

Julia's Gulch Restoration Report and Plans

PREPARED FOR:

Cascade Land Conservancy and
Friends of Julia's Gulch
917 Pacific Avenue, Suite 304
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PROJECT:

Julia's Gulch
Tacoma, Washington
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Executive Summary

The findings and conclusions presented in this report are based on an interpretation of information currently available to AHBL. This summary is for introductory purposes and should be used only in conjunction with the full text of this report.

AHBL has completed this Restoration Report and Plans to assist in the progression of removal of noxious weeds and invasive species within Julia's Gulch. The site contains three forest communities including Douglas Fir/Big Leaf Maple, Red Alder/Big Leaf Maple, and Douglas Fir/Pacific Madrone. The site was further divided into ten restoration areas based on plant community, soil type, slope aspect and topographic position. This report proposes restoration of nine of the restoration areas where blackberry, ivy, holly and other noxious weeds and invasive species will be removed and native planting is proposed. This report also proposes restoration of the native plant community in one restoration area through the removal of noxious weeds and invasive species but due to very low percentages of these species planting is not proposed. Overall, approximately 11 acres of the site are proposed to have noxious weeds and invasive species removed and native species planted. The remainder of the site has minimal noxious weed and invasive cover and will not require planting or has no noxious weed and invasive cover. In addition, a long-term adaptive management plan for the continued maintenance of the native plant community within Julia's Gulch is proposed.

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1.0 INTRODUCTION

AHBL has completed this Restoration Report and Plans to assist in the progression of removal of noxious weeds and invasive species within Julia's Gulch in Tacoma, Washington. We understand that the Friends of Julia's Gulch are working as volunteers to remove noxious weeds and invasive species and planting native species. The Port of Tacoma owns title to the 31.66-acre property, while the Cascade Land Conservancy holds the conservancy easement for the site. Cascade Land Conservancy has requested that a stewardship plan be prepared for Julia's Gulch to plan for the future requirements and funding to meet those requirements.

Prior to preparation of this report several onsite meetings and team meetings with the Friends of Julia's Gulch and Cascade Land Conservancy occurred. The onsite meetings including review of plant communities, staking of two areas of blackberries in the central portion of the base of the gulch, and completing soil sampling, soil classification and testing for soil pH and nitrogen.

The site contains three forest communities including Douglas Fir/Big Leaf Maple, Red Alder/Big Leaf Maple, and Douglas Fir/Pacific Madrone. The site was further divided into ten restoration areas based on plant community, soil type, slope aspect and topographic position. This report proposes restoration of nine of the restoration areas where blackberry, ivy, holly and other noxious weeds and invasive species will be removed and native planting is proposed. This report also proposes restoration of the native plant community in one restoration area through the removal of noxious weeds and invasive species but due to very low percentages of these species planting is not proposed. Overall, approximately 11 acres of the site are proposed to have noxious weeds and invasive species removed and native species planted. The remainder of the site has minimal noxious weed and invasive cover and will not require planting or has no noxious weed and invasive cover. Approximately 1.43 acres of the site have been restored in the last year by the Friends of Julia's Gulch (0.74 acre) and the Washington Conservation Corps crew (0.69 acre). In addition, a long-term adaptive management plan for the continued maintenance of the native plant community within Julia's Gulch is proposed.

1.1 Volunteer Activities

Prior to issuance of this report the Friends of Julia's Gulch completed a general restoration map and goals and objectives for restoration of Julia's Gulch (Appendix A). The Friends of Julia's Gulch have completed the following activities to date.

- Hold volunteer work parties on the second Saturday of each month. This is an ongoing activity.
- Removal of blackberries and planting of trees on Green Tacoma Day 2009 southwest of the road crossing the central portion of the main gulch.
- Removal of blackberries and Japanese knotweed on the flat area near the southwest corner of the site. This is an ongoing activity.
- Planting of native tree, shrub and herbaceous species and placement of wood mulch on the flat area and sandy hill near the southwest corner of the site. This is an ongoing activity.
- Arranged for the City of Tacoma to periodically pick up invasive species piles and provide mulch to the site at the southwest access.
- Planting of trees in the gravel flat area near the south central property line.
- Placement of two water bladder tanks, one near the southwest corner of the site and one near the south central property line. The tanks are filled on a regular basis by the City of

Tacoma. The one on the south central portion of the site was stolen in the winter of 2010.

- Watering of planted trees and shrubs. This is an ongoing activity.
- Removal of blackberries and planting of vegetation by the WCC Crew on the south portion of the east facing slope. Planting was completed in December 2010.
- Creation of an access path from the southwest corner of the site to the base of the ravine. The path is in place.
- Maintenance of old roads and trails through the removal of blackberries and other vegetation that has encroached. This is an ongoing activity.
- Acquisition of funding from the Tacoma Garden Club for two Julia's Gulch signs. The signs have been purchased and posted on the site near Norpoint Way NE. The signs explain who the Friends of Julia's Gulch are and the ecological significance of the property.
- Jonathan Dawes a Boy Scout for his Eagle Scout Project placed gravel to define a trail to a bench that he installed at the overlook near the southwest corner of the site.

1.2 Scope of Services

The scope of services for this project included the following.

1. Delineate and stake each habitat in the Gulch. The delineation will occur using walking transects across accessible portions of the site. We understood that a general habitat map has been completed, and that your group will be using a GPS system to map the stake locations and prepare a map that corresponds with the staked areas that will be described in our report. AHBL completed the habitat map and the group used a GPS system to map the existing trails on the site.
2. Inventory the plant communities in each habitat, including restoration zones that require re-vegetation after invasive species are removed. A plant list will be prepared for each habitat.
3. Inventory overall habitat conditions and general health of each plant community.
4. Provide a list and recommended number of appropriate native trees and shrubs that can be planted in the restoration zones in each plant community.
5. Provide recommendations for planting based on soil analysis of samples for pH, nitrogen, phosphorus, and potassium.
6. Complete a forest inventory in accordance with full forest stand delineation standards. The inventory will be conducted using the variable radius plot point sampling method of inventory forest resources. Forest stands will be delineated into a vegetative cover type, with a size designation based upon the dominant/co-dominant tree species. The inventory will result in recommendations for thinning, restocking, and management.
7. Provide best management practices and regulatory requirements for working on and near slopes.
8. Prepare a report with tables that clearly describes the habitats, vegetation within each habitat, and restoration zone and management recommendations for each zone.

1.3 Site Location and Description

The proposed project site is comprised of 3 parcels (0321253000, 0321253043 and 0321253042) totaling 31.66 acres, located east of Norpoint Way NE in Section 25, Township 21, Range 03, W.M. in Tacoma, Pierce County, Washington (Appendix B). The site includes two ravines with steep slopes that have been highly disturbed by past filling and use of the main ravine (Julia's Gulch) for gravel mine settling ponds. The eastern gulch located on the site is known by the City as Metal Gulch. Based on review of the City of Tacoma govMe maps the site does not contain easements or utilities (sanitary sewer, storm sewer, waterlines, overhead and underground power, communication lines) that would limit restoration efforts. Soils in the enhancement areas are predominantly sand and gravelly sandy loam on the slopes and clay or silt loam in the base of the gulches. Vegetation includes well developed forest overstory with the understory dominated by either native plant communities or non-native plant communities including blackberry, ivy or knotweed. The south central portion of the site contains a cleared compacted gravel lot with a concrete pad. The gravel area contains weed species and a few tree saplings. Vegetation planted in this area by Friends of Julia's Gulch does not have a high survival rate due likely to compacted soils and high soil pH. Streams and wetlands were not observed on the site. A seasonal stream in the east gulch has been mentioned by several individuals from the City of Tacoma; however, no channel, bed or bank was observed in this gulch during the site visits. Runoff from the site ultimately enters a tidal ditch located 610 feet south of the site on the north side of Marine View Drive and then flows into the Hylebos Waterway located approximately 710 feet from the site. The Hylebos Waterway has fish use including Fall Chinook, Coho, Fall Chum, Pink Salmon, and Winter Steelhead. The site is located in the Puyallup/White Basin Water Resource Inventory Area 10.

The subject property is bordered immediately to the north by undeveloped land, and single-family housing; to the south by Marine View Park and commercial and industrial businesses; to the west by Norpoint Way NE, single-family housing and undeveloped land; and to the east by undeveloped land and single-family housing

Information from the City of Tacoma GovMe website and Ecology's website regarding the subject site is located in Table 1 below.

Table 1: GovMe and Ecology Website Information	
Habitat corridor:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Aquifer recharge area:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (rain gardens to treat water quality require health department approval)
Floodway:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Flood zone:	100 year <input type="checkbox"/> 500 year <input type="checkbox"/> None <input checked="" type="checkbox"/>
Habitat zone:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetlands not on or near site; therefore, not applicable to site.
Mine hazard area:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Steep slopes:	<25% <input checked="" type="checkbox"/> 25% – 40% <input checked="" type="checkbox"/> >40% <input checked="" type="checkbox"/>
Slope stability:	Intermediate <input type="checkbox"/> Modified <input type="checkbox"/> Unstable slope <input type="checkbox"/> Unstable old slide <input type="checkbox"/> Unstable recent slide <input type="checkbox"/> None <input checked="" type="checkbox"/>
Shoreline:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Stream:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Julia's Gulch Stream was historically filled, Metal Gulch stream not present based on field observation
Wetland:	Filled <input type="checkbox"/> High probability <input checked="" type="checkbox"/> Known <input type="checkbox"/> Non-jurisdictional <input type="checkbox"/> None <input type="checkbox"/>
Utilities in project area:	Sanitary sewer <input type="checkbox"/> Storm sewer <input type="checkbox"/> Water lines <input type="checkbox"/> Overhead Power <input type="checkbox"/> None <input checked="" type="checkbox"/>
Schools:	Northeast Tacoma

Arsenic plume in project area: (request information from ecology for cautions for each zone)
http://apps.ecy.wa.gov/website/facsite/viewer.htm?sp_area=Tacoma%20Smelter%20Plume
None detected ☒ <20ppm ☐ 20-40ppm ☐ 40-100ppm ☐ 100-200ppm ☐
>200ppm ☐

1.4 Topography

The topography of the site and surrounding areas have been highly manipulated by (a) construction of roads, (b) surrounding gravel mining and the use of the site for mine slurry settlement ponds, (c) construction of an offsite chemical plant and residences. Overall the site contains a portion of two gulches that slope from the north to the south. According to the City of Tacoma govMe Map (Appendix B) the main western gulch north elevation is approximately 262 feet and the south elevation is approximately 50 feet for a total elevation change of 212 feet. From north to south the base of the western gulch has a slope of less than 2 percent. The base of the west gulch is variable between 200 feet and 80 feet wide. Two gravel roads cross the west gulch one near the south property line that is approximately 8 to 10 feet high. The second road crossing is located about 600 feet north of the southern property boundary and is approximately 10 feet high on the north side and 25 feet high on the south side. These road crossings were used as berms for slurry settling ponds for gravel mining operations and contain culverts through the berms. The western property boundary contains a flat area at the top of the slope that is between 12 and 150 feet wide. East of the flat area the western slope dips down approximately 100 feet to the base of the gulch and then back up the eastern side of the gulch to the top of the ridge approximately 110 feet. The onsite portion of the ridge is approximately 30 feet wide before it slopes back down about 75 feet into the eastern gulch. The eastern gulch is approximately 100 feet wide at the base and has an elevation change from north to south of approximately 84 feet from 160 feet to the north to 76 to the south. Near the southern boundary of the site the ridge between the two gulches has been removed and a flat gravel area is present. The flat gravel area is located approximately 65 feet above the west gulch and 40 feet above the east gulch.

