WEST MULTNOMAH
SOIL & WATER CONSERVATION DISTRICT

Name of Project: Lewis & Clark Restoration

Site Address: 0615 SW Palatine Hill Rd, Portland, OR 97219

Taxlot ID: 1S1E26CB -00100, 1S1E26CB -00200, 1S1E26CB -00300, 1S1E27 -00300, 1S1E27BD -02400, 1S1E27BD -02500, 1S1E27CA -00700, 1S1E27CA -01000, 1S1E27CA -01100, 1S1E27CA -01300, 1S1E27CA -01400, 1S1E27CA -01600, 1S1E27CA -02200, 1S1E27CB -01800, 1S1E27CB -01900, 1S1E27CD -00100, 1S1E27CD -00500, 1S1E27CD -01001, 1S1E27CD -01002, 1S1E27CD -01700, 1S1E27CD -04400, 1S1E27D -00100, 1S1E27D -00800, 1S1E28DA -00300, 1S1E28DA -04300, 1S1E28DA -04400, 1S1E28DA -04500, 1S1E28DA -04600, 1S1E28DD -00100, 1S1E28DD -00200, 1S1E28DD -00300, 1S1E34BA -00100, 1S1E35CC -03200, 1S1E34AB -04000, 1S1E34AB -04100, 1S1E34AB -04200

Landowner	**Name** Lewis & Clark College
Contacts	**Name** Amy Dvorak, Sustainability Manager, 0615 SW Palatine Hill Road, MSC 76, Portland OR 97219 | P 503.768.7794 | advorak@lclark.edu Gabe Bishop, Grounds Supervisor | P 503.768.7848 | gbishop@lclark.edu
WMSWCD Technical Contact	**Planner** Mary Logalbo, Urban Conservationist, West Multnomah SWCD 2701NW Vaughn St, Ste 450, Portland, OR 97210 503-238-4775, x103, mary@wmswcd.org

Objectives	• **Enhance wildlife habitat & protect biodiversity** • **Restore forest health and function** • **Engage students, faculty and community in natural area enhancement**

Residential:	**Livestock:**	**Other:**	**Invasive/Noxious Weeds:**
X Urban	__ Horses	X Forest	X Garlic Mustard
__ Suburban	__ Cattle	__ Pasture	X Knotweed
__ Rural	__ Sheep	__ Oak Habitat	X Ivy
	__ Other	X Stream Riparian	? Spurge laurel *(*believed to only be on neighboring property)*
Farming:		__ River Riparian	X Blackberry
__ Crop	**Erosion:**	__ Wetlands	__ Hawkweed
__ Produce	X Riverbank	__ Pond(s)	__ Yellow Archangel
__ Orchards	X Hillside/Slides	__ Drainage/Irrigation Ditches	__ False Brome
__ Nursery	__ Field/Soil Loss *Potential w/ removal	X Water Runoff	__ Pokeweed
		X Wildlife Habitat	x Other: Holly, Laurel, Norway Maple, Cherries, Clematis, Robert's & Shiny Geranium **Lunaria, Tansy Ragwort, Creeping Buttercup & St. Johnswort also found, but not addressed in plan.*

Project Area:

Total acreage:

~26 ac Phase 1 (Undergraduate Campus) + ~20 ac Phase 2 (Law Campus) + ~13 ac Phase 3 (Graduate Campus): **~59 Acres Total**

Lewis & Clark Restoratoin Projects

**Note: This plan may be done in phases or carried out all at once depending on available resources and landowner desires. Only the undergraduate campus (Phase 1) has been fully surveyed at this point (10/17/13) – the additional properties will be surveyed & the plan will be adapted accordingly by 11/15/13. The planting densities vary in different areas depending on need and potential for natural recruitment. The majority of invasives identified are throughout and general levels of infestations are alluded to in the plan. If there are distinct patches these have been highlighted and GPS points are available for precise locations.*

WEST MULTNOMAH
SOIL & WATER CONSERVATION DISTRICT

Recommended Practices	
~59 ac	**Invasive Plant Management: Throughout natural area**
~59 ac	**Native Planting: Throughout natural area**

