

# **A Vegetation Survey of the Oak Creek Riparian Zone at the Oak Creek Center for Urban Horticulture**

An Undergraduate Thesis in Horticulture

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## **ABSTRACT**

A project to restore and increase the native riparian habitat on a 1 ½ acre site along Oak Creek will begin in spring 2013. In order to carry out long-term monitoring and evaluation of the efficacy of the restoration effort, it is necessary to know what is growing there now. To that end I have conducted a multi-part inventory of the current vegetation, to establish baselines of species diversity and coverage, canopy cover, and percentage of native and invasive species against which to measure progress.

The current vegetation is a mix of native species and exotics. The tree canopy is a narrow strip along the creek banks, and there are not very many trees in it, but those present are primarily native species. This survey confirms that there is a growing problem with several Class B Noxious weeds that are likely to take over the understory if not checked. These results demonstrate a clear need for a restoration and management plan focused on increasing the native understory cover and on increasing the width of the overstory canopy. This plan should be combined with a strong, long-term institutional commitment to keep the invasive species under control. In addition there are possibilities for expanding the restored area through collaboration with other OSU departments that manage nearby stretches of Oak Creek.

# INTRODUCTION

## Background

In Benton County, Oregon, Oak Creek originates in the McDonald-Dunn forest in the Coast Range foothills west of Corvallis, and runs approximately 15 kilometers through forest, farmland, and town before merging with the Marys River on the south side of Corvallis. The total basin occupies around 3,360 hectares<sup>2</sup> (8302 acres<sup>2</sup>) (Brookes et al, 2012). Much of the current combination of open meadows and narrow riparian canopies which is typical of this and other streams in the area was established by Native American burning activities.

Along its way, Oak Creek marks the west and south boundaries of the Oak Creek Center for Urban Horticulture (OCCUH) on the Oregon State University campus (Figure 1). Prior to 1940 this area was a wet prairie system that was marshy and prone to flooding, with a riparian buffer of varying width. From the 1950's or '60s to the present it has been utilized by various OSU departments. The Entomology department used it to conduct insecticide testing on fruit and nut trees, and currently the Horticulture department maintains the property as a moderately developed urban landscape and an active outdoor classroom for many OSU students (Brookes et al, 2010).

In common with much of the Oak Creek urban interface, this reach has substantial populations of native plants, but parts are being overrun by invasive species, especially at the ground and understory level. Some of the most threatening are English Ivy (*Hedera helix*), Himalayan blackberry (*Rubus discolor*), and False Brome (*Brachypodium sylvaticum*) (Brookes, et al, 2010). In some places one or more of these plants are so dense that little else is growing.

In spring 2013 a restoration project will be started on approximately 1.5 acres of the OCCUH, encompassing the riparian zone of Oak Creek as it passes along the west and south sides (Figure 1). Mechanical and chemical means will be used to remove the invasive species, and native trees and shrubs will be planted (Lambrinos, 2012). This being a university site, the entire process will be an opportunity for academic and community education and outreach. The most effective procedures for, and long-term outcomes of such restoration projects are still being studied and debated, so restoration work done here could have much wider applications, and serve as a template for other projects (Azarenko, personal communication April 2012).

## Goals

My goal in this study was to document what is currently growing on the restoration site, to serve as a baseline for evaluating the success (or failure) of the restoration effort. In addition, I planned to set up monitoring protocols and locations, so that similar data can be collected in the future. The restoration project is to be monitored regularly for at least five years, relative to benchmarks such as the control of invasive species, success of the native species, and canopy cover (Lambrinos, 2012). Hopefully research and monitoring will continue for many years thereafter.



Figure 1: Location map of OCCUH in SW part of Corvallis with inset showing boundaries of proposed restoration area on OCCUH site.

## METHODOLOGY

For purposes of this study “native” species are defined as those generally considered native to the western portions of Oregon and Washington. My ultimate authority for questionable species was “Flora of the Pacific Northwest” (Hitchcock 1973), although I used a variety of resources, listed in the Resources section.

I collected information on the plants occurring in the target area in three different ways.

### Seed Bank Study.

On May 11, 2012, as part of a project for a Plant Ecology class taught by Dr. Peter McEvoy, I took 24 soil cores approximately 5” (12.7cm) deep at the restoration site, in order to investigate what plants might be present in the seed bank. Using an aerial photo of the OCCUH with the restoration site outlined on it as a guide, I laid out a temporary east-west transect 120’ (36.6 m) long (transect A) to define the northern edge of the site. I extended the line for the transect from the north edge of the roof gardens on the site, since they are in line with the north edge of the restoration area. Then I measured 100’ (30.5m) south for transect B, which was 100’ (30.5m) long and parallel to transect A. Because the site curves to the east, for transect C I

measured south another 100' (30.5m), and east 20' (6.1m), and for transect D south another 100' (30.5m) and east 20' (6.1m). These transects were each 100' (30.5m) long as well (Figure 2).



Figure 2: Soil seed bank samples were taken along four transects (shown in orange) in the north part of the OCCUH restoration site. Transects were labeled A through D. Sample locations are labeled with number of feet from east end of transect, and marked with a red line.

I used a random-number generator to choose six sampling points along each transect, for a total of 24 samples, and used a bulb planter to take soil samples as close as possible to each point. In some cases I had to make adjustments due to blocking vegetation. After taking each sample, I stored it in a labeled Ziploc bag in the shade.

In the greenhouse, I set up six 14" (35.6cm) square flats with shade cloth in the bottom to prevent soil leakage, and dividers to make four sections, for a total of 24 sections. I put in 3" of sterile potting mix, then spread one sample into each section, labeled according to the transect and distance (in meters) from the creek, i.e. A17, B15, and so on. Some samples were very damp and heavy, and didn't spread out well.

On May 18, 2012 I began noting germination. I marked each sprout with a color-coded toothpick, and recorded them twice a week. I took photos at several stages, and in some cases revised the color coding as they matured and identification became easier. I used several printed, internet and human resources to make provisional identifications (see Plant Identification Resources), and revised the identifications as needed as the plants grew larger. There was little or no additional germination after the first five weeks. As plants grew, I moved representative

specimens into individual pots to grow on to a size sufficient for identification, and continued to maintain them throughout the summer. When I was satisfied with the identification, most were composted to keep them from producing weedy seeds, but I retained a few into the fall for further study, or because they were desirable species that might be planted back on the site.

## **Understory Vegetation Survey**

In early July, 2012, I installed a set of six permanent transects roughly perpendicular to Oak Creek, spaced approximately 100 feet apart. I marked them with rebar poles inserted at the creek edge, and at 50' (15.24 m) and 100' (30.48 m) away from the creek centerline where possible. In the field, they are set in tubing so they can be removed to accommodate mowing. I wrapped the top foot or so of each with flagging tape for visibility, and later added orange plastic caps, which will be more permanent.

On the west side of the creek, the bank is very steep up to the road, so I only set one rebar marker at the creek edge. On the south side, the property is not part of OCCUH and is maintained as horse pasture, so I set one marker at the creek edge, and one in the unmowed area 50' (15.24 m) or less from the centerline. I labeled the transects 1N and 1S, 2N and 2S, 3E and 3S (the transect angles from NE to SW), 4E and 4W, 5E and 5W, and 6E and 6W, according to their directional orientation and relation to the creek (Figure 5). Transects 3E and 4E coincided with two of the seed bank transects, D and C respectively. (See Appendix A for placement details).

Beginning as close as possible to the edge of the creek, I then placed a ½ meter square quadrat at two meter intervals along each transect, and inventoried the plants growing in each quadrat. Unless otherwise noted, I placed the quadrats on the upstream side of the transect. The quadrat was divided by nylon line into 25 squares, and I used those to estimate percentage cover of each type of plant. I also used a densiometer to gauge the percent cover of the tree canopy, if any. I recorded all of this on a chart (Appendix B), organized by quadrat, which I later transferred into an Excel file for processing. I inventoried a total of 134 quadrats.

I took at least one reference photograph of each quadrat, with close-ups of interesting or unidentified species. I also took several area photos at key sections of each transect, to show the current vegetation in the area. Many of the plants were easily identifiable, but for those that weren't I took voucher specimens to press, as well as photos. In some cases I took small rooted pieces to grow on in a pot for identification. I used similar resources to the seed bank study to identify any plants I was unfamiliar with or unsure of, but several identifications remain provisional, or to Genus only, and a few plants are still unidentified.

## **Tree Inventory**

There is a substantial canopy of mature trees within approximately 50' (15.24 m) of the banks of Oak Creek. Many are large, native species and are likely to be retained during the restoration project. As part of the collection of baseline data I conducted an inventory of all trees on the OCCUH site measuring over 1" (2.54cm) DBH. The total area I surveyed covered approx. 2 acres, from the SE corner of the property along the creek to the 35<sup>th</sup> St. entrance driveway on the west side. It included trees north of the restoration site (Figure 1) to the OCCUH entrance. Using a GPS device, I located each one, numbering them 1N, 2N, 3E, 6W, and so on, according to the order I took them in and the side of the creek they were located on. In general, I began at the north end of the east side of Oak Creek and worked south and east, then restarted the numbering at the

north end of the west side and worked south and east. There were some variances where I had to go back to catch trees I had overlooked, or mis-entered. I estimated the height of each tree, sometimes quite roughly, since in many cases I couldn't see the top of the tree from the base, and from further away I couldn't pick out the top of the tree from others. The height estimates are fairly accurate in relation to the other trees in the area, but may not be so accurate in actual distance.

I also measured (where I could get to the tree) or estimated the Circumference for each tree, then converted it to DBH. In the data set, round numbers (20", 60") usually indicate an estimate, while exact numbers (27", 86") indicate I was able to take an actual measurement. For both the height and DBH I used inches and feet, since I can more accurately estimate those visually than metric distances. In most cases I was able to identify the tree to species.

## RESULTS AND DISCUSSION

### Seed Bank Study

As of October 2012, I had identified with some certainty 31 plants, with 6 remaining unidentified (three grasses and three forbs). Of those identified, six were native, the rest introduced and/or invasive. The native plants were *Epilobium ciliatum*, *Fraxinus latifolius*, *Galium trifidum*, *Matricaria discoidea*, *Oenanthe sarmentosa*, and *Salix sitchensis*. Of the non-native species, four were Class B noxious weeds (*Rubus discolor*, *Cirsium arvense*, *Cirsium vulgare*, *Hypericum perforatum* (Oregon State Noxious Weed list).

I was surprised to find a specimen of *Oenanthe sarmentosa* (Water Parsley) in a sample taken from 100' away from the creek on transect C, in the middle of the mowed field. I did not see any live specimens growing elsewhere. This is an indication of what surprises could await in a lengthier and more comprehensive seed bank study.

Conversely, one soil sample, taken at 96' from the creek on transect B, under a pile of woody debris, produced no seedling germination whatsoever, possibly indicating some contamination of the soil.

Because the samples were taken in spring and the time available for germination was short, it is likely that the plants which sprouted are weighted towards fast-germinating and spring-germinating plants, and may under-represent those that take a longer time, or need stratification. There could well be seed of more native species in the soil, which would have germinated during a longer study. For instance, *Heracleum lanatum* is well represented in the standing vegetation, and scatters seed freely, but none showed up in this study. Other species, such as invasive *Hedera helix* and *Rubus discolor*, were not well represented in the seed bank, although they, too, are common in the understory.

### Understory Vegetation Survey

I was able to provisionally identify about 60 species in the quadrats, with several more unidentified, including several grasses. Coverage by individual species in a quadrat ranged from under 1% to 100%. It is worth noting that 50 species were present in one or more quadrats at a coverage rate of under 10%, while only five species were present in any quadrat at a coverage rate of over 90%. These five species were Moss, a common ground-level inhabitant; various Grass species growing in the mowed meadow area (I lumped them together because few were

easily identifiable); and the invasive species *Brachypodium sylvaticum*, *Rubus discolor*, and *Hedera helix*. A total of 45 quadrats, or 34% of the total quadrats inventoried, had a species present at >90% coverage.

These near-monocultures of invasive species occurred more frequently under the tree canopy. There were 16 quadrats with 90%-plus coverage by a single plant where the canopy was less than 50%, and 29 quadrats where the canopy was over 50% (Table 1).

*Rubus discolor* occurred in more locations than any other species, in un-mowed areas in the meadow as well as in the forest. It was present in 74 (55%) of all quadrats, but seldom reached 90% coverage. The second most common species was *Brachypodium sylvaticum*. It was common in the forested area, but in the meadow area it was difficult to determine its presence because of mowing.

Table 1. Three primary invasive species were present at >90% coverage in 45 (34%) of all quadrats. Of those, 24% were >90% covered by *Brachypodium* and 13% were >90% covered by *Hedera*.

Species	% of quadrats	<i>Rubus discolor</i>	<i>Brachypodium sylvaticum</i>	<i>Hedera helix</i>
>90% coverage, Under <50% Canopy	36% open (16 of 45)	4%	4%	0
>90% coverage, Under >50% Canopy	64% shade (29 of 45)	6%	24%	13%

Of the 60+ species I identified, only 11 (18%) were Pacific NW natives, while 82% were non-native. There were five native trees present as seedlings or saplings, and 6 other native shrubs or forbs. Of those, only *Acer macrophyllum* (four occurrences), *Fraxinus latifolia* (six occurrences), *Heracleum lanatum* (19 occurrences), and *Symphoricarpos albus* (14 occurrences) were at all common or abundant. The other natives (*Alnus rhombifolia*, *Alnus rubra*, *Epilobium ciliatum*, *Mahonia aquifolium*, *Polystichum munitum*, *Quercus garryana* and *Tellima grandiflora*) appeared only 1-3 times each. *Alnus rubra*, however, is a common overstory tree (see Tree Inventory section).

Of the non-natives, nine or ten were Class B Noxious Weeds. They included *Convolvulus arvensis*, *Hedera helix*, *Brachypodium sylvaticum*, *Cirsium arvense*, *Cirsium vulgare*, *Rubus discolor*, *Conium maculatum*, *Hypericum perforatum*, *Lathyrus latifolius*, and possibly *Senecio jacobaea* (this was a very small plant that had been repeatedly mowed, so identification was uncertain).

Of all of the plants counted, forty-five (75%) appeared in fewer than five (of 134) quadrats. The three that appeared in more than 50 quadrats were *Rubus discolor*, various Grass sp., and *Brachypodium sylvaticum* (Figure 3).

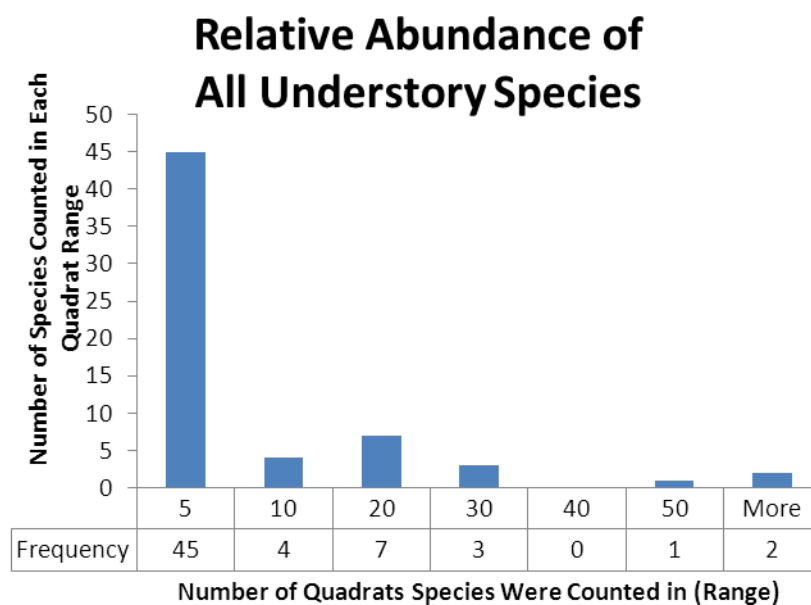


Figure 3: All inventoried species grouped by the number of quadrats they occurred in.