1.5 Fauna

A list of wildlife species observed on the site, flying over the site or heard from the site is located in Appendix C. Rodent holes for mice and moles and foraging on snags by woodpeckers were also observed on the site. Several species of hawks were observed hunting in the meadow on the central ridge. Red legged frogs and Pacific chorus frogs observed on the site are likely breeding in the stormwater ponds located west of Norpoint Way NE. No animal species listed federally or by the state as threatened or endangered have been observed on the site.

1.6 Non-Native and Invasive Plant Species

Noxious Weeds are non-native plants introduced into Washington State. They spread quickly and can be difficult to control. They out-compete native understory vegetation and prevent the establishment of native trees and shrubs that require sun for germination. Dense, impenetrable non-native and invasive thickets can block access of larger wildlife to water and other resources and impede recreation in parks and natural areas. There are three categories of noxious weeds (a) Class A Weeds, eradication of these weeds is required by law throughout Washington State, (b) Class B Weeds, control of these species is required by law in Pierce County, and (c) Non-Regulated Noxious Weeds, include State Class B and C Weeds that are highly recommended by Pierce County to be controlled on property due to environmental and economic damage caused

by their spread. The 2009 Pierce County Noxious Weed List is located in Appendix D. Pierce County Regulated Class A and B Noxious Weeds were not observed on the site. Pierce County Non-regulated Class B Noxious Weeds, Herb Robert (*Geranium robertianum*), butterfly bush (*Buddleja davidii*), ivy (*Hedera helix*), knotweed (*Polygonum cuspidate*), and scotch broom (*Cytisus scoparius*) were observed on the site.

Dominant non-native and invasive species observed within Julia's Gulch in August through November of 2010 included those listed in Table 2. Non-native and invasive species were mapped relative to site topography and the Forestry Study in Appendix D. Native, non-native and invasive species were listed on field data forms to evaluate the existing conditions of each of the mapped plots and are summarized in this report (Appendix F).

Invasive species to be targeted for removal from the restoration areas include those listed in Table 2. Some spraying of Japanese knotweed and removal of blackberry have occurred in Restoration Areas A, and E, and along the existing paths. In Restoration Area E the knotweed has been effectively eradicated. The knotweed in Restoration Area A and B will require additional spraying of herbicide to eradicate.

Table 2: Dominant Non-Native and Invasive Species Observed at Julia's Gulch			
Non-Native	Black locust	<i>Robinia pseudoacacia</i>	
	Butterfly bush	<i>Buddleja davidii</i>	Non-regulated noxious weed
	Hawthorn	<i>Crataegus monogyna</i>	
	Horse chestnut	<i>Aesculus indica</i>	
Invasive	English ivy	<i>Hedera helix</i>	Non-regulated noxious weed
	Herb Robert	<i>Geranium robertianum</i>	Non-regulated noxious weed
	Himalayan blackberry	<i>Rubus armeniacis</i>	Non-regulated noxious weed
	Holly	<i>Ilex aquifolium</i>	
	Japanese knotweed	<i>Polygonum cuspidate</i>	Non-regulated noxious weed
	Scot's broom	<i>Cytisus scoparius</i>	Non-regulated noxious weed

Species selected for removal are dominating the lower and/or mid story of the plant communities and negatively impacting the ecology and diversity of Julia's Gulch. It was determined in meetings with Friends of Julia's Gulch that horse chestnut and black locus present on the site provides tree canopy cover that is not proposed to be removed. The impacts that can be caused by the selected invasive species include the following.

Blackberry competes with low growing native vegetation and can prevent establishment of shade intolerant trees and shrubs. Dense thickets can form with little or no other vegetation present. The dense thickets can limit movement of larger animals.

Holly can form dense thickets that dominate the tall shrub layer and suppress germination and growth of native tree and shrub species.

Ivy climbs up a tree canopy and shades out deciduous leaves suppressing the overall tree, deprives the bark of normal contact with air and microorganisms, adds weight to trees making the trees top heavy and more susceptible to blow down. Ivy changes natural succession patterns of forests, limits understory regeneration and competes for water and nutrients.

Knotweed spreads rapidly, finding a hold in areas of disturbed soil. It crowds out native plant species, contributes to erosion, and discourages native animals.

Scot's broom displaces native and beneficial plants causing loss of grasslands and open forest habitat.

2.0 MANAGEMENT GOALS AND OBJECTIVES

The Friends of Julia's Gulch have goals and objectives that are not part of this restoration plan. In an effort to consider and consolidate all site goals and objectives for Julia's Gulch a brief description of all of the management goals and objectives have been included below. The goals and objectives listed here were determined at several meetings with Cascade Land Conservancy and the Friends of Julia's Gulch. The restoration goals and objectives are those that apply specifically to this study.

2.1 View corridors

Currently, the Boy Scout bench project near the southwest site access is the only view corridor on the site. Other potential corridors include the ridge between the gulches, and the west central gravel lot off of Norpoint Way NE. Views from the bench located on the southwest corner of the site and the central ridge shall be preserved.

Views of the chemical plant and construction yard south of the site are proposed to be planted with vegetation such that they cannot be seen.

2.2 Public access

Currently public access to the site is well defined foot path located near the southwest corner of the site. The public currently parks at Marine View Park located southwest of the site and walk to the trail. Future public access could also be provided from the west central portion of the site in Restoration Area B where the historic site access is located. Friend's of Julia's Gulch would like to have a loop trail in the main ravine, access to the Madrone forest at the top of the ridge with a spur trail, and connection to the existing foot path (historic road bed) on the western slope of the east ravine.

2.3 Joint use of site

There is no joint use of the site. The City of Tacoma owns two parcels north of the site that could be included in the Friend's of Julia's Gulch restoration efforts with funding assistance by the City. Parcel 6355000109 owned by the City of Tacoma is a 3.54 acre parcel located directly north of the existing Julia's Gulch property and parcel 6355000051 owned by Tacoma Public Works is a 0.28 acre parcel located north of the 3.54 acre City parcel. In addition, there is a 0.75 acre parcel located east of Julia's Gulch that is a tax title property (parcel 0321254021) that could be purchased and incorporated into the Julia's Gulch restoration effort.

2.4 Public safety

The site had at least one transient camp that has since been removed. Use of the site for walking and recreation should deter this activity. If transient camps are located on the site it should be reported to Cascade Land Conservancy.

Other public safety issues that should be considered include (a) not planting tall tree and shrub vegetation within five feet of trails or access points to the trails, and (b) if providing parking areas provide them such that they are visible from major roads and that appropriate lighting and gates are provided. If there are trees located within 10 feet of major roads, parking and access areas prune the lower branches of the trees to at least 7 feet off the ground.

2.5 Deterring illegal activities

Posting "No Dumping" signs near accesses. Report illegal activities to the Cascade Land Conservancy and appropriate authorities, if they are observed occurring at the site.

2.6 Historic, cultural and art resources

Future signage could provide information about (a) the Tribal connection and the name Julia associated with the Gulch, (b) historic use of the gulch, and (c) habitats and geologic features associated with the gulch.

2.7 Site amenities

A bench was placed at the site by an Eagle Scout near the southwest trail access.

Future benches, and picnic tables may be placed at the site. Additional amenities that would require maintenance would need to be coordinated with different divisions at the City of Tacoma for trash cans and pickup, lighting, and educational signs.

2.8 Way-finding system

Way finding signs are not currently proposed for the site.

2.9 Regulatory considerations

The site is zoned as R-2 Single Family Residential with a View Sensitive overlay. Steep slopes between 25% and 40% and greater than 40% are located on the site. The site is in the 1873 Puyallup Tribe Treaty Area and the Northeast Tacoma Storm Basin. Julia's Gulch Creek was historically located on site but the site was historically modified and the stream is no longer present. Metal Gulch Stream is located on the southeast portion of the site in the eastern ravine offsite. There was no evidence of a stream bed or bank on the site.

To date restoration efforts at Julia's Gulch have not required permits to remove noxious and invasive plants. Coordination with City of Tacoma staff for work on slopes was completed. Future efforts should continue with the City staff coordination for work on slopes. Construction of formal parking areas, access points, and formal trails may require a conditional use permit, SEPA review, clearing and grading permits with a Stormwater Pollution Prevention Plan, and potentially building permits.

According to Appendix C of the City of Tacoma Surface Water Management Manual (September 22, 2008): "Projects falling within the thresholds listed below may use this short form instead of preparing a professionally-designed Construction Stormwater Pollution Prevention Plan (SWPPP). If your project meets the following thresholds and includes or may impact a critical area, please contact the City to determine if the SWPPP short form may be used. The thresholds for using this form are projects that propose to (a) add or replace between 2,000 and 5,000 square feet of impervious surface, (b) clear or disturb between 7,000 square feet and 1 acre of land, or grade/fill 50-499 cubic yards." Greater than 1 acre of clearing or disturbance requires a SWPPP and SEPA review.

Impacts to steep slopes are regulated by TMC 13.11.700. Clearing and grading activities in an erosion hazard area shall also be required to comply with the City amendments to the most recently adopted International Building Code.

City of Tacoma has a sign code that must be considered for placement of signs on the site.

2.10 Education

An educational brochure is in the process of being prepared with grant funding. Future signs will be prepared identifying plant material and habitat within Julia's Gulch. Friends of Julia's Gulch would like to get parents and children back to nature and hold naturalist field days at the site.

2.11 Restoration

The overall goal of this restoration plan is to remove noxious weeds and invasive species in select locations and to revegetate the areas with native trees, shrubs and herbaceous species. The overall project objective is to restore a native plant community within Julia's Gulch. Specific objectives include:

- Removal of selected noxious weeds and invasive species (Himalayan blackberry, English ivy, holly, Japanese knotweed, butterfly bush and Scot's broom) from approximately 11 acres of the site.
- Establishment of non-invasive, native tree, shrub, or herbaceous vegetation on the site.
- Increase diversity of the plant community on the site by planting species that are present in similar surrounding areas but are not present or dominant on the site.