Site Description	• **General Summary:** This plan addresses the natural areas owned and managed by Lewis & Clark. Phase 1 includes an approximately 26 acre area north of SW North Dr which abuts the recently attained 146 acre River View Natural Area (RVNA) which is being managed by Portland Parks & Recreation. The RVNA has significant ecological value – 7 streams, 130 plant species, 31 mammal species, and 74 avian species have been documented at this site. It comprises about half of the forest canopy in the 350-acre River View Subwatershed of the Lower Willamette Watershed. The target area is thick with extremely aggressive invasive plant species that threaten the forest systems health and the wildlife that depend on it. Phase 2 (which may be carried out simultaneously with Phase 1) includes ~20 acres adjacent to Tryon Creek State Park including headwater tributaries. There have been long standing efforts to restore the adjacent state park (http://www.tryonfriends.org/invasive-species-control-history-general-summary/) that this plan would complement. Tryon Creek State Park includes 650 wooded acres that provide refuge to a host of plants and animals and any efforts to enhance habitat at Lewis and Clark would greatly enhance wildlife corridors and habitat within this area. Phase 3 includes the natural area surrounding the graduate campus which could provide a substantial amount of wildlife habitat and value due to its habitat and its nearby location to important anchor habitats such as Tryon Creek State Park. Water quality could also be impacted if these invaders are not addressed - some of these invaders threaten to take down the mature trees that provide important stormwater treatment functions. This plan provides a series of steps to get the invasive plants in this area under control, a native planting plan and a maintenance schedule. The goal of this plan is to leave the natural area in a more healthy and functional state that is more maintainable for the landowner. To compliment this project and to engage the students, faculty and staff the District will support SOLVE's involvement financially (as resources are available) and with technical expertise. • **Acreage:** ~59 Total • **Drainage:** Riverview Subwatershed ("Streams 6&7", at least one is perennial) and Tryon Creek Watershed • **Topography:** Mostly steep with some moderate terrain close to parking lots (increase in steepness as you enter drainage areas) • **Soils:** Cascade silt loam, 3 to 30 percent slopes; Haploxerolls, steep; Urban land-Quafeno complex, 8 to 15 percent slopes; Cascade-Urban land complex, 0 to 8 percent slopes (See soil map for locations) **Soil info specific to Phase 1*. • **Elevation:** ~300-500'

	• **Dominant Plant Community:** Doug Fir/Hemlock and Maple Mixed Stand

Invasive Species Management Plan

Canopy Weeds

Species: Clematis (*Clematis vitalba)*, English/Irish Ivy (*Hedera spp)*

Infestation Location(s): Heavy-moderate throughout all campuses. Lightest in segments where efforts have been carried out (i.e. students under walking bridge at undergraduate campus, SOLVE site at Lewis & Clark and maple grove and swale area at graduate campus).

Treatment: Focus on tree removal first using the lifesaver (by hand) and air gapping (w/ herbicide treatment) methods. A full air gapping treatment, where climbing vines will be cut and then treated with herbicide, will be done throughout the entire project area to get ahead of the heavily infested trees. The most effective canopy weed mix we now utilize is made up of the following: [4% Accord Concentrate (glyphosate)] + [2% Garlon 3A (triclopyr amine)] + [2% Competitor (modified vegetable oil surfactant)].

Complimentary volunteer events (and facilities crews) can utilize the following manual methods (lifesaver rings) on any canopy weeds that are found growing back following treatments (wait at least a month after air gapping to access need) – this is ideally done when the soil is moist to minimize roots breaking off in dry soil:

1. Use either loppers or a pruning saw to cut through each vine clinging to the tree trunk at shoulder height and at ankle height. This severs the connection between the life sustaining roots and the rest of the ivy. Be sure to cut ALL vines as even one can continue to nourish ivy higher up the tree. Strip the Ivy away from the tree between the two cuts - some vines can be so big that you need to pry them away from the tree - just be careful not to damage the bark.
2. Imagine a 6-foot radius circle around the tree; begin by peeling back the Ivy mat 6 feet from the tree and thoroughly pull every vine and root from the circle. You may also find it helpful to cut "slices" in the ivy mat within your imaginary circle and rip out ivy like a piece of pie. If you are working on a slope, pull downhill and let gravity work with you. Research has shown that once Ivy has been pulled at least 6 feet away from a tree it will continue to grow away from the tree rather than towards it again. The keys to an effective Lifesaver are consistency and patience; all vines and roots must be removed.