## Tree Inventory

I counted a total of 195 individuals in the target area, representing 18 different species. Of these, 65 individuals were *Fraxinus latifolia*, a pioneering native species, 33 were *Acer macrophyllum*, with lesser numbers of the others. Seventy four percent of the individual trees were native. These were distributed among ten species (55% of the total species). Twenty four percent of the individuals were non-native. These were distributed among eight species (44% of the total species). Five individuals were unidentified (Figure 4). Figure 5 shows the location and distribution of various species on the site.

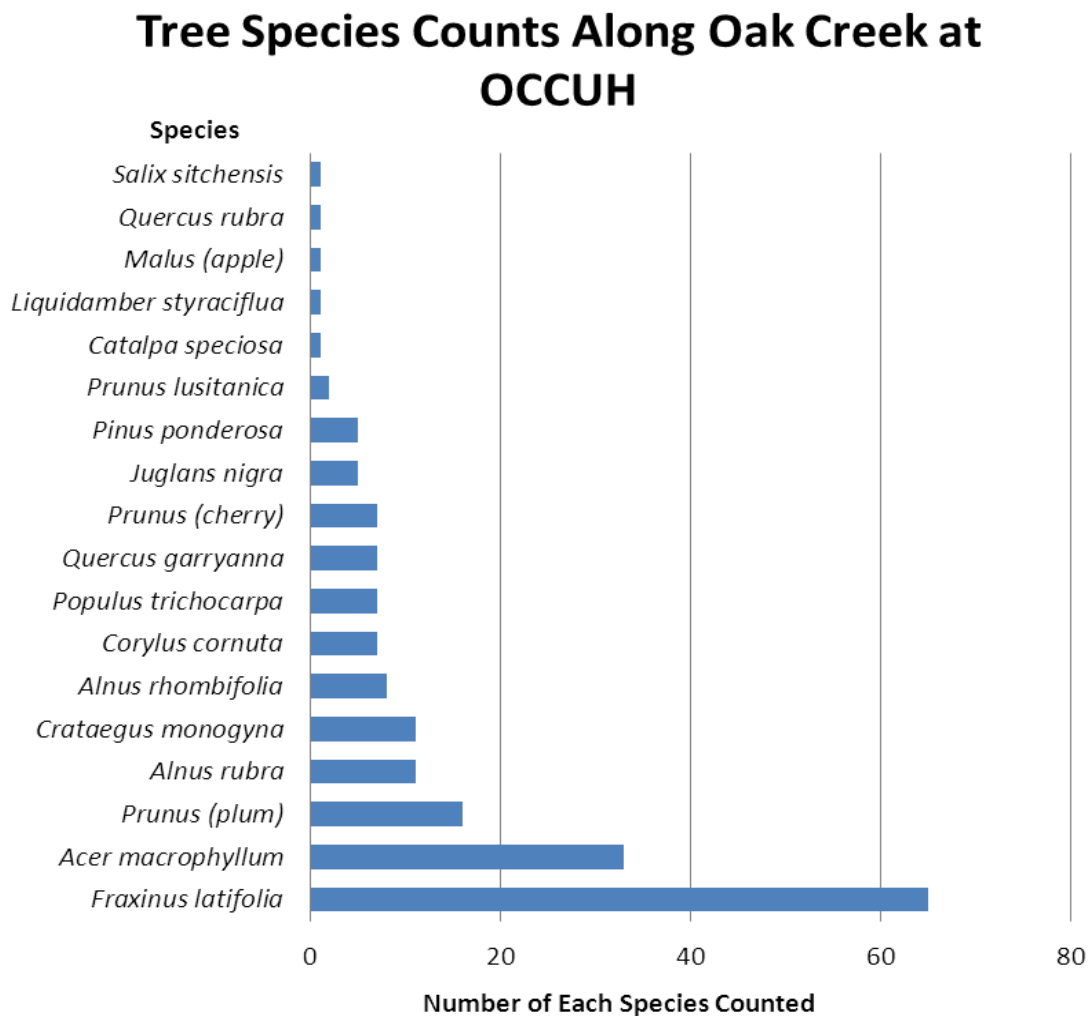


Figure 4: Number of individuals of each tree species counted.

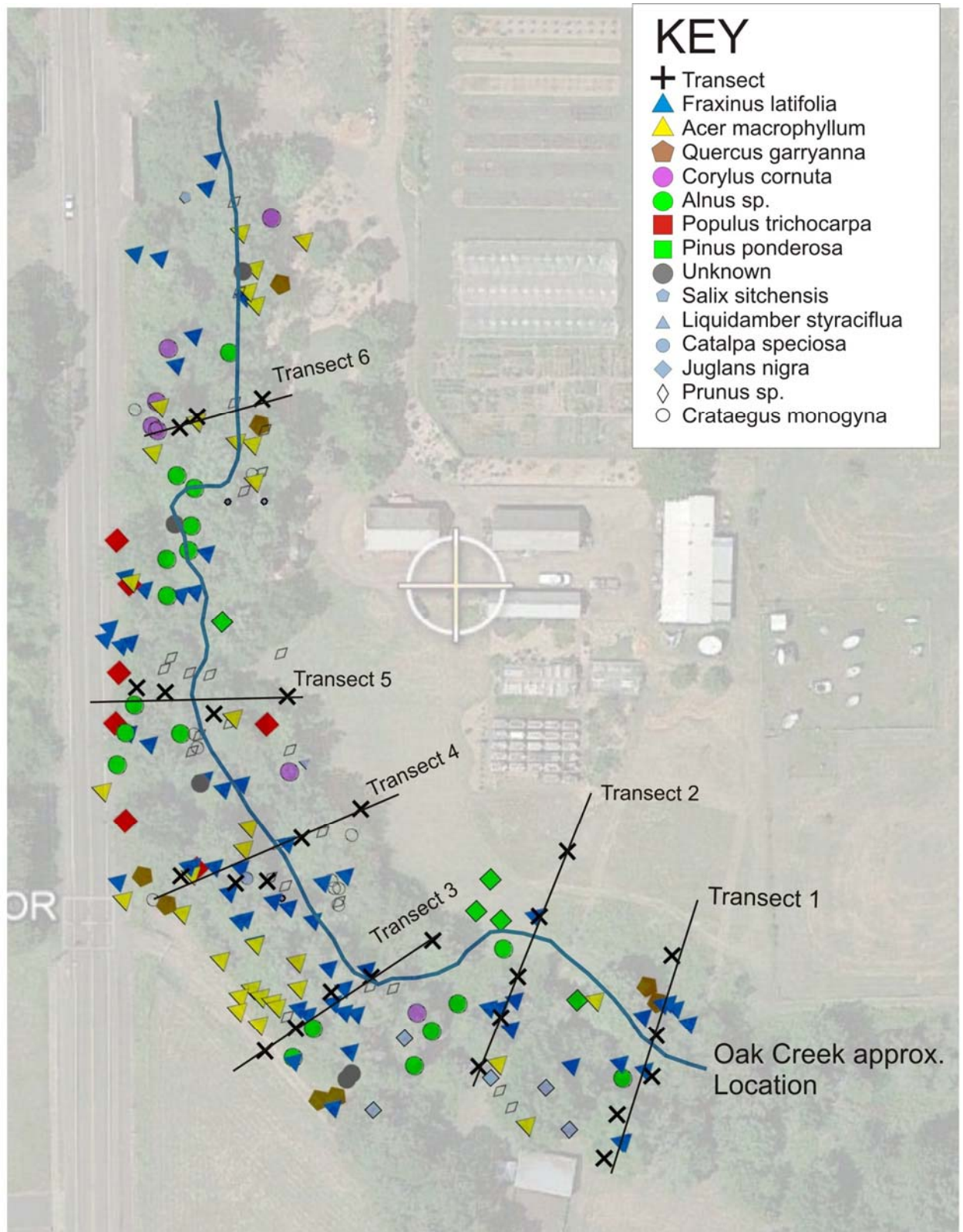


Figure 5: Locations of trees inventoried at OCCUH, Summer 2012, along with transects for vegetation survey.

### Diameter at Breast Height (DBH) Distribution

I measured both DBH and Height of each tree, but since height is seldom a good indicator of mass or age, I will only deal with DBH here. Forty-five percent of the trees had a DBH under 6". Of those, 70% were native trees. This is a typical ratio throughout the size range – natives consistently outnumbered the introduced species. Older, larger trees constituted a much smaller percentage of the population, a common characteristic of natural forests (Figure 6).

### Tree DBH Along Oak Creek at OCCUH

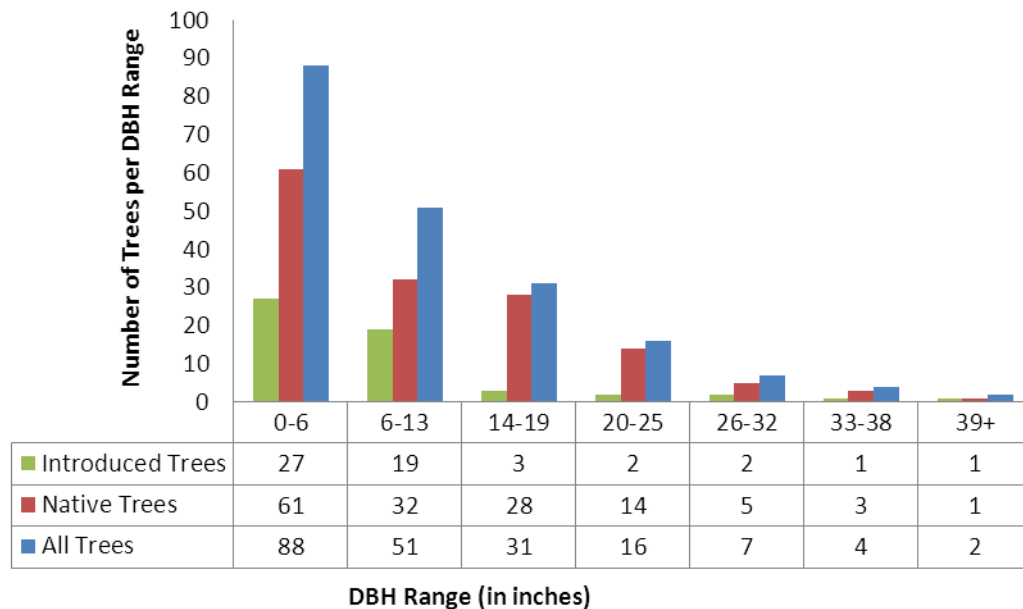


Figure 6: Comparison between DBH of native species, introduced species, and all species inventoried.

### English Ivy Coverage

*Hedera helix* (English Ivy) is one of the invasive species infesting some areas of the Oak Creek reach. Estimates of its coverage on the trees I inventoried indicate that, in most locations, it is at low levels and has not climbed very high (Fig 7). This appears to be due to the ivy having been recently cut back at the base of several of the trees. There are a few locations, though, where it is well on its way to engulfing whole trees, and a substantial part of the stream bank around transect 5E is an ivy monoculture (see Understory Vegetation section).

Appendix C contains a comprehensive list of all species I believe to be growing at the site, from these and other sources.

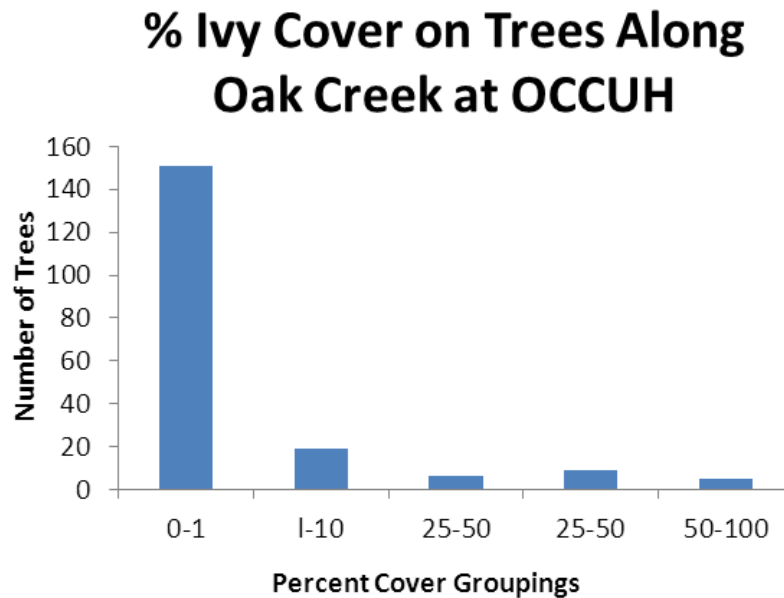


Figure 7: Percent Coverage of *Hedera helix* on inventoried trees.

## CONCLUSIONS

### Overall Diversity

The OCCUH riparian and meadow area currently contains a healthy, fairly varied mix of native and introduced species, but substantial areas are in the process of becoming monocultures of invasive exotics. At the tree canopy level, the majority of trees both large and small are native species, and the presence of numerous seedlings and saplings indicates they are holding their own against smaller, weedy species such as *Crataegus* and *Prunus*.

At the understory level, the picture is quite different. The majority of species present are non-native, although many of the non-natives are relatively benign. In some areas there are healthy populations of *Symphoricarpos albus* and *Heracleum lanatum*, which are large, competitive native species. In other areas, *Rubus discolor*, *Brachypodium sylvaticum* and *Hedera helix*, all Class B Noxious Weeds in Oregon (Oregon Noxious Weed List), have largely suppressed any other understory plants, native or not. Populations of these plants, especially *Rubus* and *Brachypodium*, are scattered throughout the study area, and there is no reason to think they will not continue to expand their territories until virtually nothing else grows in the understory. Left unchecked, *Hedera* is capable of climbing and damaging trees, and smothering understory plants and small saplings (English Ivy Fact Sheet). This could inhibit the long-term health and regeneration of the canopy. In short, if nothing is done to reverse the trend, the relatively diverse ecosystem which currently exists is likely to lose much of its diversity and become dominated by invasive species.

The meadow area is typical of mowed but otherwise untended fields, in that it is a dense mix of sun-loving grasses and forbs which can tolerate mowing. The majority are exotics, the

kinds that are common everywhere in this area. There are some native species, both as standing crop and in the seed bank (and probably more which I did not encounter). The area of meadow I studied is to be planted with native trees and shrubs and incorporated into the riparian area. Most of the meadow plants are small, even when un-mowed, and will have little effect on the trees and shrubs planted, but they could interfere with establishment of ground level native vegetation.

