

2012 Upland Forest Restoration Planting Project Plan and As-Built Report



Planting crew on the decommissioned 121.1 Road

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1.0 Background

The goal of the Upland Forest Restoration Planting Program is to diversify plant species composition and to reestablish a resilient community of native species in the Cedar River Municipal Watershed (CRMW). Planting projects focus on areas where species diversity has been decreased by past clearcut timber harvest and/or where native species dispersal is limited. Planting projects use site-specific knowledge to identify priority areas and species for restoration work (LaBarge et al. 2008).

Planting projects are implemented that contribute to native ecosystem functioning. Planning considerations include:

- contribution of the plant species to the surrounding habitat
- current and ongoing successional processes
- presence/absence of appropriate seed source
- acquisition of appropriate plant material
- use of native vegetation to inhibit the spread of invasive species

Planting is prioritized where appropriate forest structure exists and propagules are absent, and utilizes species that contribute to ecosystem processes in a way not already addressed by on-site species (Figure 1, LaBarge et al. 2008).

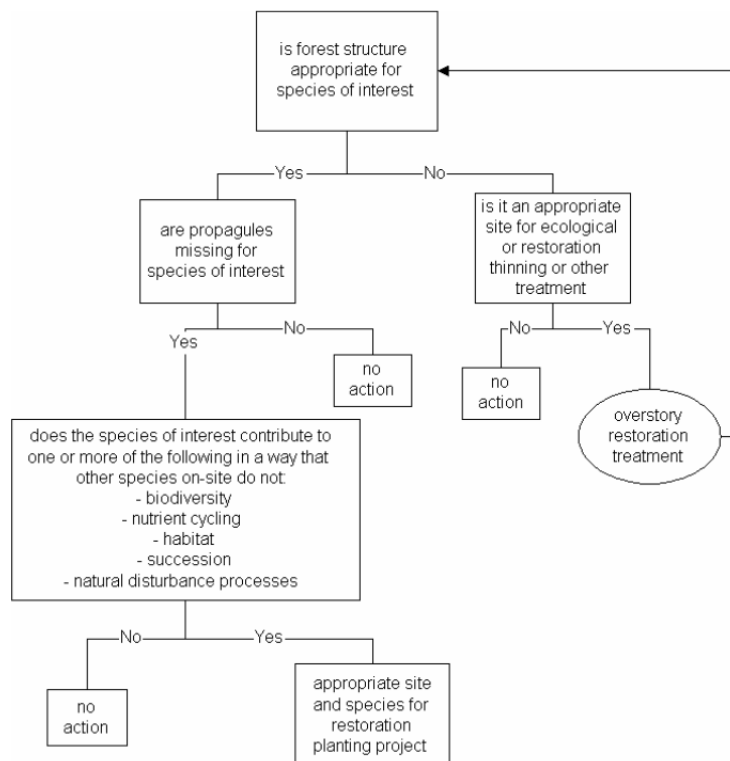


Figure 1: Decision tree for upland planting species and site selection.

This document describes information about 2012 planting projects and prescriptions, costs and plant materials, and future directions.

2.0 2012 Planting Projects

Upland forest restoration planting in 2012 focused on planting tree seedlings on decommissioned roads and in a young Douglas fir plantation. Approximately 15,840 linear feet of decommissioned road was planted with a mix of site-appropriate species. Based on an average road width of 10 feet, approximately 3.6 acres of decommissioned road was planted. Additionally, a 20-acre Douglas-fir plantation (approximately 30 years old) was planted with western red cedar seedlings. We evaluated the 2012 upland forest restoration thinning areas for planting and determined insufficient need based on current tree density and species composition. Upland forest restoration planting staff also supported plant acquisition and implementation on two riparian planting projects: the Walsh Ditch & Floodplain Reconnection Project and Webster Creek Riparian Planting.

We planted approximately 6,610 seedlings in upland restoration planting projects and 4,200 in riparian planting projects during the 2012 spring and fall planting seasons. Specific information about the seedlings, prescriptions, and planting costs is provided in the following subsections.

We used contract labor crews on all of the 2012 restoration planting projects. The crews that worked on the upland restoration planting projects (121.1 Road and 40 Road) were paid on an hourly basis, \$29.00/hour for a crew member and \$34.00/hour for a supervisor. A summary of project specific costs is provided in Table 1.