The first part of the tree saver method, the girdling of canopy weeds (cutting at shoulder and ankle height), can be done any time of year. All ground canopy manual weed removal should be done in the late fall, winter and early spring when the ground is fully saturated to ensure that as many of the roots are removed as is possible. Foliar spray of ivy on hillside may be optimal due to erosion concerns. Foliar spray could also be used for the entire ground ivy infestation but hand removal has also been found to be quite effective for ground ivy (this is usually a matter of available volunteer resources as manual removal of ground ivy can be cost prohibitive). Foliar spray is optimal on clematis growth as these roots are harder to remove effectively by hand due to their deeper tap roots unless the infestation is caught early. The most effective canopy weed mix we now utilize is made up of the following: [4% Accord Concentrate (glyphosate)] + [2% Garlon 3A (triclopyr amine)]+ [2% Competitor (modified vegetable oil surfactant)].

Invasive Trees

Species: English & Portuguese Laurel & Invasive Cherries (*Prunus spp*), Hawthorn (*Crataegus monogyna*), Holly (*Ilex aquifolium*), Norway Maple (Acer platanoides):

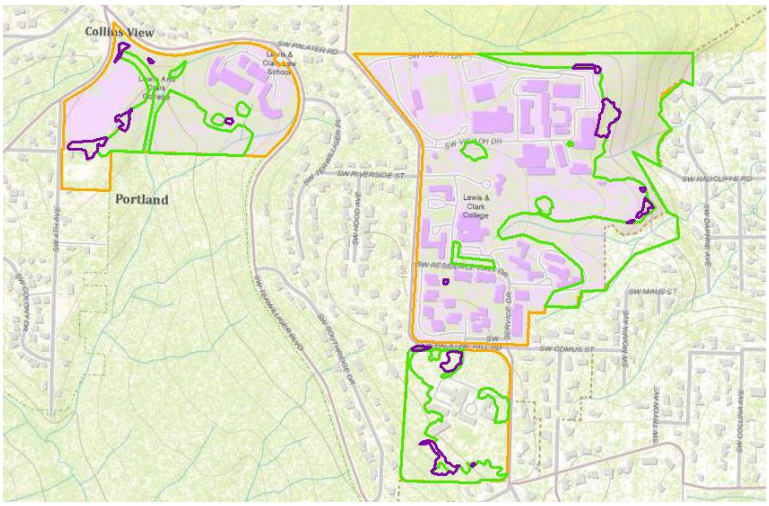
Infestation Location(s): Heavy to moderate throughout all campuses. Lightest in segments where efforts have been carried out (i.e. SOLVE site at Lewis & Clark and maple grove and swale area at graduate campus).

Treatment: Due to the degree of infestation an initial cut stump herbicide treatment (w/ 50% Garlon 3A (triclopyr amine)] is suggested for weedy trees throughout the natural area. All small saplings will be pulled up by hand done in the late fall, winter and early spring when the ground is fully saturated to ensure that as many

of the roots are removed as is possible. For medium sized trees, weed wrenches can be used to pry them out. If the tree is too large for removal with a weed wrench the trees will need to be chainsawed down and stems will need to be painted with an herbicide (cut stump) or hack and squirt treated or the suckers will need to be continuously cut and removed very frequently. Other options include using a stump grinder if opposed to painting herbicide on stems, this option would be very labor intensive methods given the terrain and degree of infestation.

Invasive Shrubs

Species: Armenian Blackberry (*Rubus armeniacus or Rubus discolor*), Spurge Laurel *(Daphne laureola)*:



Infestation Location(s): Heavy to low throughout all campuses. Infestations have been mapped through a student project in 2013 (Micah Leinbach, Map & Data Source) which found 2.8 acres, but due to the sampling techniques (i.e. only along paths) I am estimating ~4 acres of infestation from what I have observed. Some of the most heavily infested areas are on edge habitat (either or road or trail), so the student likely did capture most of the main infestations. Purple polygons display found blackberry patches.