A wide variety of animal and insect life utilizes this area. While I did not inventory fauna, I did observe many species of birds, including a raucous Kingfisher, dozens of insect varieties, squirrels, and signs of other small mammals. Honeybees from the on-site hives keep everything well pollinated. It appears to be a lively and productive ecosystem, even if many parts of it are not native.

## **Goals and Planning**

Before efforts to restore this site begin, a fundamental question should be clarified. What, exactly, is the primary goal of the project?

In Western Oregon, less than half of 105 projects to restore riparian zones have achieved 75% or greater tree survival rates. The primary reasons for success included “site preparation, post-planting maintenance, and tree protection” (Withrow-Robinson, 2011). Some of those projects may have involved starting a tree population from scratch, rather than starting with an existing canopy of established trees, as this site has. Nevertheless this is a daunting statistic, and indicates the need for comprehensive planning of the project.

Since there is a large population of non-native species already present, trying to restore a natives-only ecosystem would be difficult. It would require “aggressive site preparation techniques” (Withrow-Robinson, 2011), including up to two seasons of removal, spot spraying, and removal of re-growth. Then it would require intensive management to plant and encourage native species while preventing the growth or re-infestation of any non-native species. This might be an achievable goal if the invasive plants were confined to this site, but they are not – adjacent sites are equally compromised. As an urban site in a decidedly non-native setting, an island of pure native stock would be impossible to maintain without greater resources than are likely to be available.

In “Restoring the Native Riparian Community of an Urban Creek, Oak Creek Horticulture Reach”, Brookes, et al recommend “...removal of invasive species and the active replanting of native vegetation” and “... a management scheme...to combat any newly introduced species or reestablishment of species, before they start out-competing natives again”. This strategy would retain as much as possible of the existing native vegetation, concentrating on removing the most pernicious of the invasives, especially the Class B Noxious Weeds. Prior to planting native species, the site should be mulched and free of invasives. Follow-up would be targeted at preventing re-colonization by those invasives, to allow existing and planted natives, as well as non-invasive exotics that are already present, to flourish. Follow-up should continue for up to 20 years (Brookes, et al, 2010).

A general plan has already been written to guide the restoration and follow up on this site (Brookes, et al). The question is, can it be followed?

## Future Maintenance

The target restoration site is on the north and east banks of Oak Creek, within the OCCUH site. The opposite banks are maintained (or not) by other entities. They support substantial populations of many of the invasive species which are causing problems. For instance, on the south bank of the creek near transect 2S, *Hedera helix* has reached its mature, berry-producing form, which birds commonly transport to new locations. It is inevitable that re-infestation of the OCCUH side of the creek will occur, as long as those populations go unchecked.

There have been some attempts in the past to control some of the invasive species. There was an effort to remove *Rubus discolor* near the entrance to OCCUH, and along the westward bend of the creek (Brookes et al, 2010). In both cases, it was re-sprouting in 2010, and is present today. In addition, I saw evidence that *Hedera helix* had been cut back from numerous trees, especially near the entrance drive, but it had not been killed at the base, and so was beginning to re-grow. These examples serve to emphasize how important timely and effective follow-up will be if there is to be any hope of permanently eradicating such pests.

The current plan suggests that, after the initial restoration effort, the site is to be monitored for at least 5 years, and follow-up mechanical removal and spot spraying will be done as needed to prevent re-growth of the worst invasives. Every effort will be made to protect the newly-planted native species (Lambrinos, OWEB Grant Application).

It will be essential to have a long-term plan not subject to the changeable winds of administrative and departmental priorities. A few years' neglect could un-do many years of restoration effort. Fortunately, there are multiple avenues available to the OCCUH, to continue the necessary follow-up.

As part of the OSU campus, there is already a great deal of research performed there, and many students work and volunteer on the site. The restoration project is already the subject of research projects (such as mine) and will no doubt generate many more. One of the goals for the project is to provide educational and outreach opportunities, and perhaps serve as a guide or template to encourage more restoration projects on OSU land, and especially in the Oak Creek reach (Lambrinos, personal communication). With many different avenues for support, student labor, and faculty oversight, it seems that if there is a maintenance plan to follow, it should be possible to keep up with it for years to come.

Another avenue towards a successful restoration would be to collaborate with the entities which manage adjacent properties, to reduce the populations of invasive species and thus reduce the probability of re-infestation.

Regardless of whether this particular project is a long-term success or failure in terms of restoration of the native habitat, there are many benefits to doing it. It will provide practical experience in planning, implementing and maintaining a semi-urban restoration site, in a setting that will maximize its educational benefits. If one of the goals is to learn from everything that happens on the site, and provide more and better education and research opportunities to the students and faculty of OSU, than every aspect of the project is a potential win. The project will be a success, regardless of what the actual outcomes are.

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## APPENDIX A

### Vegetation Survey Transect Details

Transects were laid out as follows:

Transect #1N & 1S at approx 50' west of SE property line, extending 100' north to south perpendicular to creek. 1N: First rebar marker at 12' north of creek CL, then 50' and 100'. 1S: First rebar marker 15' (5m) south of creek CL, then 35'. Wide rock berm (under vegetation) prevented putting pole in further south.

Transect #2N & 2S: 100' west of 1N. 2N: First rebar marker 11' (3.35m) north of creek CL, then 50' and 100'. 2S: First rebar marker 18' (6m) south of creek CL, then 48'.

Transect #3E & 3W (3S): at SW corner of mowed field, extending northeast to southwest (approx 92' from Transect 2). 3E: First marker 15' (4.6m) from creek CL, then 50' and 100'. 3W (3S): First rebar marker 12 ft (4m) from CL, then 45' (15m).

Transect #4E, 4W, 100' north of Transect 3. 4E: First marker 9' (2.7m) from CL, then 50' and 100'. 4W: First marker 20' (6.6m) from creek CL, then 46' (15.3m).

5E & 5W - 100' north of Transect 4. 5E: First marker 14' (4.3m) from CL, then 50' and 100'. 5W: One marker 6' (2m) west of creek CL, no more due to steep narrow bank.

Transect #6E & 6W - 100' north of NW corner of shop building. 6E: First marker 14' (4.3m) from CL, then 65' from CL, in Box clump. 6W: One marker 4' (1.3m) west of creek CL. Upper area inaccessible, but another marker could be put there.

Quadrats were laid out as follows:

Quadrat #1 placed along transect at edge of vegetation next to creek. Subsequent quadrats placed 2 meters further along transect, measured center to center. Quadrats are placed upstream of the transect (west or north) unless otherwise noted.

## APPENDIX B: Sample Vegetation Survey Record Sheet

OCCUH Understory Vegetation Survey  
July-August 2012 by Signe Danler

[illegible]

## APPENDIX C: Species List

Species Observed at OCCUH				
Type	Status	I.D. Source	Seed Bank #	Where Located
<b>TREES</b>				
Acer macrophyllum (Bigleaf Maple)	Native	3		Widespread
Acer circinatum (Vine Maple)	Native	1		planted
Alnus rhombifolia (White Alder)	Native	1		W and S bank of creek
Alnus rubra (Red Alder)	Native	3		Scattered throughout
Catalpa speciosa	Introduced (U.S. native)	1		west bank of creek
Crataegus (monogyna?) (Hawthorn)	Introduced	1,2	D29 III	Widespread
Fraxinus latifolia	Native	1,2,3	C100 I	Widespread
Juglans nigra (Black Walnut)	Introduced (U.S. native)	1		S. bank of creek
Liquidambar styraciflua (Sweetgum)	Introduced	1		Nr Transect 4E
Pinus ponderosa	Native	6		planted
Populus trichocarpa	Native	3		Along 35th St, one btw Transect 4 & 5E
Prunus sp (cherry)	Introduced	1		Scattered throughout
Prunus sp (plum, yellow)	Introduced	1		Scattered on E side
Prunus sp (plum, red)	Introduced	1		Scattered on E side
Prunus lusitanica	Introduced	1		North near entrance
Quercus garryana	Native	3		Scattered
Quercus rubra (Red Oak)	Introduced (U.S. native)	1		Near entrance
Salix lucida ssp. lasiandra	Native	3		in creek by entrance bridge
Sophora japonica	Introduced	6		by entrance drive
<b>SHRUBS AND VINES</b>				
Camellia sinensis	Introduced	1		One on E side of creek
Convolvulus arvensis	Class B Noxious Weed	1		Transect 3S
Corylus cornuta	Native	3		scattered
Hedera helix	Class B Noxious Weed	3		Mostly E side of creek
Ilex ssp.	Invasive	3		
Mahonia aquifolium	Native	1		In field nr transect 1N
Laurus sp.	Introduced	1		
Rubus discolor (armeniacus)	Class B Noxious Weed	1,2,3	C75 II	Widespread
Salix sitchensis	Native	4	A78III	By entrance
Solanum dulcamara	Introduced	1,2	C75 I	
Symphoricarpos albus	Native	1,3		Widespread
Toxicodendron diversilobum (Poison Oak)	Native	1		W side of creek by road
Viburnum lantana	Introduced	1		Nr Transect 5, edge of field

<b>GRASS</b>				
Avena sp (Wild Oats)		1		
Brachypodium sylvaticum	Class B Noxious Weed.	3		
Carex deweyana		3		
Fescue sp.		1		
Lolium sp.		1		
Panicum capillare		2,6	D65 I	
Phalaris arundinacea (Reed Canary Grass)	Invasive	1,3		West side near road
<b>HERBACEOUS</b>				
Achillea millefolium (Yarrow)	Introduced	1		in field
Antennaria sp			C100 III	
Arctium sp (Burdock)	Introduced	2,6	D79	along creek, scattered
Bellis perennis	Introduced	1		in field
Capsella bursa-pastoris	Introduced	2	C48 II	
Cardamine hirsuta	Introduced	2	A98	
Centaureum umbellatum (erythaea)	Introduced	1		in field
Cerastium arvense		2	B28 I	
Cirsium arvense (Canada Thistle)	Class B Noxious Weed	1	D52	Widespread
Cirsium vulgare (Bull Thistle)	Class B Noxious Weed		A35III	Widespread
Conium maculatum (Poison Hemlock)	Class B Noxious Weed			South pasture
Daucus carota (Wild Carrot)	Introduced	2	D82 II	widespread
Digitalis purpurea (Foxglove)	Introduced	1	D95 II	
Dipsacus sylvestris (fullonum)(Teasel)	Invasive	2	A35 I, D82 I	
Epilobium ciliatum (Willow Herb)	Native	2	A71 II	
Equisetum sp (Horestail)	Native	1		south side of creek
Euphorbia maculata	Introduced			south pasture
Fragaria virginiana?	Introduced	2	B28 II	
Galium aparine	Native	3		scattered
Galium trifidum	Native	2	B28	
Geranium sp.		1		in field
Heracleum lanatum (Cow Parsnip)	Native	3		widespread
Hesperis matronalis (Dame's Rocket)	Introduced	1		south edge of field
Hydrophyllum tenuipes	Native	3		
Hypericum perforatum	Class B Noxious Weed	1	A35 V	
Hypochaeris radicata	Introduced	2	A71 I, A71 III	in field, widespread
Kickxia elatine	Introduced	2	D36 I	
Lathyrus latifolius	Class B Noxious Weed	1		South edge of field
Lapsana communis (Nipplewort)	Introduced	1, 7	D65	

Leucanthemum vulgare	Introduced	2	C7	in field
Lotus corniculatus	Introduced	1		
Mataricaria discoidea (Pineappleweed)	Native	2	A78 I	in field
Medicago lupulina	Introduced	1		in field
Melissa officinalis (Lemon Balm)	Introduced	1		scattered
Moss				widespread ground layer
Oenanthe sarmentosa (Water Parsley)	Native	7	C100	
Parentucellia viscosa	Introduced	5		south end of field
Plantago sp				in field
Polystichum munitum (Sword Fern)	Native	3		S. side of creek by Transect 1
Portulaca oleraceae	Introduced	2	A78 II	
Prunella vulgaris (Heal-all)	Introduced	1	D29 I	widespread
Ranunculus repens	Introduced			Creek edge, scattered but thick stands
Rumex acetosella	Introduced	2	A35 IV	S. side of creek by Transect 2S
Rumex crispus		3	A35 II	
Senecio jacobaea?	Class B Noxious Weed			
Sonchus asper (Sow Thistle)	Introduced	1		widespread
Stachys cooleyae		1		south end of field in unmowed verge
Taraxacum officinalis	Introduced	1		widespread
Tellima grandiflora	Native	3		by transect 2N
Trifolium repens	Introduced	1		widespread
Veronica persica	Introduced	1	D29 II	
Vicia sp		1		scattered

#### SOURCES

- 1) Personal observation by Signe Danler, Spring/Summer 2012.
- 2) Seed bank germination study by Signe Danler, Spring/Summer 2012.
- 3) Report:  
Brookes, Harrison, Tim Eresh, Elizabeth Records, Alan Shay, Kannika Suttiwiriya, Eve Thornton, June 2, 2010.  
Restoring the Native Riparian Community of an Urban Creek.  
Oak Creek Horticulture Reach, Oregon State University, FOR/FW 445/545.
- 4) Survey by Keith...
- 5) Pojar, Plants of the Pacific Northwest Coast
- 6) Al Shay, OSU Horticulture Dept.
- 7) Richard Halse, OSU Botany Dept.