3.0 RESTORATION PROPOSAL

Nine of the management zones (Restoration Areas A, B, C, D, E, F, G, H and I) are considered restoration areas where it is proposed to remove selected noxious weeds and invasive species and plant with native vegetation. One of the management zones (Restoration Area J) will have minor noxious weeds removed and due to very low percentages of these species planting is not proposed. Julia's Gulch has several stewards that have been trained in the Green Tacoma Partnership Program. The Friends of Julia's Gulch are to be the leads on the restoration effort. Noxious weed and invasive species plant removal methods will be in accordance with the Green Tacoma Partnership Habitat Steward Field Guide. Generally, species will be removed by hand pulling and cutting of vegetation. Roots of blackberries will be required to be dug out of the ground. Removal of trees or vegetation that requires power tools will be completed by qualified contractors. Chemical applications will be limited to Japanese knotweed and will be completed by

licensed applicators. Work on steep slopes (greater than 25%) will be completed by the Washington Conservation Corps or other professionals as approved by the Cascade Land Conservancy.

Soil decompaction should occur during the dry summer months May through September. Use of mechanical equipment such as a backhoe will be completed by a licensed contractor or professional. Soils should be decompacted to a depth of 18 inch and large rocks and debris should be removed. The soil should be amended with 2 to -4 inches of compost after decompaction. Do not amend just the planting hole (it causes poor root development). If not amending the whole bed, plant trees and shrubs in the existing soil, then mulch with compost, then wood chips on top for weed control. Mulch landscapes after planting with a minimum of 2-3 inches of arborist wood chips or coarse bark chips.

The plant species selected for the restoration areas are native to the Puget Sound Region. All of the species selected are present in local area. The planting plan proposes the establishment of intermixed trees and shrubs and ground cover in the restoration areas. Planting of native species should occur between October and March to take advantage of seasonal rains. Other planting times would require hand watering or irrigation. Clean weed free mulch may be placed around the base of the newly planted trees and shrubs to retain moisture and deter weeds. Species to be planted, their restoration locations and planting specifications are shown in Appendix F and are described in Table 3 below.

Table 3: Restoration Area Descriptions		
ID #/Size	Existing Condition	Proposed Enhancement
Restoration Area A/ 37,237 sf (0.86 acres)	Flat area along Norpoint Way near View Point Park. Contained greater than 80% cover Himalayan blackberry and other noxious weeds and invasive species. Soils are sand to gravelly sand to gravelly sandy loam with pH of 6.1. Approximately 32,000 sf (0.74 acre) has been restored and is in the maintenance phase.	Hand removal of canes and roots. Planting of native vegetation. Placement of weed free mulch.
Restoration Area B/ 135,153 sf (3.1 acres)	Flat area along Norpoint Way starting near the historic site access. Contains approximately 80% cover Himalayan blackberry, a patch of Japanese knotweed and ivy and herb Robert. Soils are gravelly sandy loam with pH of 6.2. Soils at the historic access are compacted and contain some asphalt paving.	Hand removal of blackberry canes and roots, ivy and herb Robert. Have a certified professional chemically spray or inoculate the knotweed. Planting of native vegetation. If the historic access area is not proposed to be used for parking and access it should be restored by removing asphalt surface, decompacting the soils with a

Table 3: Restoration Area Descriptions

		backhoe or equivalent equipment. Plant the area with native vegetation for a visual barrier between the site and the road.
Restoration Area C/ 268,965 sf (6.2 acres)	East facing slope of the west ravine. Contains greater than 80% cover Himalayan blackberry and other non-native and invasive species. Soils are gravelly sandy loam with pH range of 6.0 to 6.2. Approximately 30,000 square feet of this area has been cleared of blackberries and was planted in December 2010.	Steep slopes, have a professional crew hand remove blackberry canes, and roots, ivy, holly and herb Robert. Planting of native vegetation. Horse chestnut trees are proposed to remain. Locus trees may be removed and used for slope stabilization by WCC crew.
Restoration Area D/ 20,257 sf (0.47 acres)	Slopes on the northwest corner of the site. Contains approximately 80% cover Himalayan blackberry, holly, ivy and other non-native and invasive species. Soils are gravelly sandy loam with pH of 6.2.	Steep slopes, have a professional crew hand removal of canes and roots. Planting of native vegetation.
Restoration Area E/ 289,883 sf (6.7 acres)	Base of the main ravine north of the historic access road contains two patches of blackberry with approximately 30% cover. The blackberry patches were flagged and estimated size is 8,000 square feet per patch. The western boundary near the toe of slope contains 50% cover of blackberry for a width of 50 to 100 feet. Minor (less than 1%) scattered presence of ivy, holly and herb Robert. Japanese knotweed in this area has been sprayed. Soils are clay to clay loam to gravelly sandy loam and have a pH of 5.8 to 6.0.	Hand removal of blackberry canes and roots, and removal of ivy, holly and herb Robert. Planting of native vegetation in the two patch areas. Monitor the site for re-growth of knotweed and have a certified professional chemically spray or inoculate the knotweed, if required. Plant western red cedar trees in the understory of the young alder trees.
Restoration Area F/ 72,838 sf (1.7 acres)	Base of the main ravine south of the historic access road. Contains scattered patches of dense Himalayan blackberry and minor ivy and herb Robert. Estimate 30% of Area F will need restoration. Soils are clay loam to gravelly sandy loam and have a pH of 6.5.	Hand removal of blackberry canes and roots, and removal of ivy and herb Robert. Planting of native vegetation.
Restoration Area G/	West facing slope of main ravine. Contains less than 10% cover of scattered Himalayan blackberry and other	Hand removal of canes and roots. Planting of

Table 3: Restoration Area Descriptions		
282,890 sf (6.5 acres)	non-native and invasive species. Holly on this slope has already been removed. Soils are gravelly sandy loam and have a pH range of 5.8 to 6.0.	vegetation not required.
Restoration Area H/ 82,523 sf (1.9 acres)	Historically cleared areas at the top of the ridge between the two ravines. Contains approximately 20% cover Himalayan blackberry at the edges of the clearing and 30% cover of scotch broom throughout the clearing. Cottonwood trees are also encroaching on the Douglas Fir/Madrone plant community. Soils are sand to gravelly sandy loam and have a pH of 5.0.	Hand removal of blackberry canes and roots. Pull scotch broom using a weed wrench. Removal of cottonwood trees and saplings. Planting of native Madrone plant community.
Restoration Area I/ 13,520 sf (0.3 acres)	Flat compacted fill area along the south property line. Contains weedy herbaceous species, blackberry and scotch broom and compacted soils in an area less than 5,000 square feet (100 by 50 feet). Soils that are not heavily compacted are sand and sandy loam with a pH of 5.0. Concrete slab near the southeast corner.	Hand removal of blackberry canes and roots. Pull scotch broom using a weed wrench. Once weedy species are removed decompact the soils with a backhoe or equivalent equipment. Plant the area with native vegetation for a visual barrier between the site and neighboring industries. Concrete slab to remain.
Restoration Area J/ 161,850 sf (3.7 acres)	East ravine and slopes. Contains two small patches of holly trees and saplings totaling approximately 200 square feet. Very minor blackberry and ivy present on the slopes. Soils are gravelly sandy loam with pH of 6.0 to 6.2.	Remove holly, blackberry and ivy. Planting not required.

4.0 SITE MANAGEMENT PRIORITIES

Site management priorities are specified to direct efforts in specific areas of the site on a manageable schedule and costs. Restoration areas on the site were run through the triage process identified in the Green Tacoma Partnership Habitat Steward Field Guide to assist in determining the priorities.

Table 4: Habitat Tri-age Analysis			
Restoration Location	Tree Composition	Invasive Species Cover	Result
A	Medium	Low	4
B	Medium	High	6
C	Medium	High	6
D	Medium	High	6
E	Medium	Medium	5
F	Medium	Medium	5

G	High	Low	1
H	Low	Medium	8
I	Low	Medium	8
J	Medium	Low	4

Site management priorities have been divided into three categories as follows (a) short term goals – to complete within 5 years, (b) medium term goals – to complete in 5 to 10 years and (c) long term goals – to complete within 10 to 20 years. The management priorities will depend on available funding for plant material and professional crews, and volunteer interest and available time. The management priorities should be evaluated and adjusted prior to the end of the 20 year time frame. Management priorities for the site were discussed in a meeting with Friends of Julia's Gulch and Cascade Land Conservancy and include those listed in Table 5.

Table 5: Site Management Priorities

Short Term Priorities	Actions to be completed within 5 years	Estimated Volunteer Hours and Cost	
Year 1 (2011)	Have a certified professional chemically spray or inoculate the knotweed patches in Restoration Areas A and B, and Area C if growth of knotweed is identified in the already treated area.	Professional 8 hours	\$583
Year 1 (2011), ongoing	Start plant nursery in Restoration Area I maintain nursery plant material	416 hours per year	\$0.00
Year 1 (2011)	Remove holly and minor blackberry from Restoration Area J.	80 hours	\$0.00
Year 2 (2012)	Plant low growing shrubs and herbaceous species east of the bench in Restoration Area A after knotweed is controlled.	8 hours	\$40.00
Years 1-3 (2011-2013)	Continue to maintain Restoration Area A.	40 hours/year	\$0.00
Years 1-5 (2011-2015)	Inventory and salvage native plant species from proposed trail areas and determine appropriate plant locations.	160	\$0.00
Year 1 or 2 (2011 or 2012)	Fill in hole on trail and plant low growing natives species. Plant with salvaged material from pathways.	48	\$0.00
Years 1-5 (2011-2015)	Remove scotch broom in Zones H and I.	500	\$0.00
Years 1-5 (2011-2015)	Plant Zone H with native species.	500	\$4,000
Years 1-5 (2011-2015)	Remove ivy and create survival rings around trees in Restoration Areas C, D, E, F and G.	80 hours	\$0.00
Years 1-5 (2011-2015)	Remove all invasive and nonnative species from Restoration Area B	1,550 hours	\$0.00
Years 1-5 (2011-2015)	Plant native species in Restoration Area B	1,550 hours	\$9,300
Years 1-5 (2011-2015)	Clean up trash and debris as discovered onsite.	40 hours	\$0.00
Years 1-5	Remove non-native and invasive species within	500 hours	\$0.00

