Washington Native Plant Society

Twin Ponds South Restoration Proposal

Twin Ponds Park
Shoreline, WA

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Overview and Current Conditions

Site Context

Twin Ponds Park, located in the Parkwood neighborhood of Shoreline, is a 21.6-acre multi-use park. The park includes 11.4 acres that are forested, 3.7 acres of open water and 6.5 acres that are developed. The portions of the park that are developed--much of it in wetland and stream buffers--include a playground, soccer field, tennis court, community garden, lawns, paved walkways and two parking lots.

A significant feature of the park is Thornton Creek, which passes through the park from the north and goes on to create the largest watershed in the greater Seattle area. Meridian Creek, a tributary of Thornton Creek, flows from the west. Runoff from two square miles drains into the Twin Ponds wetlands (*Thornton Creek and West Lake Washington Basins Characterization Report*, p. 3-2). The total area of City of Shoreline is 11.7 square miles so accommodating runoff from two square miles of the city represents a major ecological service by the wetlands in Twin Ponds Park.

Historical Overview

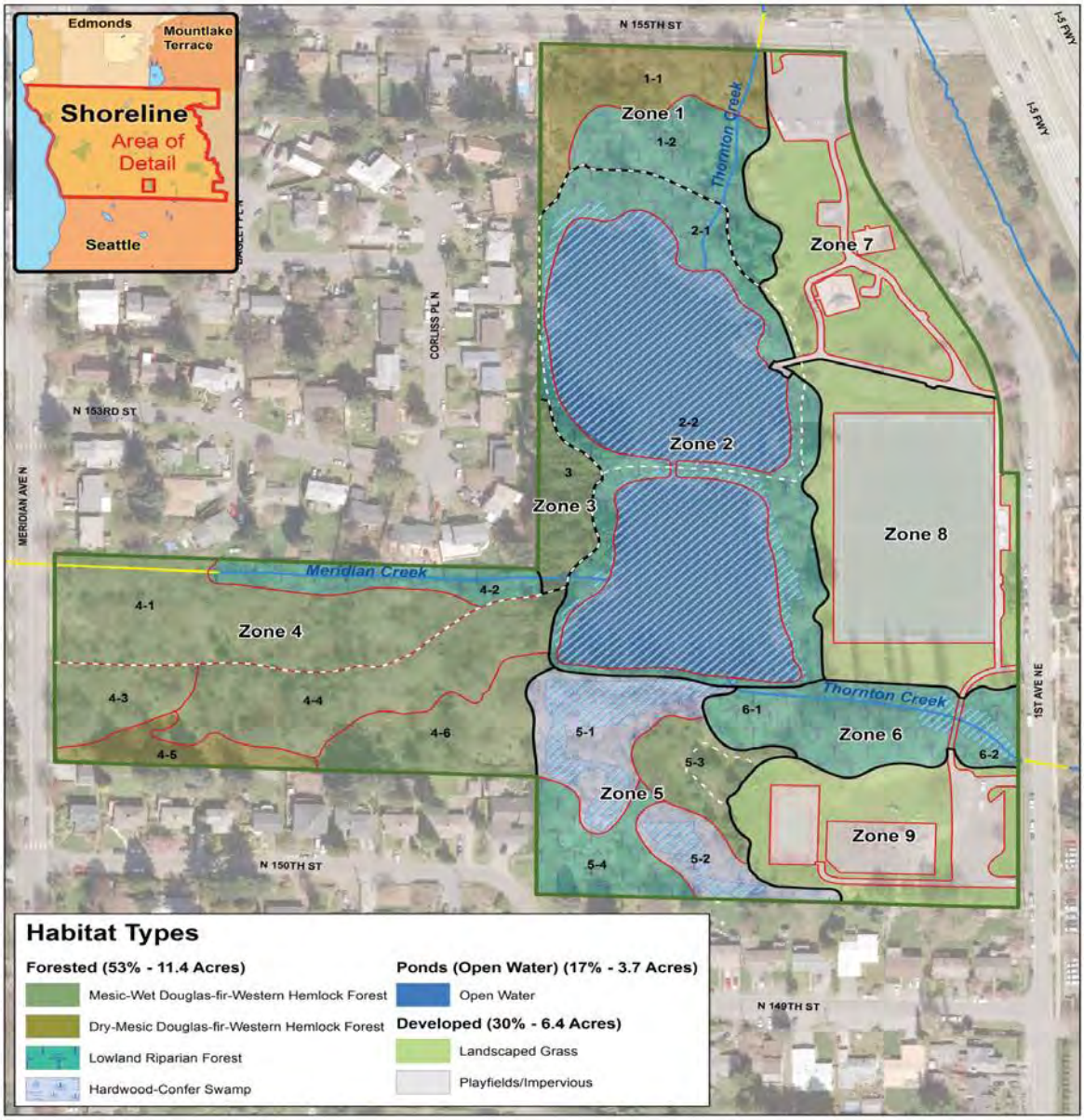
It should be noted that the ponds themselves were created by peat mining that began in the 1930s and continued into 1950s. King County created the park from the 1968 Forward Thrust bonds. Initially known as South Central Park, it was later renamed Twin Ponds Park. Following Shoreline's incorporation in 1995, King County transferred ownership of all the parks in the city to the city in 1997.

Back in 1990, John Dixon, a 1996 graduate of the Master Stewardship program, planted two coastal redwoods in an area west of the tennis court that had been used illegally as a dump. In 1993, he planted two giant sequoias and a year later, while planting the "Mercury Pine," uncovered hundreds of concrete blocks. John used the best of the blocks, with the help of the members of the early Parkwood Neighborhood Association, to create a concrete bench. By then, John had begun restoration efforts in other non-developed areas of the park, organizing annual neighborhood work parties around Earth Day and working with students at Evergreen School. Over the course of 25 years, John planted over 500 trees (over 130 Western red cedars alone) and many understory and groundcover plants. His achievements include the dedication of "Trail of Cedars" (the public trail from Meridian Avenue North to the ponds) and a successful appeal to the Department of Natural Resources to officially rename a tributary of Thornton Creek as Meridian Creek. But arguably, his most interesting legacy is the "arboretum," an area that not only includes the coastal redwoods, giant sequoias and the Mercury Pine, but a wealth of native plants and other exotic species. The land has responded splendidly: in late April 2017 (a notably late arrival of spring), various parts of the arboretum ground showcased a profusion of erythronium, horsetail, maianthemum stellatum, stinging nettle, oxalis, bleeding heart, coltsfoot, piggyback plant, cows parsnip and stinging nettle. This biodiversity bodes well for the health of the adjacent wetlands.