## APPENDIX D. Vegetation Survey Data

### OCCUH Understory Vegetation Survey July-August 2012 by Signe Danler

OCCUH Understory Vegetation Survey								
Transect #	Quadrat # (distance from creek CL in m)	Species	Plants % cover	Densimeter Reading	Densimeter % open (x1.04)	Average Densimeter	Quadrat placement, Photos, Notes	
1N	1N4	Rubus discolor	40	N	80	N	83.2	Transect 1N taken on July 13, 2012. 9am. Clear, sunny. Quadrat placed 20" off ground on vegetation, in unmowed area under tree canopy.
1N	1N4	Symphoricarpos albus	20	S	94	S	97.76	
1N	1N4	Brachypodium sylvaticum	12	E	93	E	96.72	
1N	1N4	Convolvulus sepium	8	W	87	W	90.48	
1N	1N4	Heracleum lanatum	8					
1N	1N4	Bare	12					
1N	1N6	Rubus discolor	72	N	86	N	89.44	In unmowed area under tree canopy.
1N	1N6	Symphoricarpos albus	20	S	89	S	92.56	
1N	1N6	Brachypodium sylvaticum	<4	E	93	E	96.72	
1N	1N6	Digitalis purpurea	<4	W	89	W	92.56	
1N	1N6	Stachys cooleyae (?)	<4					
1N	1N8	Rubus discolor	44	N	92	N	95.68	Quadrat placed 18" off ground on vegetation, in unmowed area under tree canopy.
1N	1N8	Brachypodium sylvaticum	20	S	89	S	92.56	
1N	1N8	Galium	8	E	90	E	93.6	
1N	1N8	Heracleum lanatum	<4	W	82	W	85.28	
1N	1N8	Acer macrophyllum	4					
1N	1N8	Dead branches etc.	16					
1N	1N10	Brachypodium sylvaticum	100	N	88	N	91.52	Quadrat at edge of unmowed area.
1N	1N10	Hypochaeris radicata	<4	S	84	S	87.36	
1N	1N10	Trifolium repens	4	E	82	E	85.28	
1N	1N10	Grass	<1	W	86	W	89.44	
1N	1N12	Hypochaeris radicata	16	N	89	N	92.56	Quadrat in mowed area.
1N	1N12	Trifolium repens	36	S	76	S	79.04	
1N	1N12	Grass	32	E	80	E	83.2	
1N	1N12	Leucanthemum vulgare	<1	W	92	W	95.68	
1N	1N12	Medicago lupulina	<1					
1N	1N12	Viola sp.	2					
1N	1N12	Prunella vulgaris	<1					
1N	1N12	Brachypodium sylvaticum (?) (short)	3					
1N	1N12	Moss (below)	8					
1N	1N14	Rubus discolor	32	N	94	N	97.76	
1N	1N14	Heracleum lanatum	4	S	30	S	31.2	Quadrat placed 30" off ground on vegetation.
1N	1N14	Crataegus monogyna	16	E	52	E	54.08	
1N	1N14	Tall grass	84	W	94	W	97.76	
1N	1N14	Acer sp. Seedling	<1					
1N	1N14	Moss (below)	18					
1N	1N16	Rubus discolor	44	N	95	N	98.8	
1N	1N16	Grass	32	S	69	S	71.76	Thin, open cover above. Moss thin cover on ground below Rubus. Next to, but not in, stand of tall (2m) grass or reed.
1N	1N16	Moss (below)	100	E	14	E	14.56	
1N	1N16	Hypericum perforatum (?) seedling	<1	W	92	W	95.68	
1N	1N18	Rubus discolor	100	N	67	N	69.68	Quadrat placed 44" off ground on vegetation. For South densitometer reading, Rubus provides the cover, other than that it would be 0% coverage.
1N	1N18	Moss (below)	100	S	57	S	59.28	

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July-August 2012 by Signe Danler

Transect #	Quadrat # (distance from creek CL in m)	Species	Plants % cover	Densiometer Reading	Densiometer % open (x1.04)	Average Densiometer	Quadrat placement, Photos, Notes
1N	1N18	Grass (below Rubus)	<1	E 27	E 28.08		cover, other than that it would be 0% coverage.
1N	1N18			W 71	W 73.84	57.72	
1N	1N20	Rubus discolor	100	N 33	N 34.32		Quadrat placed 36" off ground on vegetation. Unmowed area.
1N	1N20	Fraxinus latifolia seedling	8	S 0	S 0		
1N	1N20	Heracleum lanatum	<1	E 48	E 49.92		
1N	1N20	Grass	100	W 8	W 8.32	23.14	
1N	1N20	Vicia sp. (seedling)	<1				
1N	1N20	Leucanthemum vulgare	<1				
1N	1N22	Crataegus monogyna	72	N 70	N 72.8		Quadrat placed 48" off ground on vegetation. Unmowed area.
1N	1N22	Rubus discolor	20	S 63	S 65.52		
1N	1N22	Grass (low)	100	E 0	E 0		
1N	1N22	Dipsacus sylvestris (weak seedling)	2	W 52	W 54.08	48.1	
1N	1N24	Rubus discolor	100	N 38	N 39.52		Quadrat placed 48" off ground on vegetation. Unmowed area.
1N	1N24	Quercus garryana	16	S 0	S 0		
1N	1N24	Fraxinus latifolia	4	E 84	E 87.36		
1N	1N24	Grass (under Rubus)	100	W 25	W 26	38.22	
1N	1N24	Crataegus monogyna	4				
1N	1N26	Rubus discolor	60	N 28	N 29.12		Quadrat placed 36" off ground on vegetation. Unmowed area.
1N	1N26	Crataegus monogyna	28	S 0	S 0		
1N	1N26	Grass	36	E 0	E 0		
1N	1N26	Mahonia aquifolium	8	W 2	W 2.08	7.8	
1N	1N28	Rubus discolor	24	N 4	N 4.16		Quadrat placed 12" off ground on vegetation. Unmowed area.
1N	1N28	Grass	100	S 0	S 0		
1N	1N28			E 0	E 0		
1N	1N28			W 0	W 0	1.04	
1N	1N30	Grass	100	N 0	N 0		
1N	1N30	Daucus carota	3	S 0	S 0		
1N	1N30	Hypochaeris radicata	28	E 0	E 0		
1N	1N30	Leucanthemum vulgare	2	W 0	W 0	0	
2N	2N3	Grass - unknown	100	N 17	N 17.68		7/19/12, 9am. Cloudy. Unmowed. Took area photos in circle.
2N	2N3	Lathyrus latifolius	12	S 0	S 0		
2N	2N3	Rubus discolor	4	E 28	E 29.12		
2N	2N3			W 17	W 17.68	16.12	
2N	2N5	Grass - unknown	30	N 7	N 7.28		Mowed, open
2N	2N5	Trifolium repens	15	S 0	S 0		
2N	2N5	Hypochaeris radicata	60	E 2	E 2.08		
2N	2N5	Medicago lupulina	1	W 8	W 8.32	4.42	
2N	2N5	Leucanthemum vulgare	3				
2N	2N5	Prunella vulgaris	4				
2N	2N5	Daucus carota	<1				
2N	2N5	Unknown (photo)	<1				
2N	2N7	Grass - unknown	28	N 5	N 5.2		Mowed, open. Took more area photos.
2N	2N7	Trifolium repens	58	S 0	S 0		

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Transect #	Quadrat # (distance from creek CL in m)	Species	Plants % cover	Densiometer Reading	Densiometer % open (x1.04)	Average Densiometer	Quadrat placement, Photos, Notes
2N	2N7	Hypochaeris radicata	20	E 0	E 0		
2N	2N7	Prunella vulgaris	2	W 6	W 6.24	2.86	
2N	2N7	Taraxacum officinalis	1				
2N	2N7	Leucanthemum vulgare	<1				
2N	2N7	Thistle	<1				
2N	2N9	Brachypodium sylvaticum	60	N 0	N 0		Unmowed. Took 3 photos of surrounding area. Quadrat placed 18" up on vegetation.
2N	2N9	Alnus rubra (7' tall)	16	S 0	S 0		
2N	2N9	Fraxinus latifolia (32" tall)	40	E 31	E 32.24		
2N	2N9	Thistle	2	W 2	W 2.08	8.58	
2N	2N9	Crataegus monogyna (5' tall)	1				
2N	2N11	Crataegus monogyna	28	N 0	N 0		Unmowed. Quadrat placed 3' up on vegetation.
2N	2N11	Thistle	10	S 0	S 0		
2N	2N11	Rubus discolor	45	E 0	E 0		
2N	2N11	Brachypodium sylvaticum (below)	100	W 2	W 2.08	0.52	
2N	2N13	Brachypodium sylvaticum	100	N 0	N 0		Unmowed. Quadrat placed 10" up on vegetation.
2N	2N13	Rubus discolor	9	S 0	S 0		
2N	2N13	Crataegus monogyna	10	E 0	E 0		
2N	2N13	Leucanthemum vulgare	20	W 0	W 0	0	
2N	2N15	Rubus discolor	58	N 0	N 0		Unmowed. Quadrat placed 2' up on vegetation. Convolvulus sepium and unknown Allium were nearby but not in quadrat.
2N	2N15	Leucanthemum vulgare	<1	S 0	S 0		
2N	2N15	Grass (not Brachy) - below	95	E 0	E 0		
2N	2N17	Rubus discolor	15	W 0	W 0	0	Unmowed but lower.
2N	2N17	Grass (not Brachy) - below	100	N 0	N 0		
2N	2N17			S 0	S 0		
2N	2N17			E 0	E 0		
2N	2N17			W 0	W 0	0	Mowed, open
2N	2N19	Grass	82	N 0	N 0		
2N	2N19	Bare soil	14	S 0	S 0		
2N	2N19	Hypochaeris radicata	14	E 0	E 0		
2N	2N19			W 0	W 0	0	Freshly mowed - was taller. Brushed away cuttings.
2N	2N21	Grass	100	N 0	N 0		
2N	2N21	Leucanthemum vulgare	15	S 0	S 0		
2N	2N21	Prunella vulgaris	1	E 0	E 0		
2N	2N21	Hypochaeris radicata	15	W 0	W 0	0	
2N	2N21	Veronica persica	<1				
2N	2N21	Plantain sp.	<1				Freshly mowed.
2N	2N23	Grass	96	N 0	N 0		
2N	2N23	Hypochaeris radicata	20	S 0	S 0		
2N	2N23	Daucus carota	<1	E 0	E 0		
2N	2N23	Leucanthemum vulgare	<1	W 0	W 0	0	
2N	2N23	Brachypodium sylvaticum ?	5				Mowed, open
2N	2N25	Grass	96	N 0	N 0		
2N	2N25	Hypochaeris radicata	10	S 0	S 0		

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Transect #	Quadrat # (distance from creek CL in m)	Species	Plants % cover	Densiometer Reading	Densiometer % open (x1.04)	Average Densiometer	Quadrat placement, Photos, Notes
2N	2N25	Brachypodium sylvaticum ?	14	E	0	0	
2N	2N25	Leucanthemum vulgare	<1	W	0	0	
2N	2N25	Bare soil	3				
2N	2N25	Prunella vulgaris	3				
2N	2N25	Daucus carota	<1				
2N	2N27	Daucus carota	2	N	0	0	East side of transect, approx. 2m east of line of transect. Unmowed. Quadrat 6" off ground on vegetation.
2N	2N27	Tellima grandiflora	<1	S	0	0	
2N	2N27	Geranium sp (dry w/seeds)	<1	E	0	0	
2N	2N27	Grasses, various	100	W	0	0	
2N	2N27	Leucanthemum vulgare	<1				
2N	2N27	Allium sp	<1				East side of transect, unmowed. Quadrat 10" off ground on vegetation.
2N	2N29	Leucanthemum vulgare	40	N	0	0	
2N	2N29	Thistle	10	S	0	0	
2N	2N29	Parentucellia viscosa	2	E	0	0	
2N	2N29	Grass (thin, dry)	30	W	0	0	
2N	2N29	Allium sp	<1				
2N	2N29	Hypochaeris radicata	6				
3E	3E 3	Brachypodium sylvaticum	45	N	71	73.84	7/30/12 8:30am, Overcast. First quadrat at edge of stream, 9' from CL. Ranunculus repens in large patch at edge of stream on south side of transect. Under canopy.
3E	3E 3	Grasses, various	45	S	90	93.6	
3E	3E 3	Heracleum lanatum	2	E	96	99.84	
3E	3E 3	Rumex sp.	2	W	86	89.44	
3E	3E 3	Epilobium ciliatum(?)	3				
3E	3E 3	Prunus (cherry)	1				On slope. Crataegus nearby. Under canopy.
3E	3E 5	Brachypodium sylvaticum	60	N	83	86.32	
3E	3E 5	Rubus discolor	10	S	94	97.76	
3E	3E 5	Heracleum lanatum	8	E	96	99.84	
3E	3E 5	Prunus (cherry)	10	W	82	85.28	Under canopy.
3E	3E 7	Brachypodium sylvaticum	100	N	74	76.96	
3E	3E 7	Heracleum lanatum (dead)	8	S	94	97.76	
3E	3E 7	Rubus discolor (dead)	2	E	89	92.56	
3E	3E 7			W	96	99.84	Approx. 1.5m north of transect - nearer area was cleared. Took area photos.
3E	3E 9	Brachypodium sylvaticum	94	N	54	56.16	
3E	3E 9	Rubus discolor	16	S	96	99.84	
3E	3E 9	Heracleum lanatum	4	E	82	85.28	
3E	3E 9	Lapsana communis	2	W	83	86.32	Canopy
3E	3E 11	Rubus discolor	44	N	78	81.12	
3E	3E 11	Brachypodium sylvaticum	70	S	94	97.76	
3E	3E 11	Heracleum lanatum (dead)	12	E	92	95.68	
3E	3E 11			W	93	96.72	Dense canopy under plum tree
3E	3E 13	Bare soil	40	N	96	99.84	
3E	3E 13	Tree seedling	12	S	96	99.84	
3E	3E 13	Heracleum lanatum (dead)	8	E	96	99.84	
3E	3E 13	Rubus discolor	3	W	96	99.84	

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Transect #	Quadrat # (distance from creek CL in m)	Species	Plants % cover	Densiometer Reading	Densiometer % open (x1.04)	Average Densiometer	Quadrat placement, Photos, Notes
3E	3E 13	Unknown seedling	<1				
3E	3E 13	Brachypodium sylvaticum	20				
3E	3E 13	Plum tree (canopy)	100				
3E	3E 15	Rubus discolor	60	N	83	N 86.32	Quadrat 4' up on vegetation.
3E	3E 15	Convolvulus sepium	10	S	58	S 60.32	
3E	3E 15	Heracleum lanatum	20	E	75	E 78	
3E	3E 15	Plum tree (canopy)	50	W	90	W 93.6	
3E	3E 15	Brachypodium sylvaticum	<1				
3E	3E 17	Rubus discolor	92	N	76	N 79.04	Nr edge of canopy. Quadrat 18" up on vegetation.
3E	3E 17	Brachypodium sylvaticum (below)	<1	S	32	S 33.28	
3E	3E 17	Convolvulus sepium (above)	4	E	94	E 97.76	
3E	3E 17			W	38	W 39.52	
3E	3E 19	Bare soil	20	N	76	N 79.04	Mowed, heavy shade. Dry.
3E	3E 19	Thistle	2	S	93	S 96.72	
3E	3E 19	Rubus discolor	2	E	94	E 97.76	
3E	3E 19	Grass (thin, mostly dead)	55	W	38	W 39.52	
3E	3E 19	Prunella vulgaris	10				
3E	3E 19	Veronica persica	<1				
3E	3E 21	Brachypodium sylvaticum	90	N	96	N 99.84	Unmowed grass under Corylus clump. Heavy canopy.
3E	3E 21	Bare soil	10	S	91	S 94.64	
3E	3E 21	Acer macrophyllum	8	E	94	E 97.76	
3E	3E 21	Corylus cornuta (above)	100	W	94	W 97.76	
3E	3E 21	Unknown seedling	<1				
3E	3E 21	Crataegus seedling	<1				
3E	3E 23	Brachypodium sylvaticum	100	N	96	N 99.84	Unmowed grass under Corylus clump.
3E	3E 23	Galium trifidum	8	S	96	S 99.84	
3E	3E 23	Corylus cornuta (above)	100	E	96	E 99.84	
3E	3E 23			W	96	W 99.84	
3E	3E 25	Grass	67	N	96	N 99.84	Mowed area, under Corylus canopy.
3E	3E 25	Prunella vulgaris	4	S	96	S 99.84	
3E	3E 25	Bare soil	16	E	96	E 99.84	
3E	3E 25	Rubus discolor	<1	W	96	W 99.84	
3E	3E 25	Crataegus seedlings	1				
3E	3E 25	Taraxacum officinalis	2				
3E	3E 25	Misc unknnon seedlings	<1				
3E	3E 27	Grass	85	N	96	N 99.84	Edge of Corylus canopy
3E	3E 27	Prunella vulgaris	10	S	90	S 93.6	
3E	3E 27	Hypochaeris radicata	12	E	37	E 38.48	
3E	3E 27	Crataegus seedling	2	W	96	W 99.84	
3E	3E 27	Leucanthemum vulgare	1				
3E	3E 27	Plantago sp	3				
3E	3E 29	Grass	60	N	0	N 0	Mowed, open
3E	3E 29	Hypochaeris radicata	16	S	19	S 19.76	