Blackberry shrubs should be mowed down late summer (after the primary nesting season, August 1st on) using weed whackers with steel blades. Canes will be left onsite as mulch. Blackberry rootwads will then need to be dug up in the late fall, winter and early spring when the ground is fully saturated to ensure that as many of the roots are removed as is possible. Blackberry regrowth could also be foliar sprayed in lieu of digging up root wads. The spraying of blackberry may be optimal when riverbanks and/or steep slopes will be disturbed so that erosion/sedimentation is minimized. The majority of blackberry is found on the edge and next to the parking lot.

Spurge Laurel can be manually removed using a weed wrench or shovel prior to going to seed when the soil is moist (i.e. January – March) or it can be foliar treated with herbicide (ideal on steep slopes or very large infestations) with [2% Accord Concentrate (glyphosate)] OR [2% Garlon 3A (triclopyr amine)]+ [2% Competitor (modified vegetable oil surfactant)]. Cut stump treatment is also an option for spurge laurel.

Invasive Forbs

Species: Garlic Mustard (*Alliaria petiolata*), Knotweed (*Polygonum x bohemicum*), Robert's Geranium (*Geranium robertianum*) and Shiny Geranium (Geranium lucidum):

Infestation Location(s): Moderate to low throughout campuses. Only one small knotweed patch (~20x80ft) was found on the undergraduate campus off the North Street drive diagonal from the tennis courts entering an eroding drainage in the natural area. Garlic Mustard is heavy to light along trails, roadways and waterways in the undergraduate campus natural area. The geraniums were found to varying degrees in the landscaped edges, along roadways and paths throughout all campuses.

Treatment: Knotweed may be treated with foliar spray 2% Aquatic Formulation (glyphosate)] + 2% Competitor (modified vegetable oil surfactant)] – manual removal (aside from new small patches) is not recommended for

this species as it spreads vegetatively (especially via rhizomes) and often respond positively to attempts at manual removal (especially mowing). The geraniums and garlic mustard on site should be hand pulled or foliar sprayed early spring prior to species going to seed (January – March). If plants are close to going to seed when pulled they should be disposed of in the garbage. Foliar spray with [2% Accord Concentrate (glyphosate)] + 2% Competitor (modified vegetable oil surfactant)] is another option for the invasive forbs.

Native Planting Plan

Native Plantings Following Invasives Removal (~59 Acres, Species: Native Trees, Shrubs & Forbs, ~71390 stems total): Areas where invasives are removed and bare soil is exposed will be planted, as is needed, with a diversity of native trees, shrubs and forbs suitable to the site. The spacing will vary depending on existing vegetation on site. An estimate of 71390 stems will be needed (59 acres at 6 ft. spacing at 1210 stems/ac). All of the listed species in are suitable for the site (pending specific site conditions) and a ratio of approximately ¼ tree cover (17850 trees) by ¾ shrub (53540 shrubs/ground cover) should be utilized, some mortality is assumed when planting at this density:

Type	Common Name	Latin Name	Exposure	Moisture	Height (ft)
Tree	grand fir	Abies grandis	sun - shade	dry - moist	250
Tree	bigleaf maple	Acer macrophyllum	sun - shade	dry - moist	100
Tree	Douglas-fir	Pseudotsuga menziesii	sun - part shade	dry - moist	250
Tree	Western hemlock	Tsuga heterophylla	part shade - shade	moist - wet	225
Tree	vine maple	Acer circinatum	part shade - shade	dry - moist	25
Shrub	salal	Gaultheria shallon	part shade - shade	dry - moist	5
Shrub	nootka rose	Rosa nutkana	sun - part shade	moist - wet	10
Shrub	salmonberry	Rubus spectabilis	sun - shade	moist - wet	10
Shrub	red elderberry	Sambucus racemosa	sun - shade	dry - moist	15
Shrub	snowberry	Symphoricarpos albus	sun - shade	dry - moist	5
Shrub	evergreen huckleberry	Vaccinium ovatum	part shade - shade	dry - moist	6
Shrub	serviceberry; juneberry	Amelanchier alnifolia	sun - shade	dry - moist	20
Shrub	low Oregon grape	Mahonia nervosa	part shade - shade	dry - moist	3
Shrub	indian plum	Oemlaria cerasiformis	part shade - shade	dry - moist	15
Shrub	Pacific ninebark	Physocarpus capitatus	sun - shade	moist - wet	13
Shrub	bald hip rose	Rosa gymnocarpa	sun - shade	dry - wet	4
Shrub	red huckleberry	Vaccinium parvifoliumpart	shade - shade	dry - moist	10
Groundcover	lady fern	Athyrium filix-femina	sun - shade	moist - wet	4
Groundcover	deer fern	Blechnum spicant	part shade - shade	dry - wet	2
Groundcover	Pacific waterleaf	Hydrophyllum tenuipes	part shade - shade	moist - wet	0.5
Groundcover	sword fern	Polystichum munitum	part shade - shade	dry - moist	3
Groundcover	piggyback plant	Tolmiea menziesii	part shade - shade	dry - moist	1
Groundcover	wild ginger	Asarum caudatum	part shade - shade	moist 0.5	
Groundcover	bunchberry	Cornus unalaschkensispart	shade - shade	moist - wet	1
Groundcover	fringecup	Tellima grandiflora	part shade - shade	moist 1	
Groundcover	inside-out flower	Vancouveria hexandra	part shade - shade	dry - moist	1