Table 1. Summary of 2012 Upland and Riparian Planting Project Expenses

Project	Number of Plants	Plant Cost	Labor Cost	Total Cost per Plant	Total Project Cost*
121.1 Road	4,610	\$3,176	\$1,700	\$1.06	\$4,877
40 Road	2,000	\$988	\$968	\$0.98	\$1,956
Walsh Ditch	4,001	\$7,300			
Webster Creek	198	\$844	\$2,975	\$19.29	\$3,819

*exclusive of SPU labor

2.1 Decommissioned 121.1 Road Project

The decommissioned road planting project was selected for planting for the following reasons:

- Lack of a diverse seed source in proximity to the decommissioned road surface. In the vicinity of the decommissioned 121.1 Road, the surrounding forest is young, with a dominant population of Douglas-fir. Native western white pine, western hemlock, noble fir, silver fir, and red alder also occur, but in limited quantity and distribution.
- Opportunity to improve species diversity and contribute to future habitat and function. The planting project re-introduced tree species and supplemented less common species to this decommissioned road bed.
- Opportunity to use developing seedlings to inhibit the spread of invasive plants. In portions of the decommissioned 121.1 Road, areas of invasive Scots Broom persist. Seedlings were planted adjacent to the Scots Broom concentrations at a relatively close spacing, with the goal that over time shade from these developing seedlings will limit the growth and spread of this invasive

species. Of the 3.6 acres of decommissioned roads that were planted in the spring of 2012, approximately one acre focused on invasive species.

Prescriptions

The 121.1 Road is at an approximate elevation of 2,700 feet, northeast of Chester Morse Lake (Figure 2). Six different species of trees were selected for restoration planting on the disturbed roadbed:

Bitter cherry (*Prunus emarginata*) was selected because of its ability to thrive on disturbed sites and because of its tendency towards being an early flowering species which may be beneficial to pollinators. Bitter cherry is found in forests of the CRMW, but is not abundant. It comprised 11% of seedlings planted.

Black Cottonwood (*Populus trichocarpa*) was selected because of its ability to thrive on disturbed sites (similar to bitter cherry). This project is the first time bare root black cottonwood has been planted in the CRMW. Black cottonwood is found infrequently in forests of the CRMW at all elevations, but is not abundant at this elevation. These plantings will be monitored for survival and growth and future use of bare root black cottonwood will depend on the success rate. It comprised 14% of seedlings planted.

Cascara (*Rhamnus purshiana*) was selected because of its tendency to thrive under a variety of conditions including dry and south facing slopes. When cascara reaches flowering maturity it is heavily used by insects, and a variety of birds forage on its fruit. It comprised 15% of seedlings planted.

Western white pine (blister rust resistant – *Pinus monticola*) was planted in the drier areas of the roadbed. Planting western white pine provides an opportunity to re-introduce this species on a small scale in a landscape where historical data indicates it previously existed. It comprised 22% of seedlings planted.

Noble fir (*Abies procera*) was planted to supplement the existing population. Noble fir is a minority tree species in the adjacent forest and is found sporadically across the landscape at varying elevations. The restoration planting program has had success planting noble fir on decommissioned road beds, where success is defined as >50% survival one year after planting. It comprised 8% of seedlings planted.

Shore pine (*Pinus contorta* var. *contorta*) was planted in the upland areas of the road bed. This pine occurs rarely in the forests of the CRMW and is appropriate as a minority forest tree species at this elevation. Shore pine is anticipated to be a hardy species – one that can survive under harsh growing conditions found on this site. It comprised 30% of seedlings planted.

Over 4,600 seedlings were planted in May, 2012 on the decommissioned 121.1 Road, for a total cost of \$4877, excluding SPU labor (Table 2)

Figure 2. Map of 121.1 Road decommissioning and planting project.