(2011-2015)	5 feet of proposed trail locations.		
Ongoing	Maintain nursery plant material	416 hours per year	\$0.00
Annually	Monitor and maintain planted areas for 3 years after planting.	40 hours per year per acre	\$0.00
Annually	Evaluate and determine maintenance requirements annually for areas beyond the 3 year monitoring.	5 hours per acre	\$0.00
Medium Term Priorities	Actions to be completed within 5 to 10 years		
	Have professional crews remove blackberry and plant native species on steep slopes in areas H and G.	4 weeks	\$17,000
	Remove non-native and invasive species from Restoration Area E.	800 hours	\$0.00
	Have professional crews remove blackberry and plant native species on steep slopes in Restoration Area D.	2 weeks	\$9,264
	Decompact soils in Restoration Area I.		\$1,500
	Plant native species in Restoration Area I.	150 hours	\$900
Ongoing	Maintain nursery plant material	416 hours per year	\$0.00
Annually	Monitor and maintain planted areas for 3 years after planting.	40 hours per year per acre	\$0.00
Annually	Evaluate and determine maintenance requirements annually for areas beyond the 3 year monitoring.	5 hours per acre	\$0.00
Long Term Priorities	Actions to be completed within 20 years		
	Have professional crews remove blackberry and plant native species on steep slopes in Restoration Area C.	18 weeks	\$41,976 crew \$41,400 plants and seed Total \$83,376
	Have professional crews remove blackberry and plant native species on steep slopes in Restoration Area D.	2 weeks	\$9,264
Annually	Monitor and maintain planted areas for 3 years after planting.	40 hours per year per acre	\$0.00
Annually	Evaluate and determine maintenance requirements annually for areas beyond the 3 year monitoring.	5 hours per acre	\$0.00
Year 19	Conduct new inventory of the site and assess management requirements		
Year 20	Write new management plan for the site		
Notes: Estimate at 500 hours per acre for hand removal of blackberry and other noxious			

weeds. Estimates for professional crews (WCC) were at \$2,332 per week.

5.0 RESTORATION AREA RECOMMENDATIONS

5.1 Restoration Area A

Restoration Area A contains Red Alder/Big Leaf Maple forest and is located on a relatively flat area in the southwest corner of the site near View Point Park on Marine View Drive (Appendix B). This area contains approximately 80% cover of Himalayan blackberry and other noxious weeds. Restoration Area A has had approximately 0.74 acres already restored. Restoration included removal of blackberry canes and roots and other noxious weeds, planting of native species under the big leaf maple and red alder canopy, and placement of a mulch layer. A bench and gravel trail was constructed as part of an Eagle Scout project in Area A. Low growing shrubs and herbaceous plants (Appendix G) should be planted near the bench after localized knotweed has been eradicated by a licensed applicator.

The remaining 0.12 acres requires removal of blackberry canes and roots near the top of slope, planting of native species (Appendix G), and placement of mulch. Soils in this area are sand, gravelly sand and gravelly sandy loam and have low available nitrogen and nutrients and are acid with a pH of 6.1. A small hill located at the north portion of Area A has been planted with native trees and shrubs. The hill is composed of sand and sandy loam soils which require stabilization. Currently wood material has been staked on the hill below some of the planted species. It is recommended that compost socks (Appendix G) be staked in place horizontally on the hill at 3 to 5 foot intervals and that mulch be placed over the planting area.

5.2 Restoration Area B

Restoration Area B contains Red Alder/Big Leaf Maple forest and is located directly north of Area A and is located on a relatively flat area along Marine View Drive (Appendix B). Restoration Area B contains a historic access area to the site that could be used as a future access. If the historic access is to be used as a future access low growing shrubs should be planted near the entrance for safety and visibility. If the historic access is not going to be used for a future access the asphalt should be removed from the site, soils should be decompacted using a backhoe or equivalent equipment. Soil decompaction should occur during the dry summer months May through September. Use of mechanical equipment such as a backhoe will be completed by a licensed contractor or professional. Soils should be decompacted to a depth of 18 inch and large rocks and debris should be removed. The soil should be amended with 2 to 4 inches of compost after decompaction. Do not amend just the planting hole (it causes poor root development). If not amending the whole bed, plant trees and shrubs in the existing soil, then mulch with compost, then wood chips on top for weed control. Mulch landscapes after planting with a minimum of 2-3 inches of arborist wood chips or coarse bark chips. The plant numbers provided in Appendix G took into consideration removal of the historic access.

The remaining area outside of the historic access area has approximately 80% cover of Himalayan blackberry, a patch of Japanese knotweed, ivy and Herb Robert. Soils are gravelly sandy loam and have low available nitrogen and nutrients and are acid with a pH of 6.2. Restoration Area B requires removal of blackberry canes and roots and other noxious weeds including but not limited to ivy and Herb Robert and planting of native trees, shrubs and

herbaceous species (Appendix G). A patch of Japanese knotweed is located at the eastern edge of the Restoration Area B (see map in Appendix B). A certified professional should chemically spray or inoculate the knotweed and planting in this area should not occur until the knotweed has been fully eradicated.

5.3 Restoration Area C

Restoration Area C contains Red Alder/Big Leaf Maple forest and is located on the east facing slope of Julia's Gulch directly east of Areas A and B. Soils in this area are sandy loam and gravelly sandy loam and have low available nitrogen and nutrients and are acid with a pH ranging between 6.0 and 6.2. Restoration Area C has had approximately 0.69 acres of the slope already restored by the Washington Conservation Corps. Restoration Area B contains the access trail which was improved by placing log edges and a stable base. Restoration included removal of blackberry and other noxious weeds on the slopes, planting of native species under the big leaf maple and red alder canopy, and hand scattering of regreen (annual rye) to stabilize the surface soils and native seeds. The remaining 5.51 acres has approximately 80% cover of blackberry and other noxious weeds which require removal and planting of native trees, shrubs and herbaceous species (Appendix G). Use of regreen to assist in stabilizing the sloping surface soils is recommended. Since this area is on steep slopes work should be completed by professional crews and not volunteers.

5.4 Restoration Area D

Restoration Area D contains Red Alder/Big Leaf Maple forest and is located in the northwest corner of the site on the east facing steep slope of Julia's Gulch (Appendix B). Soils in this area are a gravelly sandy loam and have low available nitrogen and nutrients and are acid with a pH of 6.2. Restoration Area D has approximately 80% cover of Himalayan blackberry, holly, ivy and other noxious weeds. Removal of ivy from the trees with survival rings should occur early to protect the existing tree canopy health. Removal of other noxious weeds and planting of native trees, shrubs and herbaceous species is required (Appendix G). Use of regreen to assist in stabilizing the sloping surface soils is recommended. Since this area is on steep slopes work should be completed by professional crews and not volunteers.

5.5 Restoration Area E

Restoration Area E contains Red Alder/Big Leaf Maple forest and is located in the central base of Julia's Gulch with the south end stopping at a historic dirt access road (Appendix B). The southern portion of Restoration Area E is a regenerating alder forest with scattered young western red cedar trees. This area was the base of the siltation pond and contains clay to clay loam soils with low available nitrogen and nutrients and acid soil with a pH of 5.8. Soils near the edges of the base of the ravine contain gravelly sandy loam soils with a pH of 6.0. In many locations the clay contains remnant fractures caused by dewatering of the clay once the area was no longer used as a setting pond. The majority of the ravine has a well developed native plant community. Since the alders are an even age stand it is recommended that western red cedar, western hemlock, Sitka spruce and pacific yew trees of varying ages be planted throughout the alder stand. Trees should be planted where dense shrub is not present. The edges of Restoration Area E contain approximately 50% cover of Himalayan blackberry for a width of 50 to 100 feet. In addition, two 8,000 square foot areas located in the central portion of the ravine contain approximately 30% cover of Himalayan blackberry. The remainder of Restoration Area E contains scattered blackberry, ivy on the trees and ground, holly, and Herb Robert. Noxious

weeds should be removed by hand and planting of native trees, shrubs and herbaceous species should occur (Appendix G). Near the trail in the central portion of the ravine a patch of Japanese knotweed was sprayed and appears to be eradicated. The knotweed debris should be removed and the area should be replanted with native tree and shrub species (Appendix G). Along the foot path in Restoration Area E are numerous sword fern and other native shrubs that could be inventoried and moved to appropriate locations as the trail is more developed.

5.6 Restoration Area F

Restoration Area F is located in the base of Julia's Gulch south of the historic dirt access road (Appendix B). Red Alder/Big Leaf Maple forest with scattered black cottonwood and is located in the central base of Julia's Gulch south of the historic dirt access road (Appendix B). A portion of Restoration Area F had noxious weeds removed and native trees and shrubs planted in 2009. Many of the planted trees and shrubs did not survive and will require replanting. This area received water from the siltation pond through a culvert in the access road that is up slope. At the south end Restoration Area F a raised dirt road with a culvert is located along the site south boundary. Soils in Restoration Area F are clay loam near the central base and gravelly sandy loam outside the central base of the ravine. Soils have low available nitrogen and nutrients and are acid with a pH of 6.5. The central base of the ravine contains a small (less than 0.1 acre) red osier dogwood plant community with cottonwood trees in the overstory. The remainder of Restoration Area F contains past areas where noxious weeds have been removed or scattered dense patches of Himalayan blackberry, minor ivy and Herb Robert. Overall, approximately 30% of Restoration Area F will need to be restored. Noxious weeds should be removed by hand and planting of native trees, shrubs and herbaceous species should occur (Appendix G). The slopes in this area are not steep and can be restored by volunteers.

5.7 Restoration Area G

Restoration Area G is a Douglas Fir/Big Leaf Maple forest with scattered Red Alder and Pacific Madrone located on the west facing steep slope of Julia's Gulch (Appendix B). This area has had the least impact to the plant community over the last 50 to 75 years and contains a well developed canopy, sub canopy, shrubs, herbaceous and moss/ground cover. Soils in this area are gravelly sandy loam and have low available nitrogen and nutrients and are acid with a pH ranging between 5.8 and 6.0. Restoration Area G contains less than 10% cover of noxious weeds scattered on the slope but a larger component of noxious weeds in the southwest corner of the restoration area. Holly has already been removed near the base of the slope and the scattered Himalayan blackberry should be removed from the steep slopes and planting of native evergreen trees, shrubs and herbaceous species (Appendix G) should occur. Since this area is on steep slopes work should be completed by professional crews and not volunteers.

5.8 Restoration Area H

Restoration Area H is located on the top of a ridge that slopes down to the south (Appendix B). Restoration Area H is a Douglas Fir/Pacific Madrone forest with scattered western hemlock and bitter cherry. The understory includes Madrone saplings, oceanspray, goldenrod, and western fescue. This area was cleared approximately 21 years ago with a few Douglas fir trees that are approximately 60 years of age. Soils in this area are sand to gravelly sandy loam with a pH of 5.0. Blackberry, Scotch broom and other noxious weeds should be removed by hand and planted with a native Madrone plant community (Appendix G). Cottonwood tree saplings could also be removed to assist with successful establishment of the Madrone habitat. Larger cottonwood are

providing significant habitat for wildlife and should remain. The slopes in Restoration Area H are not overly steep and work on the slopes should be able to be completed by volunteers.

