

Live plants quantity 5 divided by Planted April 2011 quantity 6 = +80% survival.

**Vane 5 length 74 feet located inland shoreline SE of pump house off Meadow Way.
The following table data combines access V5-V7 route and Vane 5 status.**



Plant Type	Height	Vigor	Qty	Plant status as of Nov 2012	
Doug fir, Sitka willow, Hemlock	2-5 ft	Good	86	Planted Apr 2011 = 112	
Alder	< 5 in	Fair	6		
Live Plants:			92	Access route & Vane 5 plant survival exceeds 80%	
Doug fir, Sitka willow, Hemlock	-	Dead	19		
Location: N 47° 06.487', W 121° 36.052' at shoreline vane stake. > 16 Foot OHW bank height. 117 Yards approximate cross channel to OHW bank distance.				Upstream #1004	

#1002

Upstream #1004



Live plants quantity 92 divided by Planted April 2011 quantity 112 = +80% survival.

Vane 6 length 70 feet located inland shoreline upstream of Vane 5 off Meadow Way.

Plant Type	Height	Vigor	Qty	Plant status as of Nov 2012	
Doug fir, Sitka willow, Hemlock	2-4 ft	Fair	87	Planted Apr 2011 = 106	
Alder	> 5 in	Poor	2		
Live Plants:			89	Vane 6 plant survival exceeds 80%	
Doug fir, Sitka willow, Hemlock	-	Dead	11		#1008
Location: N 47° 06.459', W 121° 36.048' at shoreline vane stake. > 16 Foot OHW bank height. 44 Yards approximate cross channel to OHW island bank distance.				Upstream #1007	

Live plants quantity 89 divided by Planted April 2011 quantity 106 = +80% survival.

Vane 7 length 66 feet located inland shoreline upstream of Vane 6 off Meadow Way.



Plant Type	Height	Vigor	Qty	Plant status as of Nov 2012	
Doug fir, Sitka willow, Hemlock	2-4 ft	Fair	73	Planted Apr 2011 = 100	
Doug fir, Sitka willow, Hemlock	2 ft	Poor	8		
Alder	> 5 in	Fair	1		
Live Plants:			82	Vane 7 plant survival exceeds 80%	
Doug fir, Sitka willow, Hemlock	-	Dead	22		
<p>Location: N 47° 06.435', W 121° 36.037' at shoreline vane stake.</p> <p>> 16 Foot OHW bank height.</p> <p>44 Yards approximate cross channel to OHW island bank distance.</p>					

#1011

Upstream #1010



Live plants quantity 82 divided by Planted April 2011 quantity 100 = +80% survival.

Vane 8 length 53 feet located inland shoreline downstream off Piney Way.

Plant Type	Height	Vigor	Qty	Plant status as of Nov 2012	
Doug fir, Sitka willow, Hemlock	2-4 ft	Good	15	Planted Apr 2011 = 66	
Doug fir, Sitka willow, Hemlock	2-4 ft	Fair	36		
Doug fir	> 5 in	Fair	11		
Live Plants:			62	Vane 8 plant survival exceeds 80%	
Doug fir, Sitka willow, Hemlock	-	Dead	10		#1030
Location: N 47° 06.381', W 121° 35.000' at shoreline vane stake. > 10 Foot OHW bank height. 76 Yards approximate cross channel to OHW island bank distance.					Upstream #1033



Live plants quantity 62 divided by Planted April 2011 quantity 66 = +80% survival.

Vane 9 length 43 feet located inland shoreline upstream of vane 8 off Piney Way.

Plant Type	Height	Vigor	Qty	Plant status as of Nov 2012	
Doug fir, Sitka willow, Hemlock	2-4 ft	Fair	62	Planted Apr 2011 = 66	
Live Plants:			62	Vane 9 plant survival exceeds 80%	
Doug fir, Sitka willow, Hemlock	-	Dead	7		#1013
Location: N 47° 06.369', W 121° 35.982' at shoreline vane stake. > 10 Foot OHW bank height. 75 Yards approximate cross channel to OHW island bank distance.					Downstream #1012



Live plants quantity 62 divided by Planted April 2011 quantity 66 = +80% survival.

Vane 10 length 50 feet located inland shoreline upstream of vane 9 off Piney Way.
Following data combines access V8-V14 route and Vane 10 status.