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3E	3E 29	Trifolium repens	12	E 0	E 0		
3E	3E 29	Leucanthemum vulgare	1	W 67	W 69.68	22.36	
3E	3E 29	Unknown	1				
3E	3E 29	Plantago sp	8				
3E	3E 29	Crataegus seedling	<1				
3E	3E 29	Bare soil	5				
3E	3E 31	Grass	60	N 0	N 0		Mowed, open. Took area photos.
3E	3E 31	Plantago sp	20	S 0	S 0		
3E	3E 31	Leucanthemum vulgare	18	E 0	E 0		
3E	3E 31	Prunella vulgaris	<1	W 24	W 24.96	6.24	
3E	3E 31	Medicago lupulina	1				
3E	3E 31	Daucus carota	<1				
3E	3E 31	Hypochaeris radicata	4				
3E	3E 31	Crataegus seedling	<1				
3E	3E 31	Moss (below)	20				
3E	3E 31	Rumex sp.	<1				
3E	3E 31	Unknown	<1				
4E	4E 1	Brachypodium sylvaticum	55	N 64	N 66.56		8/1/12 7:30am. Clear and sunny.. Took area photos. First quadrat at edge of dropoff to creek.
4E	4E 1	Heracleum lanata (dead)	16	S 28	S 29.12		
4E	4E 1	Tree seedling	4	E 44	E 45.76		
4E	4E 1	Rubus discolor	2	W 78	W 81.12	55.64	
4E	4E 3	Rubus discolor (above and below)	60	N 95	N 98.8		Quadrat on slope, 18" up on vegetation. Mostly Rubus canopy, little Ash overhead.
4E	4E 3	Symphoricarpos albus	18	S 36	S 37.44		
4E	4E 3	Bare soil below	90	E 90	E 93.6		
4E	4E 3	Fraxinus latifolia above 6'		W 96	W 99.84	82.42	
4E	4E 5	Rubus discolor (above and below)	4	N 95	N 98.8		Quadrat 18" up on vegetation. Mixed canopy - Cherry, Ash, Rubus.
4E	4E 5	Brachypodium sylvaticum	62	S 40	S 41.6		
4E	4E 5	Heracleum lanata (dead)	18	E 83	E 86.32		
4E	4E 5	Symphoricarpos albus	33	W 82	W 85.28	78	
4E	4E 5	Prunus (Cherry) sapling above	16				
4E	4E 7	Rubus discolor	18	N 96	N 99.84		Full canopy
4E	4E 7	Brachypodium sylvaticum	70	S 94	S 97.76		
4E	4E 7	Crataegus seedling	1	E 96	E 99.84		
4E	4E 7	Prunus (Cherry) canopy above	100	W 95	W 98.8	99.06	
4E	4E 7	Unknown	<1				
4E	4E 7	Bare soil	20				At foot of cherry tree
4E	4E 9	Brachypodium sylvaticum	90	N 96	N 99.84		
4E	4E 9	Rubus discolor	4	S 96	S 99.84		
4E	4E 9	Prunus (Cherry) canopy above	100	E 94	E 97.76		
4E	4E 9			W 96	W 99.84	99.32	
4E	4E 11	Rubus discolor above	55	N 96	N 99.84		Quadrat 12" p on vegetation. Mixed canopy
4E	4E 11	Brachypodium sylvaticum below	13	S 96	S 99.84		
4E	4E 11	Bare soil, debris	85	E 96	E 99.84		

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4E	4E 11			W 96	W 99.84	99.84	
4E	4E 13	Rubus discolor	100	N 96	N 99.84		Quadrat 24" up on Rubus. Under canopy.
4E	4E 13			S 96	S 99.84		
4E	4E 13			E 96	E 99.84		
4E	4E 13			W 96	W 99.84	99.84	
4E	4E 15	Rubus discolor above	40	N 90	N 93.6		Under canopy. Quadrat 12" up on Rubus.
4E	4E 15	Wood debris below	90	S 9	S 9.36		
4E	4E 15			E 96	E 99.84		
4E	4E 15			W 96	W 99.84	75.66	
4E	4E 17	Rubus discolor	68	N 94	N 97.76		Unmowed, under canopy. Quadrat 18" up on vegetation.
4E	4E 17	Grass	76	S 96	S 99.84		
4E	4E 17	Plum tree canopy	100	E 93	E 96.72		
4E	4E 17			W 96	W 99.84	98.54	
4E	4E 19	Grass (thin blade)	93	N 53	N 55.12		Open, mowed, at edge of trees.
4E	4E 19	Leucanthemum vulgare	5	S 96	S 99.84		
4E	4E 19	Dipsacus sylvestris	<1	E 93	E 96.72		
4E	4E 19	Unknown - Geranium or Ranunculus	<1	W 96	W 99.84	87.88	
4E	4E 19	Unknown	<1				
4E	4E 19	Prunella vulgaris	2				
4E	4E 19	Hypochaeris radicata?	6				
4E	4E 19	Crataegus seedling	<1				
4E	4E 19	Taraxacum officinalis	1				
4E	4E 19	Moss	15				
4E	4E 22	Grass (broad blade)	1	N 7	N 7.28		Took 3' btw quadrats to avoid bee bench. Open, mowed, in front of beehive. Moss is generally widespread, but not always visible beneath herbaceous layer.
4E	4E 22	Grass (thin blade)	62	S 80	S 83.2		
4E	4E 22	Leucanthemum vulgare	1	E 25	E 26		
4E	4E 22	Daucus carota	2	W 67	W 69.68	46.54	
4E	4E 22	Hypochaeris radicata	17				
4E	4E 22	Taraxacum officinalis	2				
4E	4E 22	Moss	45				
4E	4E 22	Medicago lupulina	<1				
4E	4E 22	Prunella vulgaris	<1				
4E	4E 22	Geranium sp	<1				
4E	4E 24	Grass (broad blade)	2	N 0	N 0		Open,, mowed.
4E	4E 24	Grass (thin blade)	60	S 23	S 23.92		
4E	4E 24	Achillea millefolium	25	E 0	E 0		
4E	4E 24	Leucanthemum vulgare	29	W 47	W 48.88	18.2	
4E	4E 24	Daucus carota	1				
4E	4E 24	Medicago lupulina	<1				
4E	4E 24	Hypochaeris radicata	4				
4E	4E 24	Moss	38				
4E	4E 26	Grass (broad blade)	6	N 0	N 0		Open, mowed.
4E	4E 26	Grass (thin blade)	64	S 8	S 8.32		

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4E	4E 26	Fragaria virginiana	5	E	0	0	
4E	4E 26	Achillea millefolium	33	W	40	41.6	
4E	4E 26	Hypochaeris radicata	14				
4E	4E 26	Unknown (broad leaf - photo)	2				
4E	4E 26	Leucanthemum vulgare	4				
4E	4E 26	Prunella vulgaris	5				
4E	4E 26	Daucus carota	<1				
4E	4E 26	Centaureum umbellatum	<1				
4E	4E 26	Bare soil	3				
4E	4E 26	Moss	10				
4E	4E 28	Grass (broad blade)	8	N	0	0	open, mowed.
4E	4E 28	Grass (thin blade)	62	S	0	0	
4E	4E 28	Prunella vulgaris	14	E	0	0	
4E	4E 28	Daucus carota	3	W	16	16.64	
4E	4E 28	Fragaria virginiana	2				
4E	4E 28	Moss	47				
4E	4E 28	Hypochaeris radicata	4				
4E	4E 28	Leucanthemum vulgare	3				
4E	4E 30	Grass (broad blade)	8	N	0	0	Open, mowed
4E	4E 30	Grass (thin blade)	63	S	0	0	
4E	4E 30	Leucanthemum vulgare	3	E	0	0	
4E	4E 30	Fragaria virginiana	2	W	16	16.64	
4E	4E 30	Daucus carota	<1				
4E	4E 30	Prunella vulgaris	2				
4E	4E 30	Hypochaeris radicata	9				
4E	4E 30	Bare soil or dead growth	10				
4E	4E 30	Moss	15				
4E	4E 30	Unknown	2				
5E	5E 4	Hedera helix	100	N	96	N 99.84	8/1/12 10:30 am. Sunny and clear. Ivy slope under dense canopy.
5E	5E 4	Plum (above)	100	S	95	S 98.8	
5E	5E 4			E	96	E 99.84	
5E	5E 4			W	96	W 99.84	
5E	5E 6	Hedera helix	100	N	96	N 99.84	Dense Ivy under dense canopy. Some Rubus poking through, but none in transect.
5E	5E 6	Rubus discolor	16	S	94	S 97.76	
5E	5E 6	Prunus (yellow plum) (above)	100	E	96	E 99.84	
5E	5E 6			W	96	W 99.84	
5E	5E 8	Hedera helix	100	N	96	N 99.84	Dense Ivy under dense canopy, Ivy hanging down from tree
5E	5E 8	Prunus (yellow plum) branch, 30° up	20	S	96	S 99.84	
5E	5E 8			E	96	E 99.84	
5E	5E 8			W	96	W 99.84	
5E	5E 10	Hedera helix (open, thin)	78	N	96	N 99.84	Dense canopy. Dead Rubus arching over transect, with some sprouting.
5E	5E 10	Rubus discolor (dead)	10	S	96	S 99.84	
5E	5E 10	Prunus (yellow plum) (above)	100	E	96	E 99.84	

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5E	5E 10			W 96	W 99.84	99.84	
5E	5E 12	Hedera helix (open, thin)	90	N 96	N 99.84		Dead twiggy tree canopy mixed with Rubus, then live tree above.
5E	5E 12	Rubus discolor (dead)	20	S 96	S 99.84		
5E	5E 12	Prunus (yellow plum) (above)	100	E 96	E 99.84		
5E	5E 12			W 96	W 99.84	99.84	
5E	5E 14	Hedera helix	100	N 94	N 97.76		Dead twiggy tree canopy mixed with Rubus, then live tree above.
5E	5E 14	Prunus (yellow plum) (above)	100	S 96	S 99.84		
5E	5E 14			E 95	E 98.8		
5E	5E 14			W 96	W 99.84	99.06	
5E	5E 16	Fine grass	100	N 30	N 31.2		At edge of Ivy, in mowed area. Shady.
5E	5E 16	Unknown (photo)	<1	S 90	S 93.6		
5E	5E 16	Unknown, tiny seedlings	<1	E 80	E 83.2		
5E	5E 16	Moss	100	W 83	W 86.32	73.58	
5E	5E 18	Fine grass	98	N 62	N 64.48		Mowed area, under Acer Macrophyllum canopy.
5E	5E 18	Taraxacum officinalis	<1	S 96	S 99.84		
5E	5E 18	Prunella vulgaris	<1	E 96	E 99.84		
5E	5E 18	Plum fruit, fallen	<1	W 69	W 71.76	83.98	
5E	5E 18	Unknown (photo)	1				
5E	5E 18	Bare soil	1				
5E	5E 18	Moss	18				
5E	5E 20	Fine grass	100	N 59	N 61.36		Mowed area, shady.
5E	5E 20	Prunella vulgaris	17	S 96	S 99.84		
5E	5E 20	Unknown (same as 5E 18)	2	E 92	E 95.68		
5E	5E 20	Hypochaeris radicata	3	W 93	W 96.72	88.4	
5E	5E 20	Plantago sp	<1				
5E	5E 20	Acer macrophyllum (above)	100				Mowed grass, in sun
5E	5E 22	Fine grass	79	N 2	N 2.08		
5E	5E 22	Hypochaeris radicata	31	S 86	S 89.44		
5E	5E 22	Trifolium repens	5	E 36	E 37.44		
5E	5E 22	Prunella vulgaris	5	W 56	W 58.24	46.8	
5E	5E 24	Hypochaeris radicata	53	N 0	N 0		Mowed, in sun
5E	5E 24	Trifolium repens	3	S 45	S 46.8		
5E	5E 24	Fine grass	40	E 0	E 0		
5E	5E 24	Leucanthemum vulgare	<1	W 15	W 15.6	15.6	
5E	5E 24	Prunella vulgaris	6				
5E	5E 24	Moss	3				Mowed, in sun
5E	5E 26	Fine grass (dead)	77	N 0	N 0		
5E	5E 26	Hypochaeris radicata	29	S 37	S 38.48		
5E	5E 26	Prunella vulgaris	1	E 0	E 0		
5E	5E 26	Trifolium repens	<1	W 94	W 97.76	34.06	
5E	5E 26	Grass (broad blade)	2				Mowed, in sun
5E	5E 28	Fine grass (dead)	88	N 0	N 0		
5E	5E 28	Hypochaeris radicata	17	S 84	S 87.36		

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5E	5E 28	Grass (broad blade)	5	E	0	E	0		
5E	5E 28	Trifolium repens	2	W	0	W	0		21.84
6E	6E 4	Brachypodium sylvaticum	78	N	68	N	70.72	8/7/12 2:30 pm. Sunny, clear. At edge of drop off to creek, under opening in tree canopy of Acer and Fraxinus. Unmowed. 4' tall Asters nearby, blooming.	
6E	6E 4	Hedera helix	44	S	37	S	38.48		
6E	6E 4	Heracleum lanatum	18	E	73	E	75.92		
6E	6E 4	Lapsana communis	2	W	45	W	46.8		57.98
6E	6E 6	Brachypodium sylvaticum	100	N	89	N	92.56	Deep Acer canopy.	
6E	6E 6	Hedera helix	3	S	60	S	62.4		
6E	6E 6	Lapsana communis	<1	E	84	E	87.36		
6E	6E 6			W	75	W	78		80.08
6E	6E 8	Brachypodium sylvaticum	100	N	78	N	81.12	Deep Acer canopy.	
6E	6E 8	Hedera helix	10	S	74	S	76.96		
6E	6E 8			E	90	E	93.6		
6E	6E 8			W	67	W	69.68		80.34
6E	6E 10	Brachypodium sylvaticum	100	N	52	N	54.08	Deep Acer canopy.	
6E	6E 10	Hedera helix	14	S	88	S	91.52		
6E	6E 10	Prunella vulgaris	1	E	75	E	78		
6E	6E 10			W	60	W	62.4		71.5
6E	6E 12	Vinca major	65	N	46	N	47.84	Sloping up to upper terrace, covered with Ivy and Vinca.	
6E	6E 12	Galium sp. (near dead)	20	S	78	S	81.12		
6E	6E 12	Brachypodium sylvaticum	15	E	67	E	69.68		
6E	6E 12	Hedera helix	26	W	48	W	49.92		62.14
6E	6E 14	Hedera helix	100	N	58	N	60.32	Edge of Ivy at top of slope. Plum tree canopy.	
6E	6E 14	Rubus discolor	12	S	83	S	86.32		
6E	6E 14	Vinca major	2	E	88	E	91.52		
6E	6E 14			W	40	W	41.6		69.94
6E	6E 16	Wood chips only	100	N	61	N	63.44	Canopy of plum, Acer circinatum, Acer macrophyllum. Transect ends in large Buxus clump.	
				S	89	S	92.56		
				E	71	E	73.84		
				W	76	W	79.04		77.22
Far Side of Oak Creek									
1S	1S 3	Gravel	100	N	67	N	69.68	Took area photos. Taken on gravel bar.	
	1S 3	Arctium sp (Burdock) (2)	3	S	77	S	80.08		
	1S 3	Hypericum (1)	1	E	57	E	59.28		
	1S 3	Vicia sp.	3	W	78	W	81.12		72.54
	1S 3	Taraxacum officinalis	3						
	1S 3	Toxicodendron diversilobum (Poison Oak)	1						
	1S 5	Heracleum lanatum	19	N	72	N	74.88	Solanum dulcamara and Rubus discolor on downed tree in stream. Also thicket of unknown plant, approx. 6' tall, willowy. Took photos.	
	1S 5	Brachypodium sylvaticum	58	S	62	S	64.48		
	1S 5	Hedera helix	9	E	57	E	59.28		
	1S 5	dead wood	6	W	80	W	83.2		70.46
	1S 5	bare soil	19						
	1S 5	Arctium sp (Burdock)	2						