5.9 Restoration Area I

Restoration Area I is located along the south central property line (Appendix B). Restoration Area H was a Douglas Fir/Pacific Madrone forest that has cleared and graded since the 1950s. Restoration of this restoration area will take significant work to remove compacted soils and concrete and asphalt debris, amend the soils and plant an appropriate forest plant community that can block views of the industrial uses south of the site and blend into the Madrone forest to the north in Restoration Area H (Appendix G). Existing vegetation includes Scotch broom, Himalayan blackberry and early invading herbaceous grasses and weeds. A few cottonwood trees are located on the northwest corner of the restoration area. This area also contains a few stressed tree saplings planted in the spring of 2010. Soils below the compacted gravelly layer are sand and sandy loam with a pH of 5.0. A cement pad is located in the southeast corner of Restoration Area I. If the pad is not proposed to be used in the future it should be removed and restored similar to the compacted soil areas.

Restoration in Area I should include decompaction of the soils during the dry summer months by a licensed contractor using a backhoe to a depth of 18 inch. Large rocks and debris should be removed. The soil should be amended with 2 to -4 inches of compost after decompaction. Do not amend just the planting hole (it causes poor root development). If not amending the whole bed, plant trees and shrubs in the existing soil, then mulch with compost, then wood chips on top for weed control. Mulch landscapes after planting with a minimum of 2-3 inches of arborist wood chips or coarse bark chips.

5.10 Restoration Area J

Restoration Area J is located in the southeast corner of the site and was historically known as Gun Metal Gulch (Appendix B). Restoration Area J is a Douglas Fir/Big Leaf Maple forest with scattered Red Alder and Black Cottonwood (Appendix B). This area has had the least impact to the plant community over the last 50 to 75 years and contains a well developed canopy, sub canopy, shrubs, herbaceous and moss/ground cover. Soils in this area are gravelly sandy loam and have low available nitrogen and nutrients and are acid with a pH ranging between 6.0 and 6.2. Restoration Area J contains very minor cover of noxious weeds. Scattered Himalayan blackberry, holly and ivy should be removed. Planting is not required in Restoration Area J unless noxious weed patches develop over time.

6.0 LONG-TERM ADAPTIVE MANAGEMENT PLAN

Upon completion of the enhancement in specific management zones continued maintenance to keep nonnative and invasive species from becoming dominant in the Julia's Gulch over time will need to occur. The goals of this long-term adaptive management plan include the following.

1. Evaluation of the site on an annual basis by Cascade Land Conservancy and implementation of items 2 through 4 below by volunteers or professional contractors, if required.

2. Prevention of non-native and invasive species establishment through the placement of natural weed free mulches and/or planting of native species.
3. Early detection to identify the presence, location, overall percent cover and the dominant native plant community that the non-native and invasive species are associated with through annual invasive species review once the areas have been restored.
4. Control and management through removal of the non-native invasive species in the same year that it is detected. Removal may include the use of chemical applications, if required, and will be completed by a licensed applicator.
5. Enhancement by planting of native species appropriate for the dominant native plant community if the target non-native or invasive species cover is greater than 10%. Planting shall occur between October and March following removal of the non-native and invasive species.

7.0 Limitations

The findings and conclusions documented in this report have been prepared for specific application to this site. They have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. Our work was also performed in accordance with the terms and conditions set forth in our proposal. The conclusions and recommendations presented in this report are professional opinions based on an interpretation of information currently available to us, and are made within the operation scope, budget, and schedule of this project. No warranty, expressed or implied, is made. Changes in government codes, regulations, or laws may occur. Because of such changes, our observations and conclusions applicable to this site may need to be revised wholly or in part.

AHBL, Inc.



Theresa R. Dusek
Natural Resources Ecologist Project Manager

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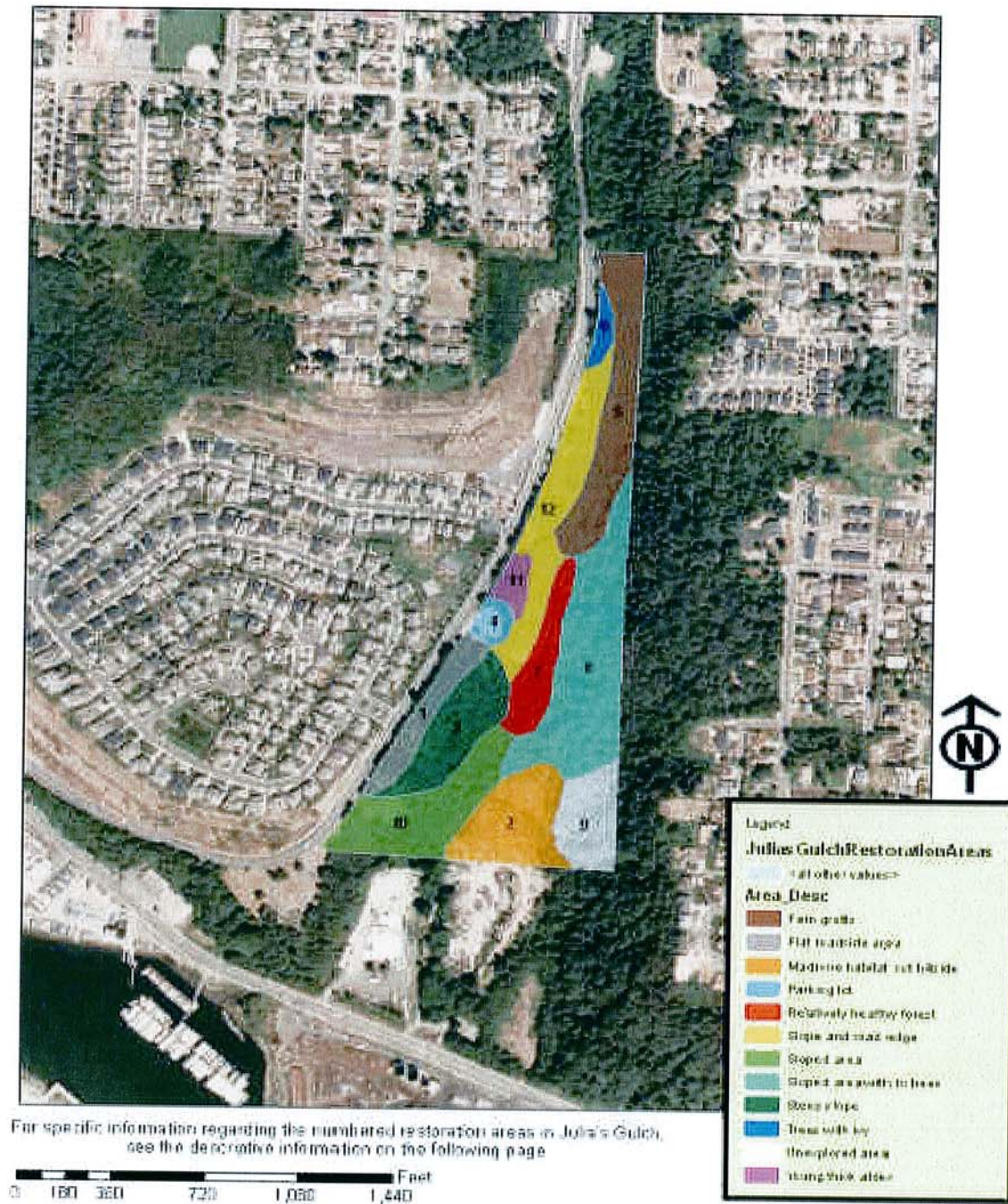
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Appendix A

Julia's Gulch Original Restoration Map and Goals and Objectives

Julia's Gulch Restoration Areas



Julia's Gulch Original Goals and Objectives

GOAL #1 - IMPROVE HABITAT

Objective 1: Remove invasive species

Tasks

- hold volunteer work parties to remove blackberries at S.W. entrance
- spread wood chips (or fabric if effective) over removed invasives
- build a crude trail to have access to property
- inoculate or spray Japanese knot weed
- cut ivy from trees in the one area that the ivy exists
- remove piles of invasives or let compost
- continue removing blackberries from S.W. entrance to gravel parking area and when completed move to another area in gulch and on slopes

Objective 2: Plant natives

Tasks

- apply for Splash Grant for \$ to buy natives and look for other funding
- plant natives at S.W. entrance continuing the planting as each area is removed of invasives
- seek expert advice re: planting natives on slopes
- care for natives planted at base of gulch during 2008 Green Tacoma kick-off
- decide and obtain best native plants to place along Norpoint Way to shade out blackberries

GOAL # 2 - PROVIDE EDUCATIONAL OPPORTUNITIES AT THE SITE

Objective 1 - Install a loop trail that circles the property

Tasks

- stake a trail using GIS (Chris, Chuck, Dan)
- complete permits for trail construction
- contract with a crew to construct trail

Objective 2 - Install large signs at trail entrance locations explaining who we are and the ecological significance of the property

Task

- contact City and/or Garden Club of Tacoma to do or finance this signage

Objective 3 - Get parents and children back into nature

Task

- hold 3 naturalist field days at site each year

Objective 4 - Install small signs along trail identifying native plants

Tasks

- purchase/borrow a "sign maker" or find a volunteer group to make signs
- hold community events to install signs

Objective 5 - Set up a website with help from Chuck Buzzard

Appendix B

Exhibits

WE-1.....Julia's Gulch Map



Map Legend

- Highlighted Tax Parcels
- Tax Parcels
- Contours - Cities
- Intermediate Contour
- Index Contour
- Roads
- Interstate
- Limited Access
- State Routes
- Other State Routes
- Ramps
- Major Arterial
- Collector
- Local Access
- County - 2008 -
- Ortho
- Knotweed

Area Calculations:

- A = 37,237 SF
- B = 135,153 SF
- C = 268,965 SF
- D = 20,257 SF
- E = 289,883 SF
- F = 72,838 SF
- G = 282,890 SF
- H = 82,523 SF
- I = 13,520 SF
- J = 161,850 SF

(Areas are approximate)



The map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. The orthophotos and other data may not align. The County assumes no liability for warranties associated by actual survey. All data is expressly provided AS IS and WITH ALL FAULTS. The County makes no warranty of fitness for a particular purpose.