WEST MULTNOMAH
SOIL & WATER CONSERVATION DISTRICT

General Project Timeline

Fall 2013	• Contractor: Air gapping of canopy weeds w/o herbicide (note, this is the choice of L&C, WMSWCD has recommended air gapping and cut stump treatment of weedy trees at this time).
Winter 2013/2014	• Volunteer: hand pull/removal of ground ivy and plan specified invasive forbs.
Spring 2014	• Volunteer: lifesaver rings of ivy from trees and hand pull removal of ground ivy. Contractor: Foliar spray of target invasive forbs.
Summer 2014	• WMSWCD: Monitoring • Contractor: Weed whack blackberry patches (after August 1st).
Fall 2014	• Contractor: Air gapping of canopy weeds, cut stump treatment of weedy trees, foliar treatment of knotweed. • Volunteer: lifesaver rings around desirable natives.
Winter 2014/2015	• Volunteer: Potential small planting of natives in steep forested areas and edge where invasives are thoroughly hand removed by volunteers and slope is of concern.
Spring 2015	• Contractor & Volunteers: Weeding around newly planted natives and retreat invasives as needed (this will include forb treatments and a ground ivy/clematis treatment).
Summer 2015	• WMSWCD: Monitoring • Landowner & Volunteers: Watering new plantings, if feasible.
Fall 2015	• Contractor & Volunteers: Retreat invasives as needed (this will include a canopy weed treatment, knotweed treatment and blackberry treatment).
Winter 2015/2016	• Volunteer: Potential small planting of natives in steep forested areas and edge where invasives are thoroughly hand removed by volunteers and slope is of concern.
Spring 2016	• Volunteers & Contractors: Weeding around newly planted natives and retreat invasives as needed.
Summer 2016	• WMSWCD: Monitoring • Landowner & Volunteers: Watering any new plantings as is feasible.
Fall 2016	• Contractors & Volunteers: Retreat invasives as needed (this will include a canopy weed treatment, knotweed treatment and blackberry treatment).
Winter 2016/2017	• Contractors: Major planting throughout natural areas.
Spring 2017	• Contractors & Volunteers: Targeted weeding around newly installed natives (hand pulling and circle sprays as is needed).
Summer 2017	• WMSWCD: Monitoring • Landowner & Volunteers: Watering new plantings on edges of properties and in sunny areas as is feasible.
Fall 2017 and beyond	• Landowner & Volunteers: Retreat invasives and replant natives as needed. Landowners to continue summer monitoring and targeted planting care.

2701 NW VAUGHN STREET, SUITE 450 ♦ PORTLAND, OR 97210
P: 503.238.4775 ♦ F: 503.326.3942
WWW.WMSWCD.ORG

_____	_____	_____
Name of landowner	**Signature of landowner**	**Date**
_____	_____	_____
Name of project manager	**Signature of project manager**	**Date**

Please direct questions/comments to:

Mary Logalbo
West Multnomah Soil & Water Conservation District
2701 NW Vaughn St., Ste. 450
Portland, OR 97210
Phone: (503) 238-4775 x103
Fax to: (503) 326-3942
Email: mary@wmswcd.org

Thank you for partnering with WMSWCD to conserve and protect soil & water resources for people, wildlife and the environment in Multnomah County and beyond!