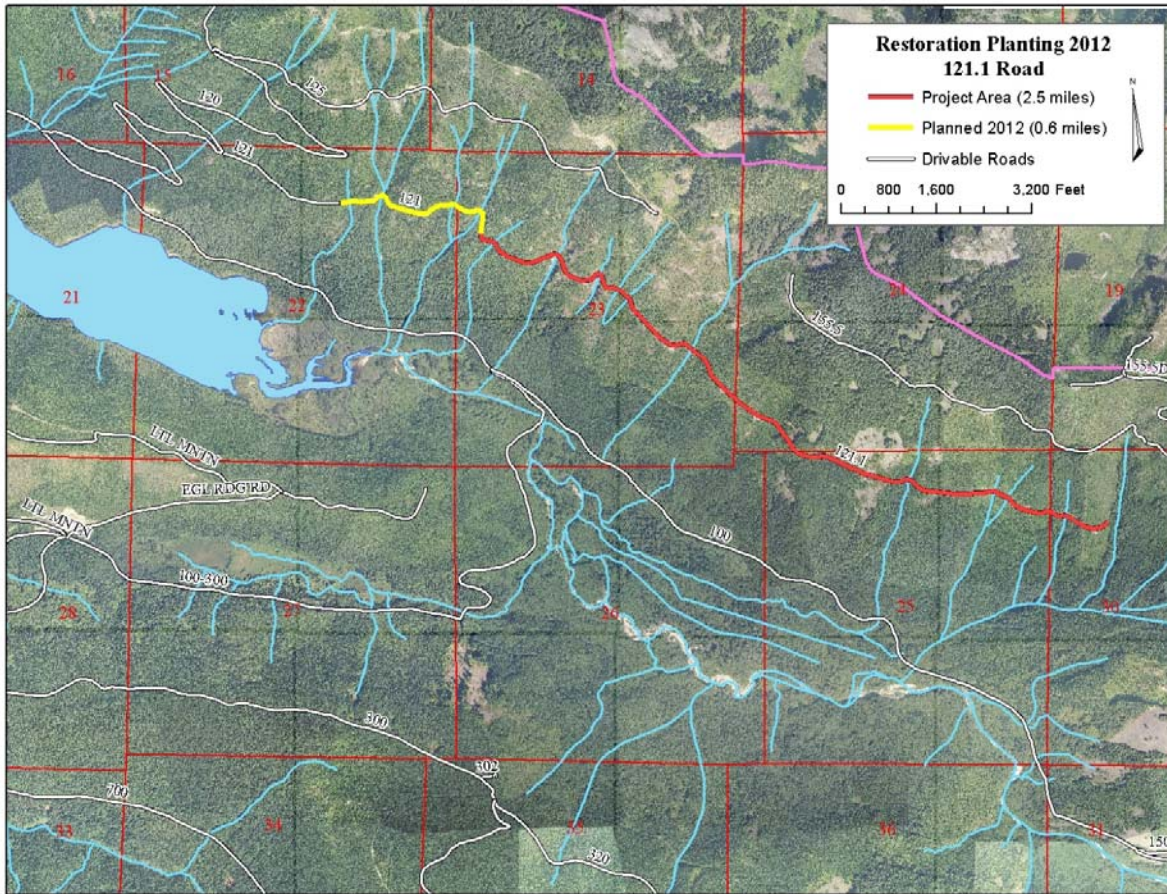


Table 2. 121.1 Road Project seedling and cost information

	Species	Number of Seedlings	Stock Type	Seedling Cost*	Seed Zone	Contracted Labor Cost
	Bitter cherry	490	Bare root 18"	\$487	Western Washington	
	Black cottonwood	650	Bare root 12"	\$647	Western Washington	
	Cascara	680	Bare root 18"	\$863	Western Washington	
	Western white pine	1,000	Plug+1	\$517	Western Washington	
	Lodge pole pine	1,400	2+0	\$378	Twin harbors	
	Noble fir	100	P+1	\$206	Lewis	
	Noble fir	290	2+0	\$78	Lewis	
Total		4,610		\$3,177		\$1,700

*sales tax and shipping charges (where applicable) included in seedling cost

2.2 40 Road Douglas-fir Plantation

The 40 Road red cedar planting project occurred in a characteristic Douglas-fir plantation that was pre-commercially thinned in 1995 to a 12-foot spacing. This project is located in the lower CRMW at an elevation of 800 feet (Figure 3).

This unit was selected as a good site for western red cedar planting for a variety of reasons:

- it is relatively wet
- it has sizable blown-down areas
- it has a thriving population of non-native blackberry
- the young (age: 30±) Douglas-fir have small diameters compared with their heights (poor height to diameter ratio)
- there is frequent top breakage as well as poor crown development

Planting cedar in this Douglas-fir plantation will assist in this forest's developmental trajectory in the following ways:

- promote a secondary species to occupy areas of anticipated future Douglas fir mortality
- introduce a tree species that can provide future canopy complexity
- provide shade in the long-term to invasive blackberries, ultimately minimizing their spread

Western red cedar (*Thuja plicata*) was planted because of its ability to survive in a variety of light conditions and wet to moist soil conditions, and is appropriate for this elevation. This tree species will also contribute to biodiversity and habitat development.