Scale 1:1,200
0 50 100 ft.
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Appendix C

Wildlife and Habitat Associates

WILDLIFE SPECIES		ASSOCIATION WITH HABITAT TYPE			
Note: species in bold letter were observed directly or indirectly onsite including observations of others					
Common Name	Scientific Name	Upland Forest, Shrub	Wetland	Urban Environment	Riparian
Amphibians					
Tiger Salamander	<i>Ambystoma tigrinum</i>		CA/B	GA/F	
Northwestern Salamander	<i>Ambystoma gracile</i>	GA/F	CA/B	P/F	CA/B
Long-toed Salamander	<i>Ambystoma macrodactylum</i>	GA/B	CA/B	GA/B	CA/B
Cope's Giant Salamander	<i>Dicamptodon copei</i>	GA/F			CA/B
Pacific Giant Salamander	<i>Dicamptodon tenebrosus</i>	GA/F		P/F	CA/B
Olympic Torrent Salamander	<i>Rhyacotriton olympicus</i>	GA/F			CA/B
Columbia Torrent Salamander	<i>Rhyacotriton kezeri</i>	GA/F			CA/B
Cascade Torrent Salamander	<i>Rhyacotriton cascadae</i>	GA/F			CA/B
Rough-Skinned Newt	<i>Taricha granulosa</i>	GA/F	CA/B	P/F	CA/B
Dunn's Salamander	<i>Plethodon dunni</i>	GA/B		P/B	GA/B
Larch Mountain Salamander	<i>Plethodon larselli</i>	GA/B			
Van Dyke's Salamander	<i>Plethodon vandykei</i>	GA/B			GA/B
Western Red-Backed Salamander	<i>Plethodon vehiculum</i>	GA/B		P/F	GA/B
Ensatina	<i>Ensatina eschscholtzii</i>	GA/B		P/B	GA/B
Tailed Frog	<i>Ascaphus truei</i>	GA/F			CA/B
Great Basin Spadefoot	<i>Scaphiopus intermontanus</i>		CA/B	GA/B	
Western Toad	<i>Bufo boreas</i>	GA/F	CA/B	P/F	CA/B
Woodhouse's Toad	<i>Bufo woodhousii</i>		CA/B	GA/F	
Pacific Chorus (Tree) Frog	<i>Pseudacris regilla</i>	GA/B	CA/B	GA/B	CA/B
Red-Legged Frog	<i>Rana aurora</i>	CA/F	CA/B	P/F	CA/B
Cascades Frog	<i>Rana cascadae</i>	GA/F	GA/B		GA/B
Oregon Spotted Frog	<i>Rana pretiosa</i>	GA/F	CA/B		CA/B
Columbia Spotted Frog	<i>Rana luteiventris</i>		CA/B		
Bullfrog	<i>Rana catesbeiana</i>	GA/F	CA/B	GA/F	CA/B
Reptiles					
Snapping Turtle	<i>Chelydra serpentina</i>		CA/F		GA/B
Painted Turtle	<i>Chrysemys picta</i>		CA/F		GA/B
Western Pond Turtle	<i>Clemmys marmorata</i>		CA/F		CA/B
Red-Eared Slider Turtle	<i>Trachemys scripta</i>		CA/F	GA/R	GA/B
Northern Alligator Lizard	<i>Elgaria coerulea</i>	GA/B		GA/B	GA/B
Southern Alligator Lizard	<i>Elgaria multicarinata</i>	P/B		P/B	P/B
Sagebrush Lizard	<i>Sceloporus graciosus</i>			GA/B	
Western Fence Lizard	<i>Sceloporus occidentalis</i>	GA/B		GA/B	
Western Skink	<i>Eumeces skiltonianus</i>	GA/B		P/B	
Rubber Boa	<i>Charina bottae</i>	GA/B		GA/B	GA/B
Racer	<i>Coluber constrictor</i>			GA/B	
Sharptail Snake	<i>Contia tenuis</i>	GA/B		GA/B	GA/B
Ringneck Snake	<i>Diadophis punctatus</i>	GA/B		P/B	P/B
California Mountain Kingsnake	<i>Lampropeltis zonata</i>	P/B		P/B	P/B
Gopher Snake	<i>Pituophis catenifer</i>			GA/B	
Western Terrestrial Garter Snake	<i>Thamnophis elegans</i>			GA/B	GA/B
Northwestern Garter Snake	<i>Thamnophis ordinoides</i>	GA/B		GA/B	GA/B

WILDLIFE SPECIES		ASSOCIATION WITH HABITAT TYPE			
Note: species in bold letter were observed directly or indirectly onsite including observations of others					
Common Name	Scientific Name	Upland Forest, Shrub	Wetland	Urban Environment	Riparian
Common Garter Snake	<i>Thamnophis sirtalis</i>	GA/B	CA/B	GA/B	CA/B
Western Rattlesnake	<i>Crotalus viridis</i>	GA/B			GA/B
Mammals					
Virginia Opossum	<i>Didelphis virginiana</i>	GA/B		CA/B	GA/B
Masked Shrew	<i>Sorex cinereus</i>	GA/B			P/B
Preble's Shrew	<i>Sorex preblei</i>		P/B		
Vagrant Shrew	<i>Sorex vagrans</i>	GA/B	GA/B	P/B	P/B
Montane Shrew	<i>Sorex monticolus</i>	GA/B			P/B
Water Shrew	<i>Sorex palustris</i>	GA/B			CA/B
Pacific Water Shrew	<i>Sorex bendirii</i>	GA/B	GA/B		CA/B
Trowbridge's Shrew	<i>Sorex trowbridgii</i>	CA/B		GA/B	GA/B
Merriam's Shrew	<i>Sorex merriami</i>				
Pygmy Shrew	<i>Sorex hoyi</i>				
Shrew-Mole	<i>Neurotrichus gibbsii</i>	CA/B	GA/B	GA/B	GA/B
Townsend's Mole	<i>Scapanus townsendii</i>	GA/B	GA/B	GA/B	GA/B
Coast Mole	<i>Scapanus orarius</i>	CA/B		GA/B	GA/B
California Myotis	<i>Myotis californicus</i>	CA/B	GA/B	P/B	GA/B
Western Small-Footed Myotis	<i>Myotis ciliolabrum</i>		GA/F	P/B	
Yuma Myotis	<i>Myotis yumanensis</i>		CA/F	GA/B	CA/B
Little Brown Myotis	<i>Myotis lucifugus</i>		GA/F	GA/B	GA/B
Long-Legged Myotis	<i>Myotis volans</i>		GA/F	P/B	GA/B
Fringed Myotis	<i>Myotis thysanodes</i>	GA/B	GA/F	P/B	GA/B
Keen's Myotis	<i>Myotis keenii</i>	CA/B	GA/F		GA/B
Long-Eared Myotis	<i>Myotis evotis</i>	GA/B	GA/F	GA/B	GA/B
Silver-Haired Bat	<i>Lasionycteris noctivagans</i>	CA/B	GA/F	P/F	GA/F
Western Pipistrelle	<i>Pipistrellus hesperus</i>			P/F	
Big Brown Bat	<i>Eptesicus fuscus</i>	CA/B	GA/F	CA/B	GA/B
Hoary Bat	<i>Lasiurus cinereus</i>	GA/F	GA/F	GA/F	GA/B
Spotted Bat	<i>Euderma maculatum</i>		GA/F		
Townsend's Big-Eared Bat	<i>Corynorhinus townsendii</i>	GA/B	GA/F	P/B	GA/F
Pallid Bat	<i>Antrozous pallidus</i>		CA/F	P/B	GA/F
Eastern Cottontail	<i>Sylvilagus floridanus</i>			GA/B	
Nuttall's (Mountain) Cottontail	<i>Sylvilagus nuttallii</i>			P/B	
European Rabbit	<i>Oryctolagus cuniculus</i>	P/B		GA/B	
Snowshoe Hare	<i>Lepus americanus</i>	GA/B			GA/B
Mountain Beaver	<i>Aplodontia rufa</i>	CA/B			
Least Chipmunk	<i>Tamias minimus</i>			P/B	GA/B
Yellow-Pine Chipmunk	<i>Tamias amoenus</i>			GA/B	
Townsend's Chipmunk	<i>Tamias townsendii</i>	CA/B		GA/B	GA/B
Red-Tailed Chipmunk	<i>Tamias ruficaudus</i>			GA/B	
Yellow-Bellied Marmot	<i>Marmota flaviventris</i>			GA/B	
Columbian Ground Squirrel	<i>Spermophilus columbianus</i>			P/B	
California Ground Squirrel	<i>Spermophilus beecheyi</i>	GA/B		P/B	

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Common Name	Scientific Name	Upland Forest, Shrub	Wetland	Urban Environment	Riparian
Golden-mantled Ground Squirrel	<i>Spermophilus lateralis</i>			GA/B	
Cascade Golden-Mantled Ground Squirrel	<i>Spermophilus saturatus</i>			GA/B	
Eastern Gray Squirrel	<i>Sciurus carolinensis</i>			CA/B	
Eastern Fox Squirrel	<i>Sciurus niger</i>			CA/B	
Western Gray Squirrel	<i>Sciurus griseus</i>	P/B		GA/B	
Red Squirrel	<i>Tamiasciurus hudsonicus</i>			P/B	
Douglas' Squirrel	<i>Tamiasciurus douglasii</i>	CA/B		GA/B	
Northern Flying Squirrel	<i>Glaucomys sabrinus</i>	CA/B		P/B	
Northern Pocket Gopher	<i>Thomomys talpoides</i>	GA/B		GA/B	
Western Pocket Gopher	<i>Thomomys mazama</i>	CA/B		GA/B	
American Beaver	<i>Castor canadensis</i>	GA/F	CA/B	P/F	CA/B
Western Harvest Mouse	<i>Reithrodontomys megalotis</i>		CA/B		
Deer Mouse	<i>Peromyscus maniculatus</i>	CA/B	CA/B	CA/B	CA/B
Columbian Mouse	<i>Peromyscus keeni</i>	CA/B			
Bushy-Tailed Woodrat	<i>Neotoma cinerea</i>	CA/B		GA/B	
Southern Red-Backed Vole	<i>Clethrionomys gapperi</i>	GA/B			
Heather Vole	<i>Phenacomys intermedius</i>				P/B
Meadow Vole	<i>Microtus pennsylvanicus</i>		CA/B		
Montane Vole	<i>Microtus montanus</i>		CA/B	P/B	
Gray-tailed Vole	<i>Microtus canicaudus</i>				
Townsend's Vole	<i>Microtus townsendii</i>	GA/B	CA/B		GA/B
Long-Tailed Vole	<i>Microtus longicaudus</i>	GA/B	CA/B		CA/B
Creeping Vole	<i>Microtus oregoni</i>	GA/B			GA/B
Water Vole	<i>Microtus richardsoni</i>	P/B			CA/B
Sagebrush Vole	<i>Lemmys curtatus</i>				
Muskrat	<i>Ondatra zibethicus</i>			P/B	CA/B
Black Rat	<i>Rattus rattus</i>			CA/B	
Norway Rat	<i>Rattus norvegicus</i>			CA/B	
House Mouse	<i>Mus musculus</i>			CA/B	
Western Jumping Mouse	<i>Zapus princeps</i>		GA/B		
Pacific Jumping Mouse	<i>Zapus trinotatus</i>	GA/B	GA/B		CA/B
Common Porcupine	<i>Erethizon dorsatum</i>	CA/B	P/F	P/B	GA/B
Nutria	<i>Myocastor coypus</i>		CA/B	P/F	CA/B
Coyote	<i>Canis latrans</i>	GA/B	GA/F	GA/B	GA/B
Gray Wolf	<i>Canis lupus</i>			GA/B	
Red Fox	<i>Vulpes vulpes</i>	P/B		GA/B	GA/B
Black Bear	<i>Ursus americanus</i>	GA/B	GA/F	GA/F	GA/B
Grizzly Bear	<i>Ursus arctos</i>		P/F		
Raccoon	<i>Procyon lotor</i>	GA/B	CA/F	CA/B	CA/B
American Marten	<i>Martes americana</i>	GA/B			P/B
Fisher	<i>Martes pennanti</i>	CA/B			CA/B
Ermine	<i>Mustela erminea</i>	GA/B			GA/B
Long-Tailed Weasel	<i>Mustela frenata</i>	GA/B	GA/F	GA/B	GA/B