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	1S 5	Rubus discolor seedling	<1				
	1S 5	Unknown tree seedling	4				
	1S 7	Polystichum munitum	27	N	68	N 70.72	Light Fraxinus canopy. On slope up from creek.
	1S 7	Brachypodium sylvaticum	28	S	79	S 82.16	
	1S 7	dead wood	7	E	70	E 72.8	
	1S 7	bare soil	52	W	81	W 84.24	
	1S 7	Symphoricarpos albus	<1				
	1S 7	Rubus discolor	<1				
	1S 9	Rubus discolor	50	N	72	N 74.88	At top of slope. Took area photos.
	1S 9	Brachypodium sylvaticum	58	S	72	S 74.88	
	1S 9	bare soil	12	E	71	E 73.84	
				W	86	W 89.44	
	1S 11	Brachypodium sylvaticum	90	N	78	N 81.12	
	1S 11	Rubus discolor	37	S	71	S 73.84	
	1S 11			E	88	E 91.52	
	1S 11			W	81	W 84.24	
	1S 13	Brachypodium sylvaticum (mostly dead)	100	N	78	N 81.12	On rocky berm btw riparian area and field
	1S 13	Rubus discolor	9	S	76	S 79.04	
	1S 13	dead wood	3	E	86	E 89.44	
	1S 13	Thistle	2	W	82	W 85.28	
	1S 15	Grasses, dead	100	N	78	N 81.12	Nearby trees have mature Ivy making berries
	1S 15	Avena sp (wild oats)	6	S	61	S 63.44	
	1S 15	Rubus discolor	38	E	93	E 96.72	
	1S 15	Galium sp (dead)	1	W	81	W 84.24	
	1S 17	Grass, living	35	N	90	N 93.6	Open short meadow
	1S 17	Grass, dead	58	S	44	S 45.76	
	1S 17	bare soil	6	E	79	E 82.16	
	1S 17			W	81	W 84.24	
	1S 19	Grass, living	28	N	73	N 75.92	Open short meadow
	1S 19	Grass, dead	80	S	35	S 36.4	
	1S 19	bare soil	0	E	31	E 32.24	
	1S 19	Deer pellets	2	W	85	W 88.4	
	1S 21	Grass, living	25	N	76	N 79.04	Open short meadow
	1S 21	Grass, dead	75	S	2	S 2.08	
				E	8	E 8.32	
	1S 21			W	50	W 52	35.36
	1S 23	Grass, living	24	N	43	N 44.72	Open short meadow
	1S 23	Grass, dead	80	S	0	S 0	
	1S 23	Thistle	<1	E	3	E 3.12	
	1S 23	Rubus discolor	<1	W	7	W 7.28	
	1S 23	Deer pellets	1			1.04	Open short meadow
	1S 25	Rubus discolor	26	N	25	N 26	
	1S 25	Grass, living	29	S	0	S 0	

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	1S 25	Grass, dead	70	E 0	E 0		
	1S 25			W 0	W 0	6.5	
	1S 27	Rubus discolor	26	N 18	N 18.72		Taller area, approx 2', with Rubus
	1S 27	Conium maculatum	10	S 0	S 0		
	1S 27	Grass, living	40	E 0	E 0		
	1S 27	Grass, dead	69	W 0	W 0	4.68	
	1S 29	Rubus discolor	35	N 6	N 6.24		Took area photos. Varied unmowed area, several plants not in quadrat, including Rumex, Matricaria, various thistles
	1S 29	Daucus carota	15	S 0	S 0		
	1S 29	bare soil	36	E 0	E 0		
	1S 29	Kickxia elatine	6	W 0	W 0	1.56	
	1S 29	Grass, living	23				
2S	2S 1	Equisetum sp	16	N 58	N 1.04		Took Area photos. On gravel bar.
	2S 1	Taraxacum sp	4	S 81	S 60.32		
	2S 1	Lathyrus latifolius	5	E 65	E 84.24		
	2S 1	Grass sp	3	W 83	W 67.6	53.3	
	2S 1	Unknown tree seedling	<1				
	2S 1	Gravel	100				
	2S 3	Rubus discolor	20	N 62	N 64.48		
	2S 3	Hedera helix	46	S 76	S 79.04		
	2S 3	Symphoricarpos albus	14	E 78	E 81.12		
	2S 3	Gravel	35	W 90	W 93.6	79.56	
	2S 3	Fraxinus trunk	8				
	2S 5	Rubus discolor	22	N 80	N 83.2		Gentle slope. Ash and Maple canopy.
	2S 5	Melissa officinalis	9	S 87	S 90.48		
	2S 5	Grass sp	8	E 89	E 92.56		
	2S 5	Hedera helix	6	W 86	W 89.44	88.92	
	2S 5	Symphoricarpos albus	4				
	2S 5	bare soil	>50				
	2S 7	Rubus discolor	26	N 90	N 93.6		Quadrat placed 3' up on vegetation.
	2S 7	Symphoricarpos albus (living & dead)	67	S 80	S 83.2		
	2S 7	Brachypodium (below)	20	E 83	E 86.32		
	2S 7			W 81	W 84.24	86.84	
	2S 9	Rubus discolor	22	N 86	N 89.44		Heavy Maple and Ash canopy. Middle of slope.
	2S 9	Brachypodium sylvaticum	76	S 85	S 88.4		
	2S 9	Heracleum lanatum	2	E 94	E 97.76		
	2S 9	Hedera helix (below)	20	W 62	W 64.48	85.02	
	2S 9	Melissa officinalis	1				
	2S 9	Juglans seedling	5				
	2S 11	Rubus discolor	60	N 92	N 95.68		Quadrat placed 18" up on vegetation.
	2S 11	Melissa officinalis	9	S 90	S 93.6		
	2S 11	Brachypodium sylvaticum	30	E 94	E 97.76		
	2S 11	Unknown - brassica?	2	W 49	W 50.96	84.5	
2S 12m to 15m blocked by fallen tree. Sale vegetation as 2S 11							

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Transect #	Quadrat # (distance from creek CL in m)	Species	Plants % cover	Densimeter Reading	Densimeter % open (x1.04)	Average Densimeter	Quadrat placement, Photos, Notes
	2S 15	Rubus discolor	8	N	80	N 83.2	Walnut canopy
	2S 15	Hedera helix	52	S	95	S 98.8	
	2S 15	Brachypodium sylvaticum	20	E	94	E 97.76	
	2S 15	Juglans seedlings	6	W	76	W 79.04	
	2S 17	Brachypodium sylvaticum	45	N	80	N 83.2	Walnut canopy, shorter vegetation
	2S 17	Heracleum lanatum	12	S	91	S 94.64	
	2S 17	Rubus discolor	1	E	95	E 98.8	
	2S 17	Hedera helix	1	W	72	W 74.88	
	2S 17	bare soil	59				
	2S 17	Crataegus seedling	<1				
	2S 19	Brachypodium sylvaticum	84	N	89	N 92.56	Walnut canopy, shorter vegetation
	2S 19	Hedera helix	5	S	95	S 98.8	
	2S 19	Unknown seedling	1	E	91	E 94.64	
	2S 19	crataegus seedling	<1	W	87	W 90.48	
	2S 19	Heracleum lanatum (dead)	5				
	2S 19	bare soil	9				
	2S 19	Rubus discolor	4				
	2S 21	Rubus discolor	7	N	91	N 94.64	Walnut canopy, shorter vegetation
	2S 21	Brachypodium sylvaticum	13	S	87	S 90.48	
	2S 21	Dead vegetation	82	E	93	E 96.72	
	2S 21	Juglans seedling	5	W	90	W 93.6	
	2S 21	Rumex acetosella	2				
	2S 21	Moss	4				
	2S 21	Crataegus seedling	<1				
	2S 23	Heracleum lanatum (live)	23	N	95	N 98.8	Walnut canopy, shorter vegetation
	2S 23	Grass sp (mostly alive)	18	S	93	S 96.72	
	2S 23	dead wood	8	E	92	E 95.68	
	2S 23	bare soil	9	W	89	W 92.56	
	2S 23	Dead vegetation	33				
	2S 25	Grass sp	100	N	87	N 90.48	At edge of Walnut canopy
	2S 25	Rubus discolor	<1	S	80	S 83.2	
	2S 25	Unknown seedling	<1	E	96	E 99.84	
	2S 25			W	78	W 81.12	
	2S 27	Grass sp	85	N	94	N 97.76	Outside of Walnut canopy
	2S 27	Juglans seedling	<1	S	22	S 22.88	
	2S 27	bare soil	15	E	95	E 98.8	
	2S 27			W	32	W 33.28	
	2S 29	Grass sp	100	N	78	N 81.12	Outside of Walnut canopy
	2S 29	Lathyrus sp.	8	S	9	S 9.36	
	2S 29			E	47	E 48.88	
	2S 29			W	4	W 4.16	
3S	3S 4	Ranunculus repens	20	N	78	N 81.12	Took area photos. Lower area by stream. Steep bank up. Symphoricarpos and Rubus overhanging.
	3S 4	Epilobium ciliatum	13	S	81	S 84.24	

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Transect #	Quadrat # (distance from creek CL in m)	Species	Plants % cover	Densimeter Reading		Densimeter % open (x1.04)		Average Densimeter	Quadrat placement, Photos, Notes
	3S 4	Unknown (photo)	30	E	87	E	90.48		Upper level. Quadrat placed 18" up on vegetaion.
	3S 4	Daucus carota	20	W	88	W	91.52	86.84	
	3S 4	Grass sp	30						
	3S 6	Symphoricarpos albus	50	N	81	N	84.24		
	3S 6	Rubus discolor	5	S	72	S	74.88		
	3S 6	bare soil	90	E	71	E	73.84		
	3S 6			W	81	W	84.24	79.3	
	3S 8	woody debris	65	N	91	N	94.64		In thicket of Alnus rubra. Many obstructions. Measurements approx.
	3S 8	Rubus discolor	15	S	62	S	64.48		
	3S 8	Symphoricarpos albus	5	E	75	E	78		
	3S 8	bare soil	30	W	67	W	69.68	76.7	
	3S 10	Grass, dead	72	N	81	N	84.24		Rubus arching above. Some thistles nearby.
	3S 10	Rubus discolor	10	S	55	S	57.2		
	3S 10	woody debris	8	E	79	E	82.16		
	3S 10	Symphoricarpos albus	2	W	79	W	82.16	76.44	
	3S 10	Brachypodium sylvaticum	5						
Between 10m and 14m Alnus rhombifolia thicket threaded with Rubus discolor. Impassible.									
	3S 14	Rubus discolor	74	N	15	N	15.6		
	3S 14	Alnus rhombifolia	14	S	0	S	0		
	3S 14	Conium maculatum	10	E	18	E	18.72		
	3S 14	Grass sp	13	W	0	W	0	8.58	
	3S 16	Grass, dead	94	N	5	N	5.2		In dirt road. Took area photos.
	3S 16	Euphorbia maculata	5	S	0	S	0		
	3S 16			E	18	E	18.72		
	3S 16			W	0	W	0	5.98	
	3S 18	Grass, live	58	N	6	N	6.24		At edge of road
	3S 18	Grass, dead	57	S	0	S	0		
	3S 18	Convolvulus sepium	9	E	0	E	0		
	3S 18	Daucus carota	1	W	0	W	0	1.56	
	3S 20	Grass, dead	100	N	2	N	2.08		
	3S 20	Thistle	4	S	0	S	0		
	3S 20	Rumex sp.	2	E	5	E	5.2		
				W	0	W	0	1.82	
Stopped at fence. Horse pasture beyond.									
4W	4W 4	Sedge?	8	N	68	N	70.72		Quadrats placed downstream of transect instead of upstream as usual. Took area photos. Many varied seedlings in gravel nearby - Ranunculus, thistles, Daucus, Brachypodium, etc.
	4W 4	Vicia sp.	1	S	96	S	99.84		
	4W 4	Stachys cooleyae (?)	8	E	93	E	96.72		
	4W 4	Rubus discolor seedling (1)	1	W	96	W	99.84	91.78	
	4W 4	Gravel	100						
	4W 4	Rumex seedling (1)	1						
	4W 4	Grass?	4						
	4W 6	Brachypodium sylvaticum	62	N	93	N	96.72		Mostly Fraxinus canopy.
	4W 6	Rubus discolor	13	S	96	S	99.84		

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Transect #	Quadrat # (distance from creek CL in m)	Species	Plants % cover	Densiometer Reading	Densiometer % open (x1.04)	Average Densiometer	Quadrat placement, Photos, Notes
	4W 6	Symphoricarpos albus (above)	70	E 92	E 95.68		
	4W 6	Hedera helix	3	W 96	W 99.84	98.02	
	4W 6	Ranunculus repens	1				
4W	4W 8	Grass sp (Brachypodium?)	28	N 96	N 99.84		Steep slope
	4W 8	Hedera helix	3	S 96	S 99.84		
	4W 8	Symphoricarpos albus (above)	50	E 96	E 99.84		
	4W 8	bare soil	64	W 96	W 99.84	99.84	
	4W 10	Rubus discolor (many dead stems)	34	N 96	N 99.84		Quadrat placed 3' up on vegetation.
	4W 10	Symphoricarpos albus	26	S 96	S 99.84		
	4W 10	Hedera helix (below)	10	E 96	E 99.84		
	4W 10			W 96	W 99.84	99.84	
	4W 12	Brachypodium sylvaticum	68	N 96	N 99.84		
	4W 12	Rubus discolor	12	S 94	S 97.76		
	4W 12	bare soil/litter	24	E 96	E 99.84		
	4W 12			W 96	W 99.84	99.32	
	4W 14	Rubus discolor	28	N 96	N 99.84		
	4W 14	Brachypodium sylvaticum	2	S 83	S 86.32		
	4W 14	dead vegetation	68	E 96	E 99.84		
	4W 14			W 89	W 92.56	94.64	
	4W 16	Rubus discolor	10	N 94	N 97.76		Canopy of mixed Oak, Maple, Ash, Poplar.
	4W 16	Crataegus monogyna	9	S 79	S 82.16		Quadrat placed near transect marker.
	4W 16	Grass, dead, and litter	72	E 92	E 95.68		
	4W 16	bare soil	17	W 90	W 93.6	92.3	
	4W 16	Quercus garryana seedling	2				
	4W 18	Grass, dead, and litter	100	N 82	N 85.28		At edge of canopy.
	4W 18	Thistle	7	S 2	S 2.08		
	4W 18	Rubus discolor	1	E 63	E 65.52		
	4W 18			W 17	W 17.68	42.64	
	4W 20	Grass, dead	100	N 57	N 59.28		
	4W 20	Thistle	4	S 0	S 0		
	4W 20	Hyphchaeris radicata	3	E 7	E 7.28		
	4W 20			W 10	W 10.4	19.24	
	4W 22	Grass, dead	100	N 46	N 47.84		At edge of road
	4W 22			S 0	S 0		
	4W 22			E 3	E 3.12		
	4W 22			W 0	W 0	12.74	
	4W 24	Gravel road	100	N 24	N 24.96		In road
	4W 24			S 0	S 0		
	4W 24			E 0	E 0		
	4W 24			W 0	W 0	6.24	
	4W 26	Rubus discolor	14	N 16	N 16.64		In ditch by road
	4W 26	Thistle	17	S 0	S 0		
	4W 26	Dipsacus sylvestris	32	E 0	E 0		