Twin Ponds Park

Park Zones and Habitat Management Units

Map 1



Habitat Types

Forested (53% - 11.4 Acres)

- Mesic-Wet Douglas-fir-Western Hemlock Forest
- Dry-Mesic Douglas-fir-Western Hemlock Forest
- Lowland Riparian Forest
- Hardwood-Confer Swamp

Ponds (Open Water) (17% - 3.7 Acres)

- Open Water

Developed (30% - 6.4 Acres)

- Landscaped Grass
- Playfields/Impervious

Legend

- Park Boundary
- Park Zone Areas
- Management Units
- Trails
- Wetlands
- Open Water Course
- Piped Water Course

N

0 75 150 300

Feet

1:1,600

CITY OF SHORELINE

Site Description and Current Conditions

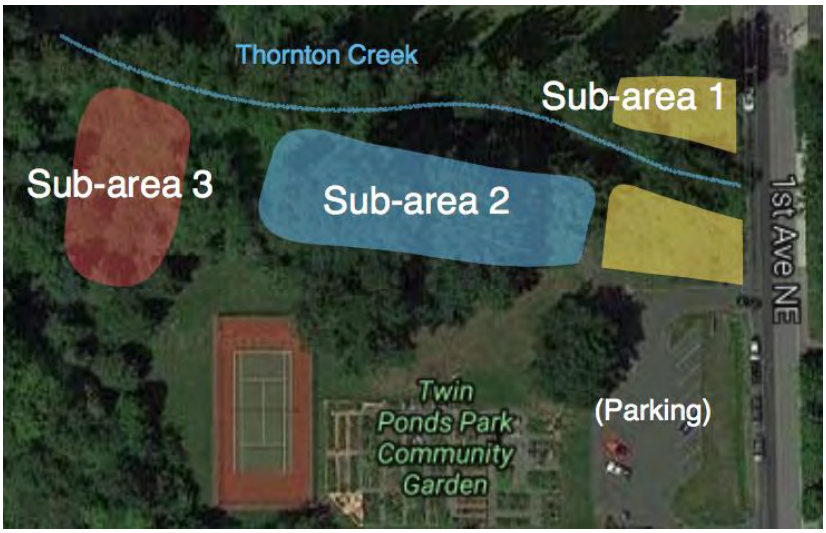
Twin Ponds Park South Restoration Work Area is divided into three sub-areas. Each of the sub-area has important variations in their assets and challenges.

Thornton Creek is the prime feature of the first two areas. Vital riparian and wetland environments take up virtually all of the first sub-area and at least half of the second area. Our work will directly benefit Thornton Creek by providing native coniferous tree cover and native shrubs that will shade the creek and improve habitat for native wildlife.

Sub-area 1 (East of pedestrian bridge to road; Zone 6-2)
The first sub-area encompasses Zone 6-2, which starts east of the pedestrian bridge and extends to just before 1st Avenue NE. This area is a priority as it is highly visible to the public and future signage could provide an opportunity to educate the public about the importance of wetlands and to inform them of the restoration taking place.

Sub-area 2 (West of pedestrian bridge to area of knotweed infestation; Zone 6-1)
The second sub-area is in Zone 6-1, extending from west of the pedestrian bridge to the west boundary of Zone 6-2 through which Thornton Creek runs. The area is unfortunately bounded on the north and west by a large knotweed infestation that abuts Thornton Creek.

Sub-area 3 (In Arboretum; Zone 5-3)
Sub-area 3 is within Zone 5-3, in the area of the loop trail in the existing Arboretum of native and non-native conifers and shrubs. Some work has occurred here in the past as noted in the introduction. Patches of native plant understory are present.



(Looking North from South of the bridge. Sub-area 1 on right, Sub-area 2 on left)

(Existing native plant community in Sub-area 3)

Site Assessment data and current plant species and maps are available in Appendices A, B and C.

Concerns and Management Priorities

Guiding Documents:

In 2016, contracted by the Shoreline Parks Department, EarthCorps (Nelson Salisbury, ecologist) created a vegetation management plan for Twin Ponds Park. As part of the project, the wetlands and streams were professionally delineated for the first time.

This restoration plan elaborates on the vegetation management plan, more specifically focusing on management units (MUs) 6-1, 6-2 and 5-3. In addition, King Conservation District has identified these MUs as Zones 5 and 6 in the Forest Stewardship Strategies also developed for the City of Shoreline. In this work proposal document and for ease of identification within our one-acre project, we have designated the following management zone correlations:

Vegetation Management Plan Designation	KCD Forest Stewardship Strategies	WNPS Master Steward Designation
Management Unit	Zone	Sub-Area
5-3	5	3
6-1	6	2
6-2	6	1

Furthermore, we followed plant number recommendations calculated by our stewardship coordinator as summarized below:

Twin Ponds South Planting Recommendations

Habit	Total Plant Space (ft^2)	Portion	Density (ft oc)	# Total
Potted Trees	16,335	5%	8	102
Potted Shrubs	16,335	5%	4	204
Live stake shrubs	16,335	45%	1.5	4901

Concerns at the Site

Invasive Species:

This site presents several restoration challenges. One is the large amount of invasive species present. These include: Himalayan blackberry (*Rubus armeniacus),* reed canarygrass (*Phalaris arundinacea*), Bohemian knotweed (*Polygonum x bohemicum),* Norway maple (*Acer platinoides*), English ivy (*Hedera helix*), English holly (*Ilex aquifolium*), creeping buttercup (*Ranunculus repens*), herb Robert (*Geranium robertianum*), Italian arum (*Arum italicum*), poison hemlock (*Conium maculatum*), morning glory (*Calystegia sepium*), and yellow flag iris (*Iris pseudocorus*).

Some of the invasive species at the site present unique challenges. The Himalayan blackberry in sub-areas 1 and 2 is abundant, thickly interwoven with other native and non-native] species, and extremely vigorous. It covers the perimeter of 3 sides of area 1 to a depth of 8 to 10 feet. It also has significant coverage in area 2, especially on the perimeter. While we believe it can be removed by hand, first cutting it down to 18 inches and then grubbing it out, it may require several work parties for the initial removal. Once removed, we will have to mulch it and monitor it vigilantly for re-sprouting.

Of particular concern is the steep slope in sub-area 1 on the east side by 1st Avenue. The area drops off from street level starting at about two feet into the blackberry growth. The drop off at that point is about 10 feet deep and very difficult to see when standing at street level. The culvert under the street carrying the stream is at the bottom of this drop off. This section may need to be tackled by City of Shoreline staff or contractors as the incline is greater than 30%.

Another concern is the Bohemian knotweed. About ⅓ of area 6-1 is infested with Bohemian knotweed, which the Parks Department has agreed to contract out for injection with herbicides by the contractor.

Reed canarygrass is known to be extremely difficult to eradicate. Since it is limited to relatively small areas in sub-areas 1 and 2, we will attempt to dig up these areas in order to prevent its spread once the Himalayan blackberry is gone. The soil is relatively soft and moist where it occurs and the matted roots are not prohibitively thick so it can be dug with hand tools this year. If there is recurrence in 2018, we can use several layers of burlap to cover and shade the canary grass. Application of the burlap will extend 2 feet beyond the edge of the infestation and the burlap will be covered by 6 inches of wood mulch such as the trunks of the Norway maple saplings, not the seed bearing components. In 2017 when working in sub-area 1 and in 2018 when working on sub-area 2, we can also plant the infested area with willow stakes, a method which shades the reed canary grass sprouts. This has been successful in the Puget Sound area in places that do not get flooded. In sub area 2 it occurs well above the stream bank.

There are two poisonous invasive weeds, Italian arum in area 2 and poison hemlock in sub-areas 1, 2, and 3. Both require the use of protective clothing and gloves which need to be removed as soon as the task is finished. Fortunately, the patches of these are small. Italian arum exists in one small clump. Only one patch of the hemlock was found in each sub-area 1 and 2, and one large clump in area 3. Both of these species can be carefully dug out, not cut, with care to remove the tubers or taproot completely. They will be disposed of in plastic bags in the trash.

About 200 Norway maple saplings are predominantly in sub area two. They vary in size from one very large tree with thick bark, to about ten trees that are close to five inches in diameter and the remainder, many smaller saplings. The US Forest Service recommends removing larger Norway Maple trees by girdling. This involves stripping an area of bark about five inches high around the tree to deprive it of nutrients and allowing it to die. This takes about two years. It appears that the largest maple, which will continue to re-seed the area, could be girdled by using a chainsaw. This could be done several years from now so that new plantings would have time to grow and the tree can continue to provide shade that cools the stream and suppresses weeds that need sun.