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Common Name	Scientific Name	Upland Forest, Shrub	Wetland	Urban Environment	Riparian
Mink	<i>Mustela vison</i>	GA/F	CA/F	P/F	CA/B
Wolverine	<i>Gulo gulo</i>	GA/F			
American Badger	<i>Taxidea taxus</i>				
Western Spotted Skunk	<i>Spilogale gracilis</i>	GA/B		P/B	GA/B
Striped Skunk	<i>Mephitis mephitis</i>	GA/B		P/B	GA/B
Northern River Otter	<i>Lutra canadensis</i>		CA/B		CA/B
Mountain Lion	<i>Puma concolor</i>	GA/B	GA/F	P/F	
Bobcat	<i>Lynx rufus</i>	GA/B	GA/F	GA/B	GA/B
Feral Horse	<i>Equus caballus</i>		P/F		
Feral Pig	<i>Sus scrofa</i>		GA/B		
Roosevelt Elk	<i>Cervus elaphus roosevelti</i>	GA/B	GA/F	P/B	GA/B
Rocky Mountain Elk	<i>Cervus elaphus nelsoni</i>	GA/B	GA/F	P/B	GA/B
Black-Tailed Deer	<i>Odocoileus hemionus columbianus</i>	GA/B	GA/F	GA/B	GA/B
Mule Deer	<i>Odocoileus hemionus hemionus</i>		GA/F	GA/B	
Columbian White-Tailed Deer	<i>Odocoileus virginianus leucurus</i>	GA/B	GA/F	GA/B	GA/B
Moose	<i>Alces alces</i>		GA/F	P/F	
Mountain Caribou	<i>Rangifer tarandus</i>		GA/F		
Birds					
Common Loon	<i>Gavia immer</i>		CA/B		
Pied-Billed Grebe	<i>Podilymbus podiceps</i>				GA/B
Horned Grebe	<i>Podiceps auritus</i>		CA/B		
Red-Necked Grebe	<i>Podiceps grisegena</i>		CA/B		
Eared Grebe	<i>Podiceps nigricollis</i>		CA/B		
Western Grebe	<i>Aechmophorus occidentalis</i>		CA/B		
Clark's Grebe	<i>Aechmophorus clarkii</i>		CA/B		
American White Pelican	<i>Pelecanus erythrorhynchos</i>		GA/F		
Double-Crested Cormorant	<i>Phalacrocorax auritus</i>		GA/R		P/B
American Bittern	<i>Botaurus lentiginosus</i>		CA/B		
Great Blue Heron	<i>Ardea herodias</i>	GA/R	CA/F	GA/B	CA/B
Great Egret	<i>Ardea alba</i>	P/R	CA/F	P/F	GA/B
Snowy Egret	<i>Egretta thula</i>		CA/F		GA/B
Cattle Egret	<i>Bubulcus ibis</i>		CA/F		
Green Heron	<i>Butorides virescens</i>		CA/F		CA/B
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>		CA/F		GA/F
White-faced Ibis	<i>Plegadis chihi</i>		CA/B		
Turkey Vulture	<i>Cathartes aura</i>	GA/B	GA/F	P/B	GA/B
Greater White-Fronted Goose	<i>Anser albifrons</i>		CA/F		
Snow Goose	<i>Chen Ccaerulescens</i>		CA/F		
Ross's Goose	<i>Chen rossii</i>		CA/F		
Canada Goose	<i>Branta canadensis</i>		CA/B		P/B
Mute Swan	<i>Cygnus olor</i>		CA/B	GA/B	
Trumpeter Swan	<i>Cygnus buccinator</i>		CA/B		

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Common Name	Scientific Name	Upland Forest, Shrub	Wetland	Urban Environment	Riparian
Tundra Swan	<i>Cygnus columbianus</i>		CA/F		
Wood Duck	<i>Aix sponsa</i>		P/F		CA/B
Gadwall	<i>Anas strepera</i>		CA/B		
American Wigeon	<i>Anas americana</i>		CA/B		GA/B
American Black Duck	<i>Anas rubripes</i>				CA/B
Mallard	<i>Anas platyrhynchos</i>		CA/B	GA/B	CA/B
Blue-Winged Teal	<i>Anas discors</i>		CA/B		
Cinnamon Teal	<i>Anas cyanoptera</i>		CA/B		CA/B
Northern Shoveler	<i>Anas clypeata</i>		CA/B		
Northern Pintail	<i>Anas acuta</i>		CA/B		
Green-Winged Teal	<i>Anas crecca</i>		CA/B		
Canvasback	<i>Aythya valisineria</i>		CA/B		
Redhead	<i>Aythya americana</i>		CA/B		
Ring-Necked Duck	<i>Aythya collaris</i>		GA/B		CA/B
Harlequin Duck	<i>Histrionicus histrionicus</i>				CA/B
Bufflehead	<i>Bucephala albeola</i>				GA/B
Hooded Merganser	<i>Lophodytes cucullatus</i>				GA/B
Ruddy Duck	<i>Oxyura jamaicensis</i>		CA/B		
Osprey	<i>Pandion haliaetus</i>			GA/R	GA/F
White-Tailed Kite	<i>Elanus leucurus</i>	P/R			
Bald Eagle (flying overhead)	<i>Haliaeetus leucocephalus</i>	GA/R	GA/F	GA/B	GA/B
Northern Harrier	<i>Circus cyaneus</i>		GA/B	P/B	
Sharp-Shinned Hawk	<i>Accipiter striatus</i>	GA/B	GA/F	P/B	
Cooper's Hawk	<i>Accipiter cooperii</i>	GA/B	GA/F	GA/B	GA/B
Northern Goshawk	<i>Accipiter gentilis</i>	GA/B	GA/F		
Red-Shouldered Hawk	<i>Buteo lineatus</i>	GA/B			
Red-Tailed Hawk	<i>Buteo jamaicensis</i>	GA/B	GA/F	GA/B	GA/F
Rough-Legged Hawk	<i>Buteo lagopus</i>	P/F	GA/F	P/F	P/F
Golden Eagle	<i>Aquila chrysaetos</i>	P/B	P/F		
American Kestrel	<i>Falco sparverius</i>	GA/B	GA/F		
Merlin	<i>Falco columbarius</i>	GA/B	P/F	GA/F	P/F
Gyr Falcon	<i>Falco rusticolus</i>		GA/F		
Peregrine Falcon	<i>Falco peregrinus</i>		GA/F	GA/B	P/F
Ring-Necked Pheasant	<i>Phasianus colchicus</i>	GA/F		GA/B	
Ruffed Grouse	<i>Bonasa umbellus</i>	CA/B			
Blue Grouse	<i>Dendragapus obscurus</i>	CA/B			
Wild Turkey	<i>Meleagris gallopavo</i>	GA/B		GA/B	
Mountain Quail	<i>Oreortyx pictus</i>	GA/B		P/B	
California Quail	<i>Callipepla californica</i>	GA/B		GA/B	
American Coot	<i>Fulica americana</i>		CA/B	GA/B	
Sandhill Crane	<i>Grus canadensis</i>		CA/B		
Killdeer	<i>Charadrius vociferus</i>		GA/B	GA/B	GA/F
Willet	<i>Catoptrophorus semipalmatus</i>		CA/B		

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Common Name	Scientific Name	Upland Forest, Shrub	Wetland	Urban Environment	Riparian
Spotted Sandpiper	<i>Actitis macularia</i>		GA/B		
Upland Sandpiper	<i>Bartramia longicauda</i>		GA/B		
Western Sandpiper	<i>Calidris mauri</i>		CA/F		
Least Sandpiper	<i>Calidris minutilla</i>		CA/F		
Baird's Sandpiper	<i>Calidris bairdii</i>		CA/F		
Pectoral Sandpiper	<i>Calidris melanotos</i>		CA/F		
Dunlin	<i>Calidris alpina</i>		CA/F		
Ruff	<i>Philomachus pugnax</i>				GA/F
Heermann's Gull	<i>Larus heermanni</i>			GA/F	GA/F
Mew Gull	<i>Larus canus</i>			GA/F	
Ring-Billed Gull	<i>Larus delawarensis</i>			GA/F	
California Gull	<i>Larus californicus</i>			GA/F	GA/F
Herring Gull	<i>Larus argentatus</i>			GA/F	GA/F
Western Gull	<i>Larus occidentalis</i>			GA/B	GA/F
Glaucous-Winged Gull	<i>Larus glaucescens</i>			GA/B	GA/F
Glaucous Gull	<i>Larus hyperboreus</i>			GA/B	GA/F
Common Tern	<i>Sterna hirundo</i>		CA/F		
Forster's Tern	<i>Sterna forsteri</i>		CA/F		
Black Tern	<i>Chlidonias niger</i>		CA/B		
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	CA/R			P/F
Rock Dove	<i>Columba livia</i>			CA/B	P/F
Band-Tailed Pigeon	<i>Columba fasciata</i>	CA/B		GA/B	
Mourning Dove	<i>Zenaida macroura</i>	GA/B		GA/B	GA/B
Barn Owl	<i>Tyto alba</i>		GA/F	GA/B	P/F
Western Screech-Owl	<i>Otus kennicottii</i>			GA/B	
Great Horned Owl	<i>Bubo virginianus</i>			GA/B	
Snowy Owl	<i>Nyctea scandiaca</i>			P/F	
Northern Pygmy-owl	<i>Glaucidium gnoma</i>	CA/B		P/F	
Spotted Owl	<i>Strix occidentalis</i>	CA/B			
Barred Owl	<i>Strix varia</i>	CA/B		P/B	
Great Gray Owl	<i>Strix nebulosa</i>	P/B			
Long-Eared Owl	<i>Asio otus</i>	P/B	GA/F		
Short-Eared Owl	<i>Asio flammeus</i>		GA/F		
Common Nighthawk	<i>Chordeiles minor</i>	GA/B	GA/F	GA/B	GA/B
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	P/F			
Black Swift	<i>Cypseloides niger</i>	GA/F	P/F	GA/B	GA/B
Vaux's Swift	<i>Chaetura vauxi</i>	GA/B	GA/F	GA/B	GA/B
White-Throated Swift	<i>Aeronautes saxatalis</i>		GA/F		
Black-Chinned Hummingbird	<i>Archilochus alexandri</i>		GA/F		
Anna's Hummingbird	<i>Calypte anna</i>	CA/B		GA/B	GA/B
Calliope Hummingbird	<i>Stellula calliope</i>				
Rufous Hummingbird	<i>Selasphorus rufus</i>	GA/B	P/F	GA/B	GA/B
Allen's Hummingbird	<i>Selasphorus sasin</i>	GA/B		GA/B	GA/B