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Transect #	Quadrat # (distance from creek CL in m)	Species	Plants % cover	Densimeter r Reading	Densimeter % open (x1.04)		Average Densimeter	Quadrat placement, Photos, Notes	
	4W 26	Grass, live	6	W	0	W	0	4.16	
	4W 26	Grass, dead	64						
	4W 26	Daucus carota	1						
	4W 26	Vicia sp	1						
	4W 28	Cirsium arvense	35	N	21	N	21.84		Took area photos. Quadrat placed 3' up on vegetation, by fence.
	4W 28	Rubus discolor	20	S	0	S	0		
	4W 28	Dead vegetation (below)	40	E	0	E	0		
	4W 28	Brassica (unknown)	4	W	0	W	0	5.46	
	4W 28								
5W	5W 2	Brachypodium sylvaticum	59	N	96	N	99.84		Took area photos. Lower level by creek. Rock cobbles under all
	5W 2	Dipsacus sylvestris	3	S	96	S	99.84		
	5W 2	Moss	62	E	96	E	99.84		
	5W 2	Rock	6	W	96	W	99.84	99.84	
	5W 2	Fraxinus seedling (10")	9						
	5W 4	Hedera helix	41	N	96	N	99.84		Canopy of Alnus rhombifolia.
	5W 4	Brachypodium sylvaticum	45	S	94	S	97.76		
	5W 4	Rubus discolor	3	E	96	E	99.84		
	5W 4	Rock (below)	100	W	96	W	99.84	99.32	
	5W 4	Heracleum lanatum (dead)							
	5W 6								Rock, vertical. Scattered Rubus and
	5W 8	Rubus		N	91	N	94.64		Upper level has only narrow strip btw vertical wall and path. Rubus growing over fence. Alnus rhombifolia above.
	5W 8	Alnus rhombifolia		S	84	S	87.36		
	5W 8			E	92	E	95.68		
	5W 8			W	44	W	45.76	80.86	
6W	6W 1	Brachypodium sylvaticum	68	N	76	N	79.04		Took area photos
	6W 1	Daucus carota (1)	<1	S	86	S	89.44		
	6W 1	Epilobium ciliatum (1)	2	E	64	E	66.56		
	6W 1	Unknown seedling	<1	W	75	W	78	78.26	
	6W 1	bare soil and debris	32						
	6W 3	bare soil - vertical wall	75						Too steep to stand nearby and take densiometer readings.
	6W 3	Quercus seedlings	25						
	6W 3	Brachypodium sylvaticum	7						
	6W upper	Rubus discolor		N	1	N	1.04		6W upper level not accessible - fenced off and has poison oak. Canopy Acer macrophyllum. Listed plants visible from walkway.
	6W upper	Heracleum lanatum (dead)		S	27	S	28.08		
	6W upper	Toxicodendrom diversilobum (Poison Oak)		E	59	E	61.36		
	6W upper	Alnus rubra seedlings		W	1	W	1.04	22.88	
	6W upper	Phalaris arundinacea							

Transects were laid out as follows:

Transect #1N & 1S at approx 50' west of SE property line, extending 100' north to south perpendicular to creek. 1N: First rebar marker at 12' north of creek CL, then 50' and 100'. 1S: First rebar marker 15' (5m) south of creek CL, then 35'. Wide rock berm (under vegetation) prevented putting pole in further south.

Transect #2N & 2S: 100' west of 1N. 2N: First rebar marker 11' (3.35m) north of creek CL, then 50' and 100'. 2S: First rebar marker 18' (6m) south of creek CL, then 48'.

Transect #3E & 3W (3S): at SW corner of mowed field, extending northeast to southwest (approx 92' from Transect 2). 3E: First marker 15' (4.6m) from creek CL, then 50' and 100'. 3W (3S): First rebar marker 12 ft (4m) from CL, then 45' (15m).

Transect #4E, 4W, 100' north of Transect 3. 4E: First marker 9' (2.7m) from CL, then 50' and 100'. 4W: First marker 20' (6.6m) from creek CL, then 46' (15.3m).

5E & 5W - 100' north of Transect 4. 5E: First marker 14' (4.3m) from CL, then 50' and 100'. 5W: One marker 6' (2m) west of creek CL, no more due to steep narrow bank.

Transect #6E & 6W - 100' north of NW corner of shop building. 6E: First marker 14' (4.3m) from CL, then 65' from CL, in Box clump. 6W: One marker 4' (1.3m) west of creek CL. Upper area inaccessible, but another marker could be put there.

Quadrats were laid out as follows:

Quadrat #1 placed along transect at edge of vegetation next to creek. Subsequent quadrats placed 2 meters further along transect, measured center to center. Quadrats are placed upstream of the transect (west or north) unless otherwise noted.

## Appendix E: Tree Survey Data, July-August 2012 by Signe Danler

Tree #	Species	Notes	Circumference (in)	Est. height (ft)	% Ivy cover	DBH (in)
Began at NW corner of shop bldg, worked North on East side of creek.						
1E	Prunus (plum) - yellow	N. of shop bldg. Leaning 30deg.	20"	30'	0	6
2E	Crataegus	multiple trunks	T1 19.5"	33'	0	6
2E	Crataegus		T2 11"			4
3E	Prunus lusitanica	Leaning 30 deg	T1 24"	20'	0	8
3E	Prunus lusitanica		T2 22"			7
4E	Acer macrophyllum	2 trunks above 3'. Ivy was cut off, is regrowing.	T1 52"	40'	<1	17
4E	Acer macrophyllum		T2 45"			14
5E	Quercus rubra		47.5"	50-60'	0	15
6E	Acer macrophyllum	Ivy cut from trunk, re-growing strongly	T1 46"	40'	50%	15
6E	Acer macrophyllum		T2 27"			9
6E	Acer macrophyllum		T3 46"			15
6E	Acer macrophyllum		T4 25"			8
7E	Acer macrophyllum	Very near 6E	T1 30"	40'	20%	10
7E	Acer macrophyllum		T2 35"			11
8E	Prunus (plum) - yellow	Double trunk.	42"	30'	0	13
9E	Prunus (plum) - purple	Several thin trunks	15" lgst	20'	20%	5
10E	Acer macrophyllum	2 trunks leaning W from bank	T1 20"	30'	10%	6
10E	Acer macrophyllum		T2 20"			6
11E	Fraxinus latifolia		T1 40"	60'	0	13
11E	Fraxinus latifolia		T2 30"			10
12E	Acer macrophyllum	Split trunk, 1 vert, 1 horiz	70"	50'	0	22
13E	Acer macrophyllum	Same as 104E (deleted)	T1 70"	60'	0	22
13E	Acer macrophyllum		T2 40"			13
14E	Alnus rubra		30"	50'	0	10
15E	Acer macrophyllum		T1 60"	50'	0	19
15E	Acer macrophyllum		T2 30"			10
16E	Acer macrophyllum	Ivy was cut, re-growing. Same as 96E (deleted)	T1 42"	40'	<5%	13
16E	Acer macrophyllum		T2 50"			16
16E	Acer macrophyllum		T3 30"			10
16E	Acer macrophyllum		T4 40"			13
17E	Fraxinus latifolia	measure from creek	T1 30"	50-60'	<10	10
17E	Fraxinus latifolia	measure from creek	T2 40"			13
8/13/12. Began at shop building, worked south on East side of creek.						
18E	Fraxinus latifolia	Large, by NW corner of shop	T1 60"	60'	50%	19

18E	Fraxinus latifolia		T2 66"			21
18E	Fraxinus latifolia		T3 48"			15
18E	Fraxinus latifolia		T4 36"			11
19E	Dead tree	on lower terrace	26"	25'	20%	8
20E	Alnus rubra	on lower terrace at edge of creek	18"	35-40'	0	6
21E	Alnus rubra	on lower terrace at edge of creek	50"	25'	0	16
22E	Alnus rubra	on lower terrace	50"	50'?	5	16
23E	Fraxinus latifolia	on lower terrace	18"	40'	<1	6
24E	Fraxinus latifolia	on lower terrace	16"	40'	1	5
25E	Prunus (cherry)	On upper terrace. Lge free-standing south of shop, small black berries.	65"	40'	0	21
26E	Fraxinus latifolia	Fallen, dying, mostly horiz,	50"		90	16
27E	Pinus sp	By SW corner of shop	6"	15'	20	2
28E	Prunus (plum) - red	S, side of transect 5E	30"	30'	50	10
29E	Prunus (plum)	Thicket	8"	15'	<10	3
GPS re-started here						
30E	Prunus (plum) - red	multiple trunks, twined with ivy	20"	15'	75	6
31E	Prunus (plum) - red		20"	15'	75	6
32E	Prunus (plum)	Group of 10 or more sm. Plums for 20' along edge of drop to creek. Didn't measure all.	6-8"	25'	40	2
33E	Fraxinus latifolia	Lge multitrunked by creek, 20' south of Transect 5E	T1 100"	50'	<1	32
33E	Fraxinus latifolia		T2 30"			10
33E	Fraxinus latifolia		t# 20"			6
34E	Prunus (plum)	leaning 45 deg	10"	25'	<10	3
35E	Prunus (plum)		6"	10'	<10	2
36E	Alnus rubra	Large, 2 trunks above BH	T1 54"	60'	10	17
36E	Alnus rubra		T2 48"			15
37E	Crataegus monogyna		3"	15'		1
38E	Crataegus monogyna	clump of several trunks	4-15"	20'	50	3
39E	Fraxinus latifolia	Large, at edge of creek	70"	50-60'	50	22
40E	Fraxinus latifolia	Multi-stemmed	10-20"	40'	90	5
41E	Acer macrophyllum	s. of entrance to transect 5E	25"	30'	10	8
42E	Populus trichocarpa	just south of 41E	25"	50'	0	8
43E	Liquidamber styraciflua		40"	70'	0	13
44E	Corylus cornuta	multitrunked	6-8" ea	15'	0	2
45E	Prunus (cherry) (with Corylus)		20"	25'	0	6
46E	Acer macrophyllum	No. of transect 4E	T1 70"	70'	30	22
46E	Acer macrophyllum		T2 30"			10

47E	Fraxinus latifolia	W. of 43E; multitrunked	T1 20"	40'	50	6
47E	Fraxinus latifolia	Several thin trunks	T2 30"			10
47E	Fraxinus latifolia		T3 8"			3
48E	Unknown	tan mottled bark; English Laurel at base	8"	25'	<5	3
49E	Acer macrophyllum		60"	50-60'	<5	19
50E	Fraxinus latifolia	Leaning east, horiz. Branch across path.	40"	40'?	0	13
50E	Fraxinus latifolia		25-30"			9
51E	Prunus (cherry)	N., of trnsect 4E; white bark	30"	35'	0	10
52E	Fraxinus latifolia	clump of three	T1 25"	70'	0	8
52E	Fraxinus latifolia		T2 15"			5
53E	Prunus (plum?)	Left of entrance to Transect 4E	T1 20"	30'	0	6
53E	Prunus (plum?)		T2 10"			3
54E	Prunus (cherry)		20"	15'	0	6
55E	Prunus (cherry)	white bark	T1 30"	30'	0	10
55E	Prunus (cherry)		T2 30"			10
55E	Prunus (cherry)		T3 20"			6
56E	Catalpa speciosa	at edge of stream, S. of Tr 4E	25"	30'	0	8
57E	Fraxinus latifolia	Just S of Catalpa	20"	20'	0	6
58E	Crataegus monogyna	at edge of grass	25"	25'	0	8
59E	Fraxinus latifolia	In mixed thicket, 6+ trunks	20"main	25'	0	6
60E	Crataegus monogyna	In mixed thicket	8-15"	25'	0	4
61E	Prunus (cherry)	In mixed thicket	20-30"	25'	0	8
62E	Crataegus monogyna	4 trunks; just W of 60E	15-25"	30'	0	6
63E	Fraxinus latifolia	3 trunks, leaning south	5" each	20'	0	2
64E	Fraxinus latifolia	3 trunks	15-20"	30'	0	5
65E	Crataegus monogyna		25"	20'	0	8
66E	Crataegus monogyna	leaning south	30"	20'	0	10
67E	Fraxinus latifolia	N of Transect 3E; leaning east 45deg	40"	20'	0	13
67E	Following are north of Transect 3E					0
68E	Fraxinus latifolia	Very large, fallen to west, still living	80"	x	0	25
69E	Acer macrophyllum	Group of several saplings at edge of creek	6-8"	20'	0	2
70E	Fraxinus latifolia	N of Tr. 3E at edge of creek. Very large. One trunk vertical, one leaning across creek	T1 90"	50'	0	29
70E	Fraxinus latifolia		T2 90"		0	29
71E	Fraxinus latifolia	3 saplings by 70E	15-25"		0	6
72E	Fraxinus latifolia	Possibly different species	11"	25'	0	4
73E	Fraxinus latifolia	Tall, straight, at edge of creek	80"	60'	0	25
74E	Prunus (plum)	south side of Tr. 3E, leaning over	12"	15'	0	4

75E	Corylus cornuta	Thicket in mowed area	6-20"	25'	0	5
75E	Acer macrophyllum	Acer m. in thicket in mowed area	45"	45'	0	14
75E	Malus (apple)	Thicket in mowed area		15'	0	0
76E	Prunus (plum)	S of Tr 3E	10"	25'	0	3
North bank of south stretch of creek.						
77N	Acer macrophyllum	On bank approx 35' E of Tr 2N	T1 80"	60'	0	25
77N	Acer macrophyllum		T2 47"			15
78N	Fraxinus latifolia	probable i.d.	25"	50'	0	8
79N	Alnus rubra	W of Tr 1N; probable i.d.	T1 80"	50'	0	25
79N	Alnus rubra		T2 40"		0	13
80N	Fraxinus latifolia	SW of 79N	20"	60'	0	6
81N	Fraxinus latifolia	clump, just E of Tr 1N	Tr1 60"	50'	0	19
81N	Fraxinus latifolia		Tr2 42"			13
81N	Fraxinus latifolia		Tr3 22"			7
82N	Quercus garryana	in field	8"	12'	0	3
83N	Quercus garryana	in field	2"	6'	0	1
84N	Fraxinus latifolia	in field	6"	20'	0	2
85N	Fraxinus latifolia	in field	4"	20'	0	1
86N	Fraxinus latifolia	in field	6"	20'	0	2
87N	Fraxinus latifolia	in field. Not mapped.	2"	10'	0	1
88N	Fraxinus latifolia	in field	T1 2"	8'	0	1
88N	Fraxinus latifolia		T2 4"	15'	0	1
89N	Fraxinus latifolia	Tall, straight, dying at top	80"	70-80'	0	25
90N	Pinus sp	in field	<2"	3'	0	1
91N	Fraxinus latifolia	W of Tr 2N; in field; 2 trunks	<2"	7'	0	1
92N	Pinus sp	in field	2"	4'	0	1
93N	Pinus sp	in field	<2"	2'	0	1
94N	Pinus sp	in field	<2"	2'	0	1
Just South of Entrance road, East side of creek						
95E	Acer macrophyllum	Bamboo at base	40"	40'	<1	13
97E	Corylus cornuta	thicket. N of 96E	6" max	10'	at base	2
98E	Prunus (plum)		10"	15'	<1	3
99E	Fraxinus latifolia	Lge tree just south of entrance bridge	100"	70'	<5	32
100E	Fraxinus latifolia		8"	15'	<1	3
101E	Quercus garryana		10"	15'	0	3
102E	Prunus lusitanica	multi-trunked, 6 or more	10-25"	20'	0	6
103E	Alnus rhombifolia	Just W of 102E	33"	50'	<1	11
Starting at North end of West side of creek						
1W	Salix sitchensis	By entrance bridge, at creek level. Multitrunked.	10" ea	20'	0	3
2w	Fraxinus latifolia	Upper terrace	10"	20'	0	3