According to the forest service the mid-size trees are more successfully removed by girdling also and this can be done by the team using hand saws. The girdling assures that the roots also die.

We recommend that we be allowed to use this control method in our project area. Not only will it make it possible to get rid of the growing monoculture in our area but it will also protect the surrounding forests. Norway Maple is becoming an increasingly severe threat in the Northwest and will need to be addressed aggressively at some time.

The stewards cite the U.S. Forest Service method to girdle medium-to-large Norway maples in spring. Girdling is one of the most effective treatments besides sawing/ cutting with herbicidal application.[3] The Norway maple infestation is substantial and should be addressed, by either method. Coordination with the City of Shoreline and KCD is necessary to determine available resources of contractors capable of applying herbicide versus willing stewards to girdle the invasive trees.

Other invasive species at the site such as English ivy and herb Robert are less difficult to remove with typical garden tools. The herb Robert exists in copious amounts in all three areas whereas the ivy exists in small patches throughout all areas. Herb Robert is easy to pull or dig up but there is a risk of uprooting the seed bank causing the plant to spread. Although it produces seeds for long periods in the late winter and into the summer, it is nevertheless advisable to avoid removing the plant when seed heads are present as it is difficult to bag the seed heads without dispersing the seed. As with other invasive plants, repetition is required. In order to avoid removing it when the seed heads are present, the removal will need to reoccur every fall for at least 2 years and then checked for regrowth annually after that. Fortunately, most of the ivy is not climbing on trees as it occurs only in numerous smaller patches often interspersed with other weeds. English Ivy can be dug out and then disposed of by bundling piles securely and placing them in a dry spot to dry out. The bundles must be turned frequently to expose all parts of the bundle for drying and to prevent rooting at the drying location. Compost will not be added to prevent the ivy from rooting. The manual removal is more successful than chemical methods.

Still other invasive species, such as creeping buttercup, (which runs continuously along the north and east sides of section 1, in a large mass in section 2 and scattered in section 3) and yellow flag iris, are difficult to remove entirely due to the stolons or rhizomes that connect the plants. The buttercup grows in inter-connecting clumps in the form of rosettes. The rosettes have roots about 7 or 8 inches deep and are about as wide. They can be removed with a garden shovel rather than a trowel to help assure that fewer root fragments are left. We may also be able to plant through the buttercup in some areas. Yellow flag iris, likewise, can be removed with a shovel being careful to remove the entire rhizome.

Another challenge presented at this site is the amount of large non-native shrubs and trees that are present. These include English holly in sub-area 2, as well as horse chestnut and European hawthorn shrubs, in sub-area 1. The smaller species, English holly and the English hawthorn, could be cut down by the volunteers; however, they would simply regrow from their roots. A contractor would need to use herbicides to actually kill the shrubs in order to prevent their proliferation.

Additional Challenges

One additional challenge is that there is a fair amount of garbage at the site, which must be removed before work begins. Another consideration is that the first two sub-areas include wetlands and therefore, the City's Critical Area Ordinance will apply. Even working in the wetland buffer may need to be limited to the restoration team and a select number of other volunteers. Since permits are needed to plant directly in the wetland, this proposal recommends the Parks Department apply for the permits immediately so the area can be replanted with native plants as soon as the invasives are removed to help prevent their regrowth.

Also, there is a fence on the north side of sub-areas 1 and 2 which will make access and invasive removal there difficult. While the fence could have been a deterrent to passersby preventing them from entering the stream, it is currently in poor condition with broken down parts that allow park visitors to get into the stream and trample delicate areas. Please refer to the area on planting plans to see how with removal of the fence, this problem can be alleviated with well-chosen plantings that provide a thick barrier and are far more aesthetically and environmentally desirable.

As stated above the part of sub-area 1 nearest 1st Ave. NE includes a steep drop to a large culvert and will require assistance from the Park Department.

Implementation Plans

Goals, Objectives and Tasks by sub-area

Twin Ponds South Restoration Project will use King County's Best Management Practice which follows county guidelines of Integrated Pest Management (IPM). The goal is to maximize effective control and to minimize environmental, economic and social damage.

Sub-area 1:

<u>Goal 1: Remove invasive species from restoration area</u>
Identified as a priority in the KCD Forest Stewardship Strategies for South Twin Ponds, Zone

Objective 1.1: Removal of garbage
- Task 1.1.1: Pick up garbage from site
- Task 2.1.1: Transport garbage to off-site garbage facility

Objective 2.1: Removal of reed canarygrass while it is still a small population
- Task 1.2.1: Dig out reed canarygrass
- Task 2.2.1: Dispose of reed canarygrass in garbage bags
- Task 3.2.1: Cover reed canarygrass areas with cardboard and mulch

Objective 3.1: Removal of Himalayan blackberry

Task 1.3.1: Cut-back Himalayan blackberry to 18" stems

Task 2.3.1: Grub Himalayan blackberry root masses

Task 3.3.1: Cover Himalayan blackberry areas with cardboard and mulch

Objective 4.1: Removal of other invasive species, including English ivy, herb Robert, poison hemlock and common buttercup

Task 1.4.1: Hand-pull English ivy

Task 2.4.1: Dig common buttercup and herb Robert.

Task 3.4.1: Direct Parks dept. personnel to location of English holly saplings for removal, or remove by hand if small.

Objective 5.1 Remove chestnut, non-native cherry and English holly

Task 1.5.1 Request removal of these trees by Parks department.

Objective 6.1 Discard invasive materials according to BMP

Task 1.6.1 Compost all species except those listed in task below in CWD raft.

Task 2.6.1 Bag knotweed, poison hemlock and reed canary grass and place in garbage.

Objective 7.1 Monitor site for recurrence of invasive species

<u>Goal 2: Plant native vegetation, focusing on increasing diversity and conifer cover</u>

Objective 1.2: Planting of native upland and riparian vegetation

Task 1.1.2: In upland area, install potted SItka spruce, Western red cedar, Nootka rose, red-flowering currant, thimbleberry, and sword ferns.

Task 2.1.2: In riparian area, install potted Sitka spruce, Western red cedar, Oregon ash, red-osier dogwood, and Pacific ninebark as well as live stakes of willow spp. and salmonberry

Objective 2.2: Planting of native wetland vegetation in existing wetland (pending approval)

Task 1.2.2: Install live stakes of willow spp. and salmonberry

Task 2.2.2: Install potted swamp lantern, plugs of sedges, other wetland herbaceous species

Goal 3: Involve community in Twin Ponds South so that it may be preserved in the future.

Objective 3.2 Educate the community about this important riparian watershed and wetlands area with the hope that people will understand and value its importance and contribute to its preservation in the future.

Task 1.3.1 Participate in community association meetings

Task 2.3.2 Recruit volunteers for work parties and regularly scheduled work days specified elsewhere where they may have learning opportunity
Task 3.3.3 Task 1.3.3 Work with Girl Scouts and Boy Scouts who wish to complete project in a small area to assist them in completing the educational component of earning the award as determined by their requirements.
Task 4.3.4 Use local media, Shoreline Area News articles and Nextdoor Parkwood and Nextdoor Meridian Park notices to educate and recruit
Task 5.3.5 Distribute flyers to the immediate neighborhood and hand out flyers at supermarkets. Both locations may offer opportunities for discussion with citizens.