Plant Type	Height	Vigor	Qty	Plant status as of Nov 2012	
Sitka willow	2-4 ft	Good	3	Planted Apr 2011 = 22	
Birch	5-7 ft	Fair	3	Vane 10 plant survival exceeds 80%	
Doug fir, Sitka willow, Hemlock	2-4 ft	Fair	22		
Alder	4	Poor	1		
Live Plants:			29		
Sitka willow	-	Dead	3		
Birch	-	Dead	3		
Location: N 47° 06.346', W 121° 35.971' at shoreline vane stake.					
3 Foot OHW bank height.					
78 Yards approximate cross channel to OHW island bank distance.					
				Upstream #1016	



Live plants quantity 29 divided by Planted April 2011 quantity 22 = +80% survival.

Vane 11 length 137 feet located inland shoreline upstream of vane 10 off Piney Way.

Plant Type	Height	Vigor	Qty	Plant status as of Nov 2012	 #1018
Sitka willow	4 ft	Good	1	Planted Apr 2011 = 55	
Birch	4-8 ft	Fair	16	Vane 11 plant survival exceeds 80%	
Doug fir, Sitka willow, Hemlock	2-3 ft	Fair	22		
Alder	< 5 in	Fair	3		
Alder	4 ft	Fair	3		
Live Plants:			45		
Sitka willow	-	Dead	1		
Birch	-	Dead	3		
Location: N 47° 06.332', W 121° 35.935' at shoreline vane stake.					
1 to 2 Foot OHW bank height.					
48 Yards approximate cross channel to OHW island bank distance.					
 Upstream #1020					



Live plants quantity 45 divided by Planted April 2011 quantity 55 = +80% survival.

Vane 12 length 62 feet located inland shoreline upstream of vane 11 off Piney Way.

Plant Type	Height	Vigor	Qty	Plant status as of Nov 2012	
Doug fir	2 ft	Good	7		
Sitka willow	2-3 ft	Fair	6	Planted Apr 2011 = 25	
Birch	4-7 ft	Fair	8		
Live Plants:			21	Vane 12 plant survival exceeds 80%	
Sitka willow	-	Dead	1		#1021
Birch	-	Dead	15		
Location: N 47° 06.305', W 121° 35.918' at shoreline vane stake. 2 to 3 Foot OHW bank height. 48 Yards approximate cross channel to OHW island bank distance.					
					Upstream #1022



Live plants quantity 21 divided by Planted April 2011 quantity 25 = +80% survival.

Vane 13 length 40 feet inland shoreline downstream next to vane 14 from Piney Way.

Plant Type	Height	Vigor	Qty	Plant status as of Nov 2012	
Birch	4-6 ft	Good	11	Planted Apr 2011 = 15	
Birch	4-6 ft	Fair	2		
Birch	2 ft	Poor	1		
Live Plants:			14	Vane 13 plant survival exceeds 80%	
Birch	-	Dead	5		
<p>Location: N 47° 06.319', W 121° 35.923' at shoreline vane stake.</p> <p>3 Foot OHW bank height.</p> <p>Close proximity to fir island and plant density prevented cross channel measurement.</p>					
					Downstream #1026

Live plants quantity 14 divided by Planted April 2011 quantity 15 = +80% survival.

Vane 14 length 90 feet inland shoreline with vane 13 furthest upstream from Piney Way.

Plant Type	Height	Vigor	Qty	Plant status as of Nov 2012	
Sitka willow	3-4 ft	Fair	4	Planted Apr 2011 = 24	
Birch	5-7 ft	Good	11		
Birch	12 ft	Good	1		
Doug fir	2 ft	Good	3		
Alder	14 ft	Good	1		
Live Plants:			20	Vane 14 plant survival exceeds 80%	
Sitka willow	-	Dead	4		#1029
Birch	-	Dead	2		
Location: N 47° 06.148', W 121° 35.395' at shoreline vane stake. Furthest upstream inland rock vane. At site main channel bends West to East. 3 Foot OHW bank height. 63 Yards approximate cross channel bend to OHW island bank distance.					 Upstream #1028

Live plants quantity 20 divided by Planted April 2011 quantity 24 = +80% survival.

April 2011 planted quantity all sites = 767

November 2012 live plants all sites = 743
All CRR vane sites plant survival exceeds 80%.