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Common Name	Scientific Name	Upland Forest, Shrub	Wetland	Urban Environment	Riparian
Belted Kingfisher	<i>Ceryle alcyon</i>				GA/F
Lewis's Woodpecker	<i>Melanerpes lewis</i>			GA/B	
Acorn Woodpecker	<i>Melanerpes formicivorus</i>			GA/B	
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>			GA/B	
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	GA/B			
Downy Woodpecker	<i>Picoides pubescens</i>	GA/B			CA/F
Hairy Woodpecker	<i>Picoides villosus</i>	GA/B		GA/B	GA/F
White-Headed Woodpecker	<i>Picoides albolarvatus</i>			P/B	
Northern Flicker	<i>Colaptes auratus</i>	GA/B		GA/B	GA/F
Pileated Woodpecker	<i>Dryocopus pileatus</i>			GA/B	GA/F
Olive-Sided Flycatcher	<i>Contopus cooperi</i>	CA/B		GA/B	GA/F
Western Wood-pewee	<i>Contopus sordidulus</i>	GA/B		GA/B	
Willow Flycatcher	<i>Empidonax traillii</i>	GA/B		GA/B	
Hammond's Flycatcher	<i>Empidonax hammondi</i>	GA/B			
Black Phoebe	<i>Sayornis nigricans</i>	P/F		GA/B	
Say's Phoebe	<i>Sayornis saya</i>			GA/B	
Ash-Throated Flycatcher	<i>Myiarchus cinerascens</i>			GA/B	
Western Kingbird	<i>Tyrannus verticalis</i>			GA/B	
Eastern Kingbird	<i>Tyrannus tyrannus</i>		GA/F	GA/B	
Yellow-Throated Vireo	<i>Vireo flavifrons</i>			GA/B	GA/F
Cassin's Vireo	<i>Vireo cassinii</i>	GA/B		GA/B	
Hutton's Vireo	<i>Vireo huttoni</i>	GA/B		P/B	
Warbling Vireo	<i>Vireo gilvus</i>	GA/B		P/B	
Red-eyed Vireo	<i>Vireo olivaceus</i>	P/B			
Gray Jay	<i>Perisoreus canadensis</i>	GA/B			
Steller's Jay	<i>Cyanocitta stelleri</i>	GA/B		GA/B	GA/F
Blue Jay	<i>Cyanocitta cristata</i>			GA/B	
Western Scrub-Jay	<i>Aphelocoma californica</i>	P/B		GA/B	
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>			GA/B	
Black-Billed Magpie	<i>Pica hudsonia</i>			GA/B	
American Crow	<i>Corvus brachyrhynchos</i>	GA/B	P/F	GA/B	GA/F
Northwestern Crow	<i>Corvus caurinus</i>	GA/B		GA/B	GA/F
Common Raven	<i>Corvus corax</i>	GA/B	P/F	GA/B	GA/F
Sky Lark	<i>Alauda arvensis</i>			P/B	
Horned Lark	<i>Eremophila alpestris</i>			GA/B	
Purple Martin	<i>Progne subis</i>	GA/B	GA/F	GA/B	GA/F
Tree Swallow	<i>Tachycineta bicolor</i>	P/B	CA/F	GA/B	
Violet-Green Swallow	<i>Tachycineta thalassina</i>	GA/B	GA/F	GA/B	
Northern Rough-Winged Swallow	<i>Stelgidopteryx serripennis</i>	GA/F	CA/F	P/B	
Bank Swallow	<i>Riparia riparia</i>		GA/F	P/B	GA/F
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	GA/B	GA/F	GA/B	GA/F
Barn Swallow	<i>Hirundo rustica</i>	GA/B	CA/F	GA/B	GA/F
Black-Capped Chickadee	<i>Poecile atricapilla</i>	GA/B	P/F	GA/B	GA/F

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Chestnut-Backed Chickadee	<i>Poecile rufescens</i>	GA/B		GA/B	
Bushtit	<i>Psaltiriparus minimus</i>	GA/B		GA/B	GA/F
Red-Breasted Nuthatch	<i>Sitta canadensis</i>	GA/B		GA/B	
White-Breasted Nuthatch	<i>Sitta carolinensis</i>			GA/B	
Pygmy Nuthatch	<i>Sitta pygmaea</i>				
Brown Creeper	<i>Certhia americana</i>	GA/B			
Bewick's Wren	<i>Thryomanes bewickii</i>	GA/B	P/F	GA/B	GA/F
House Wren	<i>Troglodytes aedon</i>	GA/B		GA/B	
Winter Wren	<i>Troglodytes troglodytes</i>	CA/B		GA/B	
Marsh Wren	<i>Cistothorus palustris</i>		CA/B	GA/B	P/F
Golden-Crowned Kinglet	<i>Regulus satrapa</i>	GA/B			
Ruby-Crowned Kinglet	<i>Regulus calendula</i>	GA/F			
Townsend's Solitaire	<i>Myadestes townsendi</i>	GA/B		P/F	
Swainson's Thrush	<i>Catharus ustulatus</i>	GA/B			
Hermit Thrush	<i>Catharus guttatus</i>	GA/B			
American Robin	<i>Turdus migratorius</i>	GA/B	GA/F	GA/B	P/F
Gray Catbird	<i>Dumetella carolinensis</i>			P/B	
Northern Mockingbird	<i>Mimus polyglottos</i>			GA/F	
European Starling	<i>Sturnus vulgaris</i>	GA/B			P/F
Bohemian Waxwing	<i>Bombycilla garrulus</i>			GA/F	
Orange-Crowned Warbler	<i>Vermivora celata</i>	GA/B			
Nashville Warbler	<i>Vermivora ruficapilla</i>	GA/B			
Yellow Warbler	<i>Dendroica petechia</i>			P/B	
Black-Throated Blue Warbler	<i>Dendroica caerulescens</i>			P/B	
Yellow-Rumped Warbler	<i>Dendroica coronata</i>			GA/B	
Townsend's Warbler	<i>Dendroica townsendi</i>			GA/F	
Wilson's Warbler	<i>Wilsonia pusilla</i>	CA/B			
Western Tanager	<i>Piranga ludoviciana</i>	CA/B			
Spotted Towhee	<i>Pipilo maculatus</i>	GA/B		GA/F	GA/F
American Tree Sparrow	<i>Spizella arborea</i>				GA/F
Chipping Sparrow	<i>Spizella passerina</i>			P/B	
Clay-Colored Sparrow	<i>Spizella pallida</i>			P/B	
Fox Sparrow	<i>Passerella iliaca</i>	GA/B	GA/B	P/B	
Song Sparrow	<i>Melospiza melodia</i>	GA/B	GA/B	P/B	
Lincoln's Sparrow	<i>Melospiza lincolni</i>		CA/B	P/B	
Swamp Sparrow	<i>Melospiza georgiana</i>		CA/F		
White-Throated Sparrow	<i>Zonotrichia albicollis</i>	GA/B			
White-Crowned Sparrow	<i>Zonotrichia leucophrys</i>	GA/B			
Golden-Crowned Sparrow	<i>Zonotrichia atricapilla</i>	GA/B			
Dark-Eyed Junco	<i>Junco hyemalis</i>	GA/B			
Lazuli Bunting	<i>Passerina amoena</i>	GA/B			
Red-Winged Blackbird	<i>Agelaius phoeniceus</i>		CA/B		CA/F
Western Meadowlark	<i>Sturnella neglecta</i>		P/F		

WILDLIFE SPECIES		ASSOCIATION WITH HABITAT TYPE			
Note: species in bold letter were observed directly or indirectly onsite including observations of others		Upland Forest, Shrub	Wetland	Urban Environment	Riparian
Common Name	Scientific Name				
Yellow-Headed Blackbird	<i>Xanthocephalus xanthocephalus</i>		CA/B		
Great-Tailed Grackle	<i>Quiscalus mexicanus</i>			GA/F	
Brown-Headed Cowbird	<i>Molothrus ater</i>				CA/F
Purple Finch	<i>Carpodacus purpureus</i>	GA/B		GA/F	
Cassin's Finch	<i>Carpodacus cassinii</i>				
House Finch	<i>Carpodacus mexicanus</i>	GA/B		GA/F	
Red Crossbill	<i>Loxia curvirostra</i>	GA/B			
White-Winged Crossbill	<i>Loxia leucoptera</i>	P/F			
Pine Siskin	<i>Carduelis pinus</i>	GA/B		GA/F	
Lesser Goldfinch	<i>Carduelis psaltria</i>	P/F			
American Goldfinch	<i>Carduelis tristis</i>	GA/B			GA/F
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	GA/B		GA/F	
House Sparrow	<i>Passer domesticus</i>			GA/F	GA/F
Adapted from the CD Matrix provided in Johnson, D.H. and T.A. O'Neil. 2001. Wildlife-Habitat Relationships in Oregon and Washington. Oregon State University Press. Corvallis.					
Definitions: CA – Closely Associated – A species is widely known to depend on a habitat for part of or all its life history requirements. GA – Generally Associated – A species exhibits a high degree of adaptability and may be supported by a number of habitats. P – Present – A species demonstrates occasional use of a habitat. B – Breeds and feeds. F – Feeds only. R – Reproduces only. O – Other, such as roosting, resting, hibernating, or cover.					

Appendix D

Forestry Study