Sub-area 2:

<u>Goal 1: Remove invasive species from restoration area</u>

Objective 1.1: Removal of garbage
- Task 1.1.1: Pick up garbage from site
- Task 2.1.1: Transport garbage to off-site garbage facility

Objective 2.1: Removal of reed canarygrass
- Task 1.2.1: Dig out reed canarygrass
- Task 2.2.1: Dispose of reed canarygrass in garbage bags
- Task 3.2.1: Cover reed canary grass areas with cardboard and mulch

Objective 3.1: Removal of Italian arum
- Task 1.3.1: Dig Italian arum without breaking tubers
- Task 2.3.1: Dispose of Italian arum in garbage bags
- Task 3.3.1: Cover Italian arum areas with cardboard and mulch

Objective 4.1 Removal of Himalayan blackberry
- Task 1.4.1: Cut-back Himalayan blackberry to 18” stems
- Task 2.4.1: Grub Himalayan blackberry root masses
- Task 3.4.1: Cover Himalayan blackberry areas with cardboard and mulch

Objective 5.1: Removal of Norway maple saplings (see KCD Forest Stewardship Strategies)
- Task 1.5.1: Cut Norway maple saplings to 18” stems
- Task 2.5.1: For smaller Norway maple saplings, remove roots using weed wrench
- Task 3.5.1: For larger Norway maple saplings, consult Parks dept. personnel about use of girdling or guide to their location for herbicide application to stumps.

Objective 6.1: Removal of other invasive species, including English ivy, herb Robert, and common buttercup

Task 1.6.1: Hand-pull English ivy and create survival rings on established trees (see KCD Forest Stewardship Strategies)
Task 2.6.1: Dig common buttercup and herb Robert
Task 3.6.1: Direct Parks dept. personnel to location of English holly saplings for removal, or remove by hand if small. (see KCD Forest Stewardship Strategies)

Objective 7.1 Removal of larger shrubs and trees, including invasive English hawthorn, English holly, horse chestnut and non-native cherry trees. (see KCD Forest Stewardship Strategies)

Task 1.7.1: Request Parks department to remove these trees and shrubs.

Objective 8.1 Discard invasive materials according to BMP

Task 1.8.1 Compost all species except those listed in task below in CWD raft.
Task 2.8.1 Bag knotweed, poison hemlock and reed canary grass and place in garbage.

Objective 9.1: Monitor site for recurrence of invasive species (see KCD Forest Stewardship Strategies)

<u>Goal 2: Plant native vegetation, focusing on increasing diversity and conifer cover</u>
Identified as a priority in the KCD Forest Stewardship Strategies for Twin Ponds Park, Zone 6.

Objective 1.2: Planting of native upland and riparian vegetation

Task 1.1.2: In upland area, install potted Nootka rose, Indian plum, snowberry, and sword ferns
Task 2.1.2: In riparian area, install potted Western red cedar, Sitka spruce, Oregon ash, and elderberry as well as live stakes of willow spp. and salmonberry

Goal 3: Involve community in Twin Ponds South so that it may be preserved in the future.

Objective 3.2 Educate the community about this important riparian watershed and wetlands area with the hope that people will understand and value its importance and contribute to its preservation in the future.

Task 1.3.1 Participate in community association meetings
Task 1.3.2 Recruit volunteers for work parties and regularly scheduled work days as noted elsewhere to provide learning opportunities through volunteering.
Task 1.3.3 Work with Girl Scouts and Boy Scouts who wish to complete project in a small area to assist them in completing the educational component of earning the award as determined by their requirements.
Task 1.3.4 Use local media, Shoreline Area News articles and Nextdoor Parkwood and Nextdoor Meridian Park notices to educate and recruit
Task 1.3.5 Distribute flyers to the immediate neighborhood and hand out flyers at supermarkets. Both locations may offer opportunities for discussion with citizens.

Sub-area 3:

Goal 1: Remove invasive species from restoration area
Identified as a priority in the KCD Forest Stewardship Strategies for South Twin Ponds, Zone 6.

Objective 1.1: Removal of garbage
Task 1.1.1: Pick up garbage from site
Task 2.1.1: Transport garbage to off-site garbage facility

Objective 2.1: Removal of invasive species
Task 1.2.1: Hand-pull English ivy
Task 2.2.1: Dig common buttercup and herb Robert
Task 3.2.1: Direct Parks dept. personnel to location of English holly saplings for removal, or remove by hand if small.
Task 4.2.1 Remove poison hemlock, with prescribed precautions.

Objective 3.1: Compost all invasive material on-site using a CWD raft except for poison hemlock which must be bagged

Objective 4.1: Monitor site for recurrence of invasive species (see KCD Forest Stewardship Strategies)

Goal 2: Maintain native and horticultural vegetation already present

Planting Plan

Native species planting will start in October, 2017, in areas that have been cleared of invasives and prepared for planting. Planting will be limited to sub-areas 1 and 2. High priority will be given to increasing conifer cover in both sub-areas, both to provide shade for Thornton Creek and to shade out competing invasive vegetation. Another goal is to increase native plant diversity at the site. *The stewards are considering using Nootka Rose along the north perimeter to deter entrance into the creek and protect plantings.* Plants were chosen for their suitability to on-site environmental conditions and their natural associations with native plants presently on-site and with each other. The following table provides a general outline of native plant species to be planted. Substitutions may be made based on availability. The sub-area conceptual planting plans are included as Appendix D.

Plant species	Species code	Quantity	Size	Future canopy	Mid-story	Under-story	Wetland Indicator Status
Sitka spruce (*Picea sitchensis*)	PISI	40	1 gal. pots	x			FAC
Western red cedar (*Thuja plicata*)	THPL	30	1 gal. pots	x			FAC
Oregon ash (*Fraxinus latifolia*)	FRLA	22	1 gal. pots	x			FACW
Pacific willow (*Salix lasiandra*)	SALA	500	live stakes	x			FACW
Sitka willow (*Salix sitchensis*)	SASI	1000	live stakes		x		FACW
Vine maple (*Acer circinatum*)	ACCI	25	1 gal. pots		x		FAC
Salmonberry (*Rubus spectabilis*)	RUSP	1000	live stakes		x	x	FAC
Red-osier dogwood (*Cornus sericea*)	COSE	1500	live stakes		x	x	FACW
Pacific ninebark (*Physocarpus capitatus*)	PHCA	25	1 gal. pots		x	x	FACW
Nootka rose (*Rosa nutkana*)	RONU	10	1 gal. pots		x	x	FAC
Clustered rose (*Rosa pisocarpa*)	ROPI	25	1 gal. pots		x	x	FAC
Thimbleberry (*Rubus parviflorus*)	RUPA	10	1 gal. pots		x	x	FACU
Red-flowering currant (*Ribes sanguineum*)	RISA	10	1 gal. pots		x	x	FACU

Lady fern (*Athyrium felix-femina*)	**ATFE**	**34**	**1 gal. pots**			**x**	**FAC**
Sword fern (*Polygonum munitum*)	**POMU**	**40**	**1 gal. pots**			**x**	**FACU**
Swamp lantern* (*Lysichiton americanum*)	**LYAM**	**25**	**1 gal. pots**			**x**	**OBL**

***If wetland planting permitted**

Plans for data collection in study area:

The project site will be monitored by the Twin Ponds Park South stewards monthly. All documentation of project planning, reports from work parties as well as collected data during monitoring will be available for the WNPS program coordinator and the City of Shoreline as requested or scheduled.

Timeline

Twin Ponds Park South Restoration Project will begin in June 2017 upon approval of the proposal by the city of Shoreline. We will schedule work parties with the Stewards of Twin Ponds Park to immediately begin removal of invasive species followed by mulching. Work parties with other volunteer groups will be scheduled during summer and fall. Planting of native species will occur in the fall and early winter. The site will be monitored monthly for invasive species and weekly for plants health after planting.