2,000 cedar seedlings were planted in December, 2012 for a total cost of \$1956 (Table 3)

Figure 3. Map of 40 Road Restoration Planting Unit

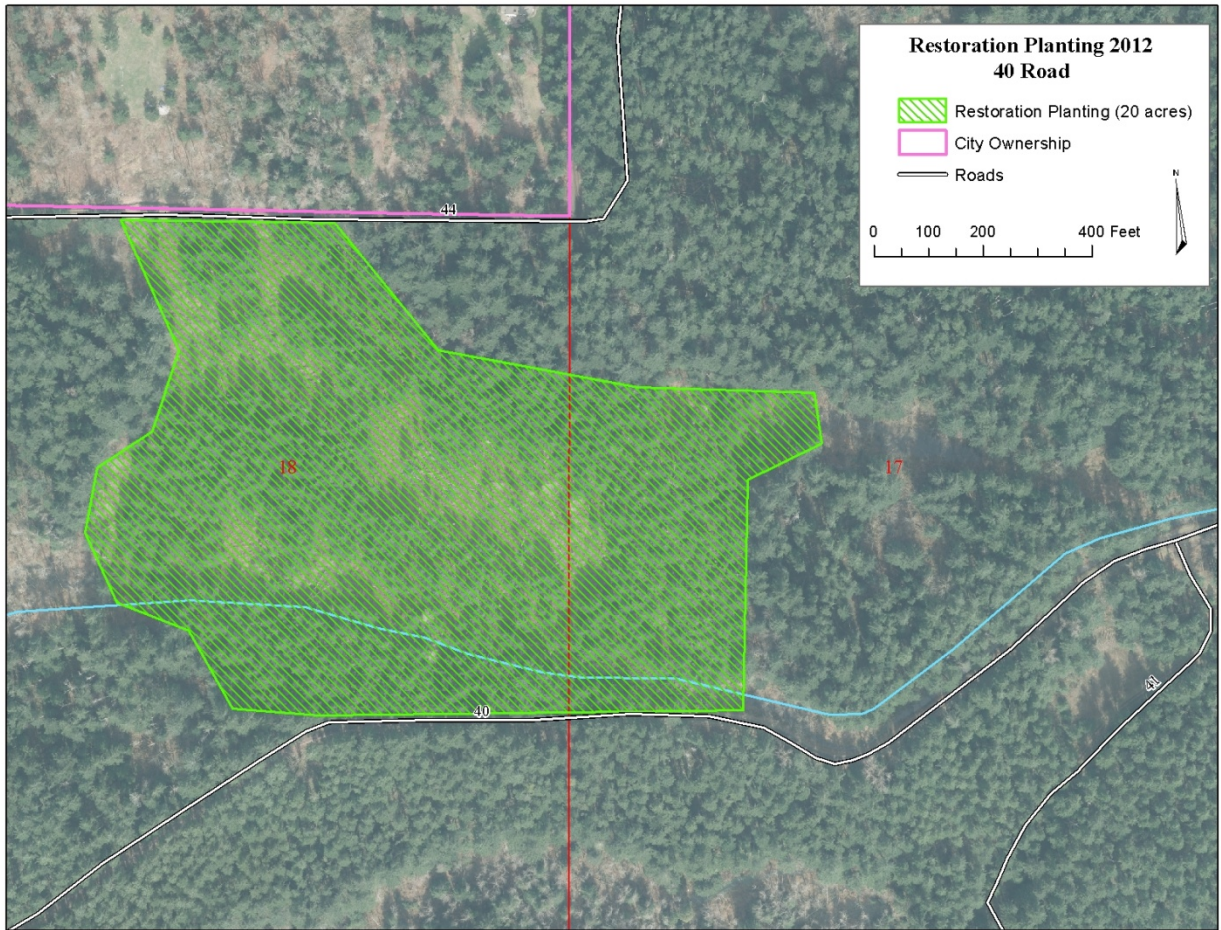


Table 3. 40 Road planting project, seedling and cost information

	Species	Number of Seedlings	Stock Type	Seedling Cost*	Seed Zone	Contracted Labor Cost
	Western red cedar	2,000	P+1	\$988	Puget Sound	
Total		2,000		\$988		\$968

*sales tax and shipping charges (where applicable) included in seedling cost

2.3 Walsh Ditch and Webster Creek Planting

Upland forest restoration planting staff supported the Walsh Ditch and Floodplain Restoration Project and the Webster Creek Riparian Project with plant acquisition and coordination. Both were installed in the fall of 2012. Information is provided in Table 4 about the seedlings and costs.