3w	Fraxinus latifolia	25"	25"	20'	0	8
4w	Fraxinus latifolia	At creek edge. Lge horz. Branch	40"	50'+	0	13
5w	Corylus cornuta	Multi-trunked	<2"	10'	0	1
6w	Fraxinus latifolia	Huge old tree at edge of creek.	80"	60'+	0	25
7w	Crataegus monogyna	Clump of saplings	<2"	6'	0	1
8w	Corylus cornuta	Clump	<2"	15'	0	1
9w	Corylus cornuta		4"	15'	0	1
10w	Acer macrophyllum	Upper terrace. Leaning toNW	15"	30'	0	5
11w	Acer macrophyllum	grouped with several smaller saplings	8"	25'	0	3
12w	Corylus cornuta	Thicket at edge of creek. Across from Tr. 6E	<2"	25'	0	1
13w	Crataegus monogyna	Upper terrace	10"	20'	0	3
14w	Alnus rubra	Massive tree growing out of side of bank, severely undercut.	120"	60'	<5	38
15w	Alnus rubra	Just S of 14W	T1 40"	60'	20	13
15w	Alnus rubra		T2 30"			10
15w	Alnus rubra		T3 20"			6
16w	Unknown - poss. Alnus	S. of 15W at edge of creek	30"	60'	0	10
17w	Populus trichocarpa	At edge of road	45"	60-70'	0	14
18w	Populus trichocarpa		T1 50"	60-70'	0	16
18w	Populus trichocarpa		T2 45"			14
19w	Fraxinus latifolia	Seedling btw Poplars	2"	10'	0	1
20w	Acer macrophyllum	Nr road edge	6"	20'	0	2
21w	Alnus rubra	Just S of end of orange fence, at edge of creek	50"	60'	0	16
22w	Fraxinus latifolia	clump of several trunks	20-30"	50'	0	8
23w	Fraxinus latifolia	Btw huge dead tree and road	20"	30'	0	6
24w	Populus trichocarpa	N of Transect 4E/W	25"	50'	0	8
West side above creek. Near Transect 4						
25w	Fraxinus latifolia	at edge of creek	10"	40'	0	3
26w	Fraxinus latifolia	at edge of creek. Same as 27W (deleted)	T2 20"	40'	0	6
26w	Fraxinus latifolia	at edge of creek	T1 30"			10
26w	Fraxinus latifolia		T3 10"			3
28w	Alnus rhombifolia	at edge of creek	60"	50'	0	19
29w	Fraxinus latifolia	at edge of creek	30"	50'	0	10
30w	Populus trichocarpa	at edge of road	80"	60-70'	0	25
31W	Alnus rhombifolia		60"	50'	0	19
32W	Alnus rhombifolia	poison oak on trunk	50"	50'	0	16
33W	Acer macrophyllum		10"	40'	0	3
34W	Populus trichocarpa	at SW corner of OCCUH property	100"+	80-90'	<5	32
South side of Oak Creek, beginning at road						

35S	Fraxinus latifolia	E. of 34W	40"	60'	<5	13
36S	Quercus garryanna	SW corner of woods by gate	25"	20'	<5	8
37S	Acer macrophyllum	clump of 6 stems	6-10"	25'	0	3
38S	Crataegus monogyna	small clump	8" & less	20'	0	3
39S	Populus trichocarpa	at edge of creek	130"	80-90'	0	41
40S	Fraxinus latifolia	at edge of creek; next to 39S	30"	50'	0	10
41S	Acer macrophyllum	At edge of creek	62"	50'	0	20
42S	Acer macrophyllum	at edge of creek	10"	25'	0	3
43S	Quercus garryanna	at edge of creek	8"	15'	0	3
44S	Fraxinus latifolia	at edge of creek	28"	60'	0	9
45S	Fraxinus latifolia	at edge of creek; W of Tr 4S	40"	60'	0	13
46S	Fraxinus latifolia	at edge of creek	T1 72"	50'	<1	23
46S	Fraxinus latifolia		T2 44"			14
47S	Fraxinus latifolia	at edge of creek	30"	50'	<5	10
48S	Fraxinus latifolia	at edge of creek	80"	50-60'	0	25
49S	Fraxinus latifolia	at edge of creek	T1 50"	50-60'	<1	16
49S	Fraxinus latifolia		T2 22"			7
50S	Acer macrophyllum	Undercut, at creek edge	T1 50"		0	16
50S	Acer macrophyllum	2 trees very close together	T2 45"	40'	0	14
51S	Fraxinus latifolia	at edge of creek	50"	60'	0	16
52S	Acer macrophyllum	Group of 3 saplings leaning south at grass edge	T1 17"	30'	0	5
52S	Acer macrophyllum		T2 12"			4
52S	Acer macrophyllum		T3 9"			3
53S	Fraxinus latifolia	at edge of creek	50"	60'	0	16
54S	Fraxinus latifolia	at edge of creek	50'	60'	0	16
55S	Acer macrophyllum	Clump of 3 small saplings at edge of creek	2-3"	10'	0	1
56S	Acer macrophyllum	at edge of grass	4"	20'	0	1
57S	Acer macrophyllum	at edge of grass	15"	25'	0	5
58S	Acer macrophyllum	at edge of grass	11"	25'	0	4
59S	Acer macrophyllum	2 trunks intertwined	9" ea	25'	0	3
60S	Acer macrophyllum	at edge of grass, at edge of grass	17"	15'	0	5
61S	Acer macrophyllum	Clump of 4 at edge of grass	T1 20"	30'	0	6
61S	Acer macrophyllum		T2 17"			5
61S	Acer macrophyllum		T3 17"			5
61S	Acer macrophyllum		T4 9"			3
62S	Acer macrophyllum		19'	30'	0	6
63S	Prunus (plum - yellow)	2 trunks	T1 24"	25'	0	8
63S	Prunus (plum - yellow)		T2 14"			4
64S	Alnus rhombifolia	Almost horiz. Towards south	20"	15'	0	6

65S	Alnus rubra (??)	1 tree w/2 trunks, 2nd tree very close	T1 49"	60'	0	16
65S	Alnus rubra (??)		T2 29"			9
65S	Alnus rubra (??)		T3 18"			6
66S	Fraxinus latifolia	at edge of creek	40"	50-60'	0	13
67S	Unknown (not Crataegus or Cherry)	Leaves variable; 1/4" black fruits in clumps	15"	25'	0	5
68S	Unknown (same)	Very shaggy bark	30"	30'	0	10
69S	Fraxinus latifolia	at edge of grass; dense Heracleum all around	50"	50'	0	16
70S	Quercus garryana	at edge of grass	40"	40'	0	13
71S	Quercus garryana	at edge of grass	20"	40'	0	6
72S	Fraxinus latifolia	at edge of grass; 3 large trunks	T1 50"	60'	0	16
72S	Fraxinus latifolia		T2 60"			19
72S	Fraxinus latifolia		T3 60"			19
73S	Juglans nigra		8"	20'	0	3
74S	Alnus rubra (? Not sure)		T1 30"	30'	0	10
74S	Alnus rubra (? Not sure)		T2 30"			10
75S	Juglans nigra		20"	30'	0	6
76S	Alnus rhombifolia	at edge of creek	T1 80"	60'	0	25
76S	Alnus rhombifolia		T2 50"			16
77S	Alnus rhombifolia	at edge of creek	T1 47"	60'	0	15
77S	Alnus rhombifolia		T2 21"			7
West of Transect 2S						
78S	Juglans nigra	Multiple trunks grown together	120"	70'	0	38
79S	Prunus (plum, red)		25"	30'	0	8
East of Transect 2S						
80S	Acer macrophyllum	Near edge of creek		25'	0	0
81S	Fraxinus latifolia	Group of several at Tr. 2S	40"	40'	<1	13
82S	Fraxinus latifolia	Group of several at Tr. 2S	14"	25'	<1	4
83S	Fraxinus latifolia	Group of several at Tr. 2S	38"	60'	<1	12
84S	Alnus rhombifolia	At edge of creek. Dead top	95"	40'	<5	30
85S	Fraxinus latifolia		14"	15'	60	4
86S	Juglans nigra		20"	50'	0	6
87S	Prunus (cherry)	At edge of grass	12"	25'	0	4
88S	Acer macrophyllum	At edge of grass	14"	25'	0	4
89S	Juglans nigra	At edge of creek	100"	60-70'	<20	32
90S	Fraxinus latifolia	At edge of creek leaning south	120"	60'	<50	38
91S	Fraxinus latifolia	At edge of creek, just W of Tr 1S	50"	60'	0	16

## APPENDIX F: Seed Bank Germination Records

Seed Bank Inventory, May-June 2012. Signe Danler

Sample #	Plant #	Color	Plant Name DATE	Germ	18-May	22-May	25-May	29-May	1-Jun	Subtotal	Habitat
A115	U7	unknown						1		1	Canopy
A115	U8	unknown						1		1	Canopy
A17	1	Plain	Leucanthemum vulgare		5	1				6	Field
A17	7	DkGrn	Grass			3		5+		3	Field
A17	9	Brwn	Cirsium arvense			1				1	Field
A17	U13		Unknown			1	2		3	6	Field
A35	1	Plain	Leucanthemum vulgare		3	1				4	Field
A35	5		Rumex sp			6	2			8	Field
A35	9	Brwn	Cirsium arvense			1		1		2	Field
A35	U2	unknown	Unknown			1				1	Field
A35	U3	Unknown	Unknown					1		1	Field
A35	U9	Pink/Grn	Very tiny						3	3	Field
A71	2	red	Hypochaeris radicata		1					1	Field
A71	7	DkGrn	Grass			2		5		7	Field
A71	10	Black	Sonchus arvensis		1		1	1		3	Field
A71	18		Epilobium ciliatum (Willow-herb)		1		1	1		3	Field
A71	U5	unknown	Unknown		1		1	1		3	Field
A78	7	DkGr	Grass			1	2	2		5	Canopy
A78	10	Black	Sonchus arvensis		1					1	Canopy
A78	12	Red/purpl	Matricaria discoidea? Lomatium?		1					1	Canopy
A78	16	Blu/Yell	Portulaca olearacea						1	1	Canopy
A78	19	Or/Blk	Potentilla (recta?)					1	1	2	Canopy
A78	U6	Unknown			1					1	Canopy
A98	7	DkGrn	Grass		1					1	Canopy
A98	19	Or/Black	Potentilla (recta?)					1	1	2	Canopy
A98	U3	Unknown				1		1		2	Canopy
B15	1	Plain	Leucanthemum vulgare		1		3			4	Field
B15	6	Yellow	Daucus carota		1					1	Field
B15	7	DkGrn	Grass			1			1	2	Field
B15	U9	Pink/grn	Very tiny						14	14	Field
B28	1	Plain	Leucanthemum vulgare		2					2	Field
B28	7	DkGrn	Grass						1	1	Field
B28	11	Unknown	Stellaria (pallida?) - chickweed		1					1	Field
B28	13	Grn/Purpl	Fragaria					1		1	Field
B28	17	Blu/Pink	Galium aparine						1	1	Field
B32	1	Plain	Leucanthemum vulgare		1	2				3	Field
B32	7	DkGrn	Grass					3		3	Field
B32	U9	Pink/grn	Very tiny					9		9	Field

B94	9	Brwn	Cirsium arvense		1		1		2	Canopy
B95	7	DkGrn	Grass				2		2	Canopy
B95	10	Black	Sonchus arvensis	1					1	Canopy
B95	14	DkBlue	Cerastium sp				1		1	Canopy
B95	20	Red/blue	Chicorum?		1	1		2	4	Canopy
B95	U12	Unknown			1				1	Canopy
C1	1	Plain	Leucanthemum vulgare	1	2		1		4	Field
C1	7	DkGrn	Grass				1		1	Field
C100	8	Pink	Tree?			1			1	Canopy
C100	14	Dk Blue	Cerastium sp				1		1	Canopy
C100	U4	Unknown					1		1	Canopy
C13	1	Plain	Leucanthemum vulgare	1			2		3	Field
C13	7	DkGrn	Grass				2		2	Field
C48	1	Plain	Leucanthemum vulgare	1					1	Field
C48	7	DkGrn	Grass				3		3	Field
C48	15	3 Red	Cardamine oligosperma				1		1	Field
C48	U0	Or/purple	Unknown				1		1	Field
C7	1	Plain	Leucanthemum vulgare	2	2				4	Field
C7	7	DkGrn	Grass				2		2	Field
C75	4	Purple	Convolvulus sepium		1				1	Canopy
C75	19	Or/Black	Potentilla (recta?)				1		1	Canopy
C75	U9	Pink/grn	Very tiny		1		1		2	Canopy
D29	1	Plain	Leucanthemum vulgare	1	3				4	Field
D29	7	DkGrn	Grass					2	2	Field
D29	19	Or/Black	Potentilla (recta?)				1		1	Field
D29	U1	Or/Purple	Unknown	5					5	Field
D29	U10		Unknown		1				1	Field
D29	U8	Orange	Unknown					1	1	Field
D36	3	Grn/Pink	Lapsana communis (Nipplewort)	1					1	Field
D52	10	Black	Sonchus arvensis				1		1	Field
D52	10	Black	Sonchus arvensis	1					1	Field
D52	U9	Pink/grn	Very tiny				2		2	Field
D65	1	Plain	Leucanthemum vulgare			1			1	Canopy
D65	7	Dk Grn	Grass		1				1	Canopy
D65	20	Blue/Red	Chicorum?	1					1	Canopy
D65	U8	Orange	Unknown		1				1	Canopy
D79	8	Pink	Tree?			1			1	Canopy
D79	U9	Pink/Grn	Very tiny				10		10	Canopy
D79	U8	Orange	Unknown	1	4	3	1	1	10	Canopy
D82	1	Plain	Leucanthemum vulgare	1					1	Canopy
D82	6	Yellow	Daucus carota		1				1	Canopy
D82	7	DkGrn	Grass				3		3	Canopy
D82	U11	Unknown			1				1	Canopy
D82	U8	Orange	Unknown		4		1		5	Canopy