(South) Twin Ponds Park Restoration Stewardship Timeline												
2017 - 2018												
Year One	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**
Planning/ Proposal	●	●										
Schedule Work Parties	●	●	●	●	●	●	●					
Invasive Removal		●	●	●	●	●	●	●	●	●	●	●
Planting / Mulching					●	●	●	●	(●)*	(●)*		
Progress Documentation			●	●	●	●	●	●	●	●	●	●
Monitoring / Evaluation				●	●	●	●	●	●	●	●	●
Sign Installation					●							
2018 - 2019												
Year Two	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**
Schedule Work Parties	●	●	●	●	●	●	●					
Invasive Removal		●	●	●	●	●	●	●	●	●	●	●
Planting/ Removal					●	●	●	●	(●)*	(●)*		
Progress Documentation	●	●	●	●	●	●	●	●	●	●	●	●
Monitoring/ Evaluation	●	●	●	●	●	●	●	●	●	●	●	●
2019 cont'd												
Year Three	**May**	**Jun**	**Jul**	**Aug**								
Invasive Removal	●	●	●	●								
Monitoring/ Evaluation	●	●	●	●								
Progress Documentation	●	●	●	●								

*Recommend live stake harvest and installation in January and February.

Resources and Assistance Required

Tools and plant procurement will be requested through the WNPS Coordinator using the forms and processes approved by the City of Shoreline.

Tools needed for work days June 11 and July 9
30 pairs of gloves
15 loppers
15 garden shovels
2 weed wrenches for more difficult plants
5 tall pruners for reaching further away, especially downhill at drop off
Materials if any to build CWD raft
3 large tarps to move cut weeds and dug up roots to CWD raft
5 gallon water jug
cash for snacks

Assistance needed from Shoreline Dept. of parks.

1. Provision and delivery of mulch from City supplies and deposited at a site to be chosen prior to various deliveries.
2. Provision and delivery of listed tools for work days listed above.
3. Assessment of possible girdling of some Norway maples.
4. Removal of large trees and shrubs such as invasive cherry, non-native hawthorn, holly, and chestnut, plus linden and poplar unlikely they would do this
5. Treatment of invasive knotweed in areas 2 and 3.
6. Removal of broken fence north of areas 1 and 2
7. Permission requested from dept. to plant in wetlands
8. Placement of permanent signage near First Avenue and section 1 indicating the Importance of restoring Thornton Creek watershed section in Twin Ponds Park with note informing how to volunteer
9. Consult with park dept. safety supervisors regarding removal of blackberry along First Av. where there is steep drop to culvert.

Community Engagement

Community Outreach will be used to bring citizens into our park not only to contribute to the work but also to learn about the value of this special watershed environment and to become invested in its care and maintenance for the future. [CB1]

Our first target will be the community at large [CB2] which we will approach through the Parkwood Neighborhood Association and we will also reach out to Meridian Park Neighborhood which is located 5 blocks North of the part at 160th Avenue. After gaining permission to address a regular meeting we will invite [CB3] the Associations to designate a member to be a liaison with our team while we educate and recruit in their community. This will be supplemented with notices to Nextdoor Meridian and Nextdoor Parkwood, email listserv communications that are widely read. The broader Shoreline Community can be reached through the Shoreline Area News. Lastly, the town of Shoreline provides notices for volunteer events. We will also distribute flyers to the immediate neighborhood and hand out flyers at supermarkets. Both locations may offer opportunities for discussion with citizens.

The work days can be attended by adults and young people 16 years of age and older whose parents give permission. We hope to enlist people to work on the following work days:
July 22
August 26
Sept. 17
Oct. 22
More days for larger work parties will be planned as the work progresses.

The team hopes to enlist a few of the volunteers who attended these larger work parties to commit to weekly work on Sundays with the team on tasks that are not suitable for large groups, or require more skill or closer supervision.

There has been an active group working to restore other parts of the park for a number of years. It is thought that some of their members would be willing to work with our team once a month on their regular work day. This will be of special benefit due to their experience and the fact that much of our riparian land cannot be trampled by large groups and some of our areas present some dangers. One of our members works regularly with this group and is already discussing this possibility.

We will also reach out to the volunteer clubs at the two local high schools to reach those who wish to fulfill their student volunteer hours requirement and to the Sustainability Association at the Shoreline Community College. These students could join the team individually or together as part of a work day.

The last focus will be to engage either Boy Scouts or Girl Scouts earning either the rank of Eagle Scout or a Golden Award. The Scout in charge of their own project will work with us to delineate the area, purpose and scope of the project. This planning responsibility is part of

earning the Award. This could include taking full charge of a small area such as part of a sub area. In that area they could address a specific weed or weeds and plant it when it is ready. They would organize their own work parties which we would supervise, usually involving other Scouts.

We hope to approach the Evergreen School as they are already active in the park. This will depend on the age of the students that they make available as well as their work schedule and the season. It would include weeding and or planting as appropriate for that group.

Preliminary work day plans for and July 22 and Aug.26
Remove trash from sub-area 1, bag, and notify for Parks pick-up
Cut blackberry canes down to 18 inches in sub-area 1 working around entire perimeter.
Grub out roots
Build CWD raft
Move on to sub-area 2 if work is completed

Bibliography and Resources

EarthCorp, 2016. *Twin Ponds Park Vegetation Management Plan*. Seattle, WA.

King Conservation District, 2017. *City of Shoreline Twin Ponds Park Forest Stewardship Strategies*. Seattle, WA.

R. W. Beck, 2009. *Thornton Creek Watershed Plan.* Shoreline, WA.

Tetra Tech/KCM, 2004. *Thornton Creek and West Lake Washington Basins Characterization.* Shoreline, WA.

http://www.shorelinewa.gov/government/departments/parks-recreation-cultural-services/park-bond-and-capital-projects-not-displayed/twin-ponds-soccer-field-improvements.