Table 4. Riparian planting projects seedling, and cost information

Project	Species	Number of Seedlings	Stock Type	Seedling Cost*
Walsh Ditch Project	Red-osier dogwood	896	Potted & stake	\$1,020
	Salmonberry	106	Potted	\$334
	Red elderberry	275	Potted	\$866
	Vine maple	275	Potted	\$866
	Pacific ninebark	275	Potted	\$866
	Sitka spruce	68	Potted	\$214
	Western red cedar	363	Potted & plug	\$761
	Douglas fir	295	Potted & plug	\$547
	Western hemlock	295	Potted & plug	\$547
	Bigleaf maple	295	Potted & plug	\$636
	Sitka willow	790	Stake	\$643
	Black cottonwood	68	stake	Collected @CRW by staff
Total		4,001		\$7,300
Webster Creek Riparian Project	Western red cedar	98	potted	\$529
	Sitka spruce	100	potted	\$315
Total		198		\$844

*sales tax included in seedling cost: 7.9% for Olympia; 8.6% for Enumclaw

2.4 Restoration Thinning

We evaluated the 450 acres that were restoration thinned in 2012 for the need to diversify the tree species in conjunction with the thinning. Based on the goals and objectives of the restoration planting program, there were no candidates for planting. Integrating restoration planting and restoration thinning will continue to be investigated in future years, where appropriate.

3.0 Looking Forward

Restoration planting is an “upland forest restoration cost and performance commitment” included in the CRMW Habitat Conservation Plan (HCP). Restoration planting installations will occur throughout the 50-year life of the HCP, unlike restoration thinning, which has a 15-year commitment in the HCP. The restoration planting cost commitment decreases over time, with a commitment of approximately \$10,000 annually through year 2015 and decreasing to approximately \$6,000 annually through year 2050 (Table 5).

Table 5. CRMW HCP Planting Cost Commitments*

Years	Total 50 year	1-10	11-15	16-20	21-30	31-40	41-50
Restoration planting	\$414,420	\$117,860	\$67,030	\$38,910	\$63,530	\$63,530	\$63,530
Per year	\$8,288.40	\$11,786	\$13,406	\$7,782	\$6,350	\$6,350	\$6,350

*from HCP 5.3-5 adjusted for inflation

3.1 Future Opportunities

There are many opportunities to continue restoration planting work in the CRMW:

- Continue evaluating restoration planting as a compliment to HCP road decommissioning, utilizing the restoration planting flow chart as a decision making tool.
- Continue evaluating and implementing restoration planting as a compliment to restoration and ecological thinning.
- Continue to utilize planting as a tool for minimizing invasive species expansion.
- Explore opportunities for contract growing and utilization of plant material using seed collected from the CRMW.
- Explore opportunities for contract growing and utilization of ‘double plugs’. Double plugs will be more robust (larger caliper, healthy root system) than a typical plug and also more expensive than a typical plug. Plug-grown stock provides more flexibility for fall planting. Additionally, larger plugs may provide higher survival rates for fall planting in the higher elevation areas and decommissioned roadbeds in the CRMW.
- Explore opportunities for enhancing mycorrhizae populations in disturbed areas with nearby native material, in conjunction with planting. Design a trial utilizing native mycorrhizae and purchased mycorrhizae in combination with planting. A good location may be a decommissioned road bed where the assumption is that beneficial mycorrhizae populations are minimal or absent.
- Continue western white pine blister rust resistant seedling relationship with US Forest Service Dorena nursery. Incorporate western white pine seedlings in annual planting installations where appropriate.
- Continue seedling survival surveys and evaluations. Supplement plantings where appropriate and utilize adaptive management principles in future installations.

Citations

LaBarge, A, R., Gersonde, S. Nickelson, B. Richards, D. Munro, C. Antieau. 2008. Upland Forest Habitat Restoration Strategic Plan. Seattle Public Utilities, Watershed Services Division, Ecosystem Section.