Appendix A – Site Assessment Raw Data

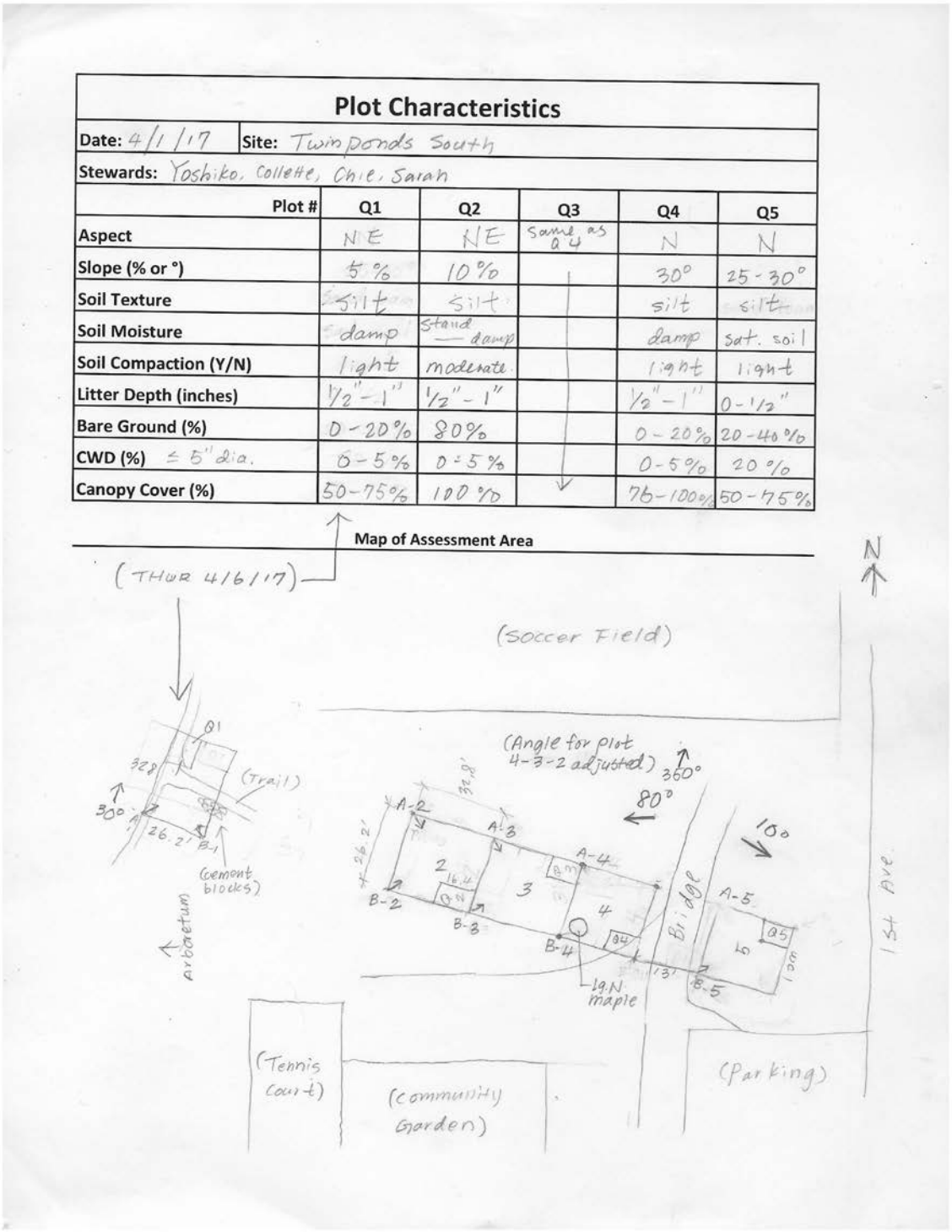
Plot Characteristics

Date: 4/1/17 Site: Twin Ponds South

Stewards: Yoshiko, Collette, Chie, Sarah

Plot #	Q1	Q2	Q3	Q4	Q5
Aspect	NE	NE	same as Q4	N	N
Slope (% or °)	5%	10%		30°	25-30°
Soil Texture	silt	silt		silt	silt
Soil Moisture	damp	stand — damp		damp	sat. soil
Soil Compaction (Y/N)	light	moderate		light	light
Litter Depth (inches)	1/2"-1"	1/2"-1"		1/2"-1"	0-1/2"
Bare Ground (%)	0-20%	80%		0-20%	20-40%
CWD (%) ≤ 5" dia.	0-5%	0-5%		0-5%	20%
Canopy Cover (%)	50-75%	100%		76-100%	50-75%

Map of Assessment Area



Trees (≥4.5ft high)

Site: Twinponds South | **Date** 4/1/17

Stewards: Yoshiko, collette, Chie, Sarah

Plot	Species / Snag		Tree Size		
Q#	Code	Name	DBH ~~(inches)~~ cm	Height	live crown %
Q5		~~▪ Alder~~		~~40'~~	~~85%~~
Q5		▪ Magnolia	23cm		50%
Q5		▪ snag (x1)			
Q5		▪ CWD (x3)			
Q5		▪ Cherry	13cm	35'	
Q5		▪ "	18cm		
Q4		▪ Norway maple	~~84~~cm	80'	50%
Q4		▪ (mystery)	48cm		76-100%
Q4		▪ Norway maple (seedling)	2.75cm	15'	"
Q4		▪ "	2cm	12'	"
Q4		▪ Hawthorn	7.5cm	18'	"
Q4		▪ Norway maple	2.5cm	12'	50%
Q4		▪ "	2cm	12'	"
Q4		▪ "	1.5	10'	"
Q3		▪ Norway maple (seedling in Q3)	2cm	10'	
Q3		▪ Norway maple	11cm	20'	75%
Q3		▪ "	6cm	20'	75%
Q2		▪ Norway maple (seedling) x12	3cm	10'	50%
Q2		▪ Birch	22cm	80'	40%
Q2		▪ "	33cm	80'	30%
Q2		▪ "	22cm	80'	30%
Q2		▪ "	32cm	80'	30%
		▪ snags (x3)			
		▪ Norway maple	11cm	80'	
		▪ "	"	80'	
Q1		▪ Sequoia	95cm	60'	90%
		▪			

~~Understory~~ % Vegetative Cover

Site: Twin ponds South | Date: 4/1/2017

Stewards: Yoshiko, Collette, Chie, Sarah

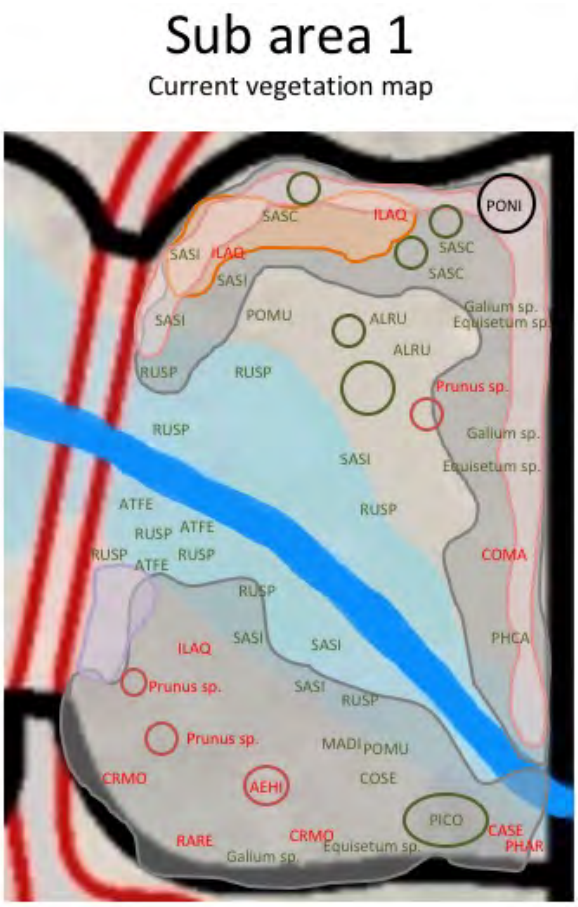
Species		Plot #				
Code	Name	Q1	Q2	Q3	Q4	Q5
	▪ Holly			0.5%		5 %
	▪ H. Blackberry			0.5%	70%	90 %
	▪ False lily of the valley					20 %
	▪ Salmon berry					20 %
	▪ Eng. Ivy	0.5%		35 %		2 %
	▪ Alder					40 %
	▪ magnolia					50 %
	▪ Herb Robert	10 %		1 %	1 %	
	▪ Elderberry	25 %			30%	
	▪ Reed canary grass				2 %	
	▪ creeping buttercup	50 %		35%	3 %	
	▪ Norway maple		40 %	90 %	40%	
	▪ wall lettuce	20 %		0.5%	1 %	
	▪ Hawthorn				15 %	
	▪ grass	20 %	1 %	3 %		
	▪ Myotory (pic/doc)			1 %		
	▪ Big leaf maple ?			5 %		
	▪ Mystery (Sarah)		0.5%			
	▪ Indian plum		0.5%			
	▪ Black cottonwood		90 %			
	▪ Birch		5 %			
	▪ Sequoia	95 %				
	▪ Thistle	5 %				
	▪ columbine	1 %				
	▪ bedstraw	15 %				
	▪ dead nettle	15 %				
	▪ Eng. laurel	0.5%				
	▪					

Appendix B: Plant Species Currently Present On site

ABGR	*Abies grandis*	Grand fir
ABMA	*Abies magnifica var. shastensis*	Shasta fir
ACCI	*Acer circinatum*	Vine maple
ACMA	*Acer macrophyllum*	Big-leaf maple
ACPL	*Acer plantanoides*	Norway maple
AEHI	*Aesculus hippocastanum*	Horse chestnut
ALRU	*Alnus rubra*	Red alder
AMAL	*Amalanchier alnifolia*	Serviceberry
Aquilegia sp.	*Aquilegia* sp.	Columbine
ARIT	*Arum italicum*	Italian arum
ATFE	*Athyrium felix-femina*	Lady fern
BEAQ	*Berberis aquifolium*	Tall Oregon grape
BENE	*Berberis nervosa*	Low Oregon grape
CALE	*Camassia leitchlinii*	Great camas
CASE	*Calystegia sepium*	Morning glory
CEVE	*Ceanothus velutinus*	Snowbrush
CHAN	*Chamaenerion angustifolium*	Fireweed
Cirsium sp.	*Cirsium* sp.	Thistle
CLPE	*Claytonia perfoliata*	Miner's lettuce
COMA	*Conium maculatum*	Poison hemlock
Cornus sp.	*Cornus* sp.	Korean dogwood; Florida dogwood
COSE	*Cornus sericea*	Red- osier dogwood
CRDO	*Crataegus douglasii*	Black hawthorn
CRMO	*Crataegus monogyna*	European hawthorn
Equisetum sp.	*Equisetum* sp.	Horsetail
EROR	*Erythronium oregonum*	White fawn lily
Galium sp.	*Galium* sp.	Bedstraw
GEMA	*Geum macrophyllum*	Big- leaved avens
GERO	*Geranium robertsonii*	Herb Robert
Hamamelis X	*Hamamelis* X	Witch-hazel, hybrid
HEHE	*Hedera helix*	English ivy
HELA	*Heracleum maximum*	Cow parsnip
Hyacinthoides sp.	*Hyacinthoides* sp.	Bluebells
ILAQ	*Ilex aquifolium*	English holly
ILVE	*Ilex verticillata* 'Sparkleberry'	Sparkleberry winterberry
IRPS	*Iris pseudacorus*	Yellow flag iris
Lamium sp.	*Lamium* sp.	Deadnettle
LOIN	*Lonicera involucrata*	Twinberry
MADI	*Maianthemum dilatatum*	False lily of the valley
Myosotis sp.	*Myosotis* sp.	Forget-me-not
OECE	*Oemleria cerasiformis*	Indian plum
PEFR	*Pedicites frigidus*	Palmate coltsfoot
PHAR	*Phalaris arundinacea*	Reed canarygrass
PICO	*Pinus contorta*	Shore pine
Pinus X	*Pinus* X	Pine, hybrid
PIOR	*Picea orientalis*	Oriental spruce
PLAC	*Platanus × acerifolia*	London Plane

POBA	*Populus balsamifera ssp. trichocarpa*	Black cottonwood
POBO	*Polygonum x bohemicum*	Bohemian knotweed
POMU	*Polystichum munitum*	Sword fern
PONI	*Populus nigra*	Lombardy poplar
Prunus sp.	*Prunus* sp.	Cherry
QUGA	*Quercus garryana*	Garry oak
QURU	*Quercus rubra*	Red oak
RARE	*Ranunculus repens*	Creeping buttercup
RIIN	*Ribes indecorum*	White- flowering currant
RILA	*Ribes lacustre*	Black gooseberry
RISA	*Ribes sanguineum*	Red- flowering currant
RONU	*Rosa nutkana*	Nootka rose
ROPI	*Rosa pisocarpa*	Clustered rose
RUAR	*Rubus armeniacus*	Himalayan blackberry
Rumex sp.	*Rumex* sp.	Dock
RUPA	*Rubus parviflorus*	Thimbleberry
RUSP	*Rubus spectabilis*	Salmonberry
SALA	*Salix lasiandra*	Pacific willow
SARA	*Sambucus racemosa*	Red elderberry
SASC	*Salix scouleriana*	Scouler's willow
SASI	*Salix sitchensis*	Sitka willow
SEGI	*Sequoia giganteum*	Giant sequoia
SODU	*Solanum dulcamara*	Bittersweet nightshade
STCO	*Stachys cooleyae*	Cooley's hedge nettle
STPS	*Stewartia pseudocamellia*	Japanese Stewartia
SYAL	*Symphoricarpos albus*	Snowberry
THPL	*Thuja plicata*	Western red cedar
Tilia sp.	*Tilia* sp.	Linden
TSHE	*Tsuga heterophylla*	Western hemlock
URDI	*Urtica dioica*	Stinging nettle
VAOV	*Vaccinium ovatum*	Evergreen huckleberry
VITR	*Vaccinium trilobum*	American cranberry viburnum

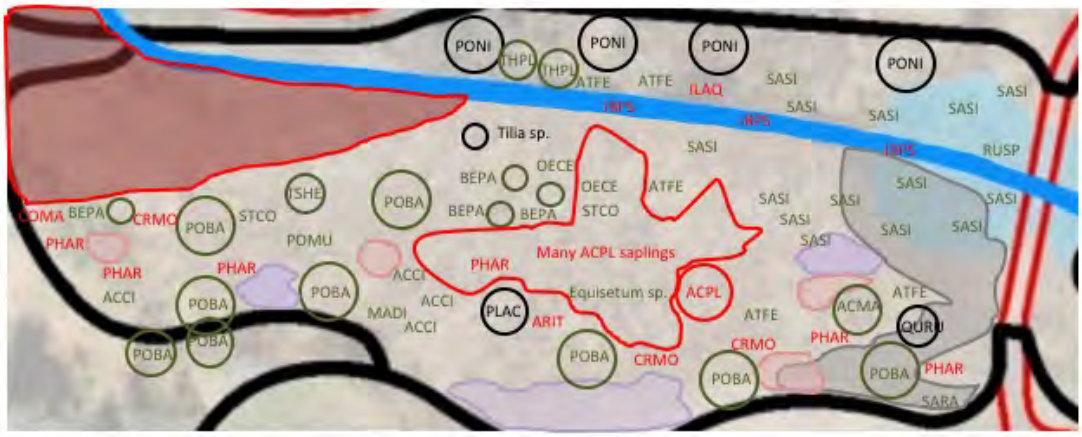
Appendix C: Current Vegetation Maps



(Figure 8. Current Vegetation Map for Sub-area 1)

Sub area 2

Current vegetation map



(Figure 9. Current Vegetation Map for Sub-area 2)

Native plants (in green)
ACCI – Vine maple
ACMA – Big-leaf maple
ALRU – Red alder
ATFE – Lady fern
COSE – Red-osier dogwood
Equisetum sp. – Horsetail
Galium sp. - Bedstraw
MADI – False lily of the valley
OECE – Indian plum
PICO – Shore pine
POBA – Black cottonwood
POMU – Sword fern
RUSP – Salmonberry
SARA – Red elderberry
SASC – Scouler's willow
SASI – Sitka willow
STCO – Cooley's hedge nettle
THPL – Western red cedar
TSHE – Western hemlock

Ornamental trees - noninvasive (in black)
PLAC – London Plane
PONI – Lombardy poplar
QURU – Red oak
Tilia sp. - Linden

Invasive plants (in red)
ACPL - Norway maple
AEHI - Horse chestnut
ARIT – Italian arum
CASE - Morning glory
COMA – Poison hemlock
CRMO – European hawthorn
ILAQ – English holly
IRPS – Yellow flag iris
PHAR – Reed canarygrass
Prunus sp. – Cherry

KEY

GERO – Herb Robert

HEHE – English ivy

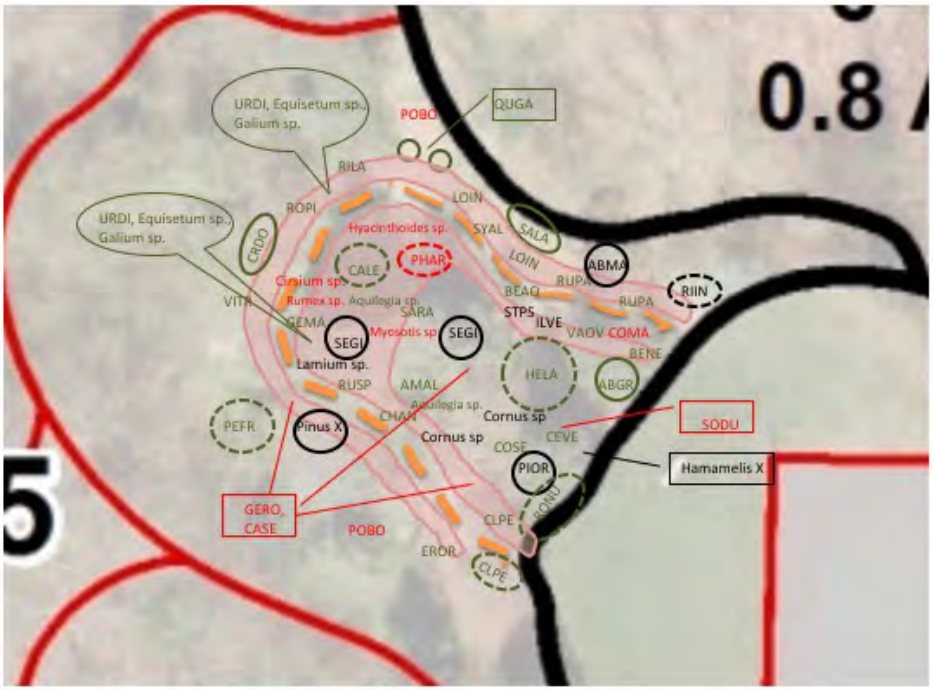
POBO – Bohemian knotweed

RARE - Creeping buttercup

RUAR - Himalayan blackberry

Note: Vegetation represented in maps is not to scale.

Sub area 3



(Figure 10. Current Vegetation Map for Sub-area 3)

Key

(sub-area 3)

Native plants (in green)
ABGR–Grand fir
AMAL –Serviceberry
Aquilegia sp. –Columbine
BEAQ – Tall Oregon grape
BENE – Low Oregon grape
CALE – Great camas
CHAN – Fireweed
CEVE – Snowbrush
CLPE – Miner's lettuce
COSE – Red-osier dogwood
CRDO – Black hawthorn
Equisetum sp. – Horsetail
EROR – White fawn lily
Galium sp. – Bedstraw
GEMA – Big-leaved avens
HELA – Cow parsnip
LOIN – Twinberry
PEFR – Palmate coltsfoot
QUGA – Garry oak
RILA – Black gooseberry
RISA – Red-flowering currant
RONU – Nootka rose
ROPI–Clustered rose
Rumex sp. –Dock
RUPA–Thimbleberry
RUSP – Salmonberry
SALA – Pacific willow
SARA – Elderberry
SYAL – Snowberry
VAOV – Evergreen huckleberry
VITR – American cranberry viburnum
URDI – Stinging nettle

Trail

Ornamentals (in black)
ABMA – Shasta fir
Cornus sp. – Korean dogwood; Florida dogwood
Hamamelis X – Witch-hazel, hybrid
ILVE – Sparkleberry winterberry
Pinus X – Pine, hybrid
PIOR – Oriental spruce
RIIN – White-flowering currant
SEGI – Giant sequoia
STPS – Japanese Stewartia

Invasive plants (in red)
Cirsium sp. – Thistle
COMA – Poison hemlock
Hyacinthoides sp. – Bluebells
Lamium sp. – Deadnettle
Myosotis sp. – Forget-me-not
SODU–Bittersweet nightshade

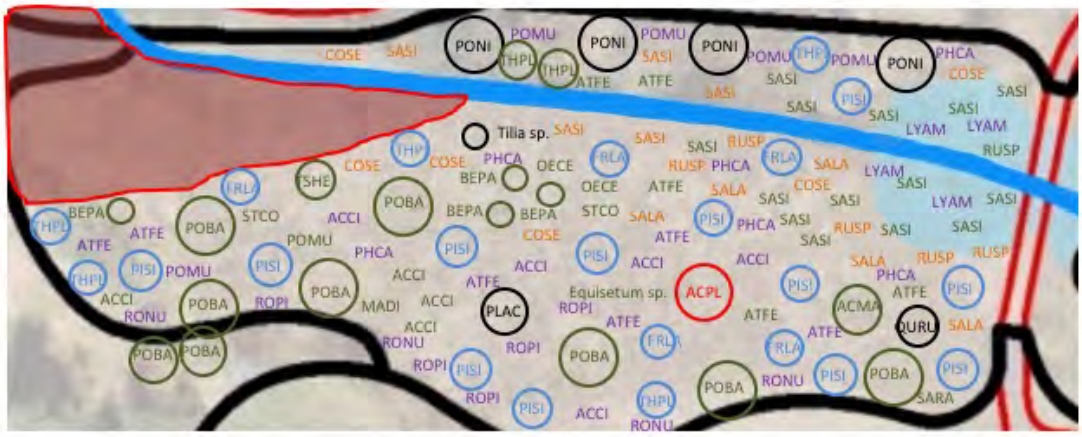
RARE - Creeping buttercup

Appendix D: Conceptual Planting Plans

(Figure 11. Conceptual Planting Map for Sub-area 1)

Sub area 2

Conceptual planting map



(Figure 12. Conceptual Planting Map for Sub-area 2)

Existing Vegetation

Native plants (in green)
ACCI – Vine maple
ACMA – Big-leaf maple
ALRU – Red alder
ATFE – Lady fern
COSE – Red-osier dogwood
Equisetum sp. – Horsetail
Galium sp. - Bedstraw
MADI – False lily of the valley
OECE – Indian plum
PICO – Shore pine
POBA – black cottonwood
POMU – Sword fern
RUSP – Salmonberry
SARA – Red elderberry
SASC – Scouler's willow
SASI – Sitka willow
STCO – Cooley's hedge nettle
THPL – Western red cedar
TSHE – Western hemlock

Ornamental trees - noninvasive (in black)
PLAC – London Plane
PONI – Lombardy poplar
QURU – Red oak
Tilia sp. - Linden

Invasive plants (in red)
ACPL - Norway maple
AEHI - Horse chestnut
ARIT – Italian arum
CASE - Morning glory
COMA – Poison hemlock
CRMO – European hawthorn
ILAQ – English holly
IRPS – Yellow flag iris
PHAR – Reed canarygrass
Prunus sp. – Cherry

KEY

(sub-areas 1 and 2)

GERO - Herb Robert

HEHE – English ivy

POBO – Bohemian knotweed

RARE - Creeping buttercup

RUAR - Himalayan blackberry

Restoration Plantings

Potted trees in blue; potted shrubs in purple; live stakes in orange

ACCI – Vine maple
ATFE – Lady fern
COSE – Red-osier dogwood
FRLA – Oregon ash
LYAM – Swamp lantern
PHCA – Pacific ninebark
PISI – Sitka spruce
POMU – Sword fern
RISA – Red-flowering currant
RONU – Nootka rose
ROPI – Clustered rose
RUPA - Thimbleberry
RUSP - Salmonberry
SALA – Pacific willow
SASI – Sitka willow
THPL – Western red cedar

Note: Vegetation represented in maps is not to scale.