

October 2014

Japanese Gulch Natural Resource Inventory

Mukilteo, WA 98275



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Japanese Gulch Natural Resource Inventory

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Cover photo: Western hemlock, Western red cedar, and bigleaf maple trees in Japanese Gulch.

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1. Introduction

The City of Mukilteo recently acquired a large tract of undeveloped property (approximately 97.7 acres) in the Japanese Gulch area adjacent to existing park owned properties. In an effort to incorporate this area with the City's established parks and open spaces, they are in the process of creating a Master Plan that will help guide future management and improvements within the area collectively referred to as the Japanese Gulch Properties that are approximately 143 acres all together. Barker Landscape Architects, P.S. have been contracted to develop the Master Plan. The purpose of this report is to provide specific information regarding the current health, structure, and function of the forests and natural areas that make up the Japanese Gulch Property. Having a thorough understanding of the existing conditions will help make informed management decisions and provide baseline conditions that can be used to track and monitor changes to the Gulch over time.

The purpose of the inventory is to map and describe the existing conditions of the Properties and use this information to develop a broad inventory of the natural resources present on the site. The following report describes the management areas that were created based on topography and existing vegetation present on the site and provides an analysis of the vegetation composition and structure present within each area.

This document is intended to help guide the long-term restoration and preservation of the natural areas present on the property. Towards this goal, Japanese Gulch has been apportioned into discreet management units based on unique habitat types and plant species assemblages to help prioritize and track restoration and planning efforts. In addition, this document can serve as a baseline condition assessment that can be used to track progress and evaluate the success of proposed restoration efforts over time.

Developing a long-term habitat management plan can be an important step in efforts to protect, enhance, and maintain the forests and associated natural areas on the property, with the specific intent to increase the natural, social, and economic services they provide. These services include: storm water mitigation, flood and erosion control, improved air quality, carbon sequestration, enhanced wildlife habitat, public education, passive and active recreation, as well as the many other documented benefits to the health and well-being of the community.

2. Site location and Context

2.1. Site Location and Description

Japanese Gulch consists of a mostly forested group of open-space properties located in the northeast portion of the City of Mukilteo and bordering the City of Everett to the east. Japanese Gulch Creek flows along the eastern boundary of the property between the park and the BNSF Railroad tracks. The properties have been divided into five general Planning Areas made up of the "Mukilteo Tank Farm Site", the "Lower Japanese Gulch", the "Dog Park", the "Upper Japanese Gulch", and the "Precht Property" planning areas. The Tank Farm site is an

industrial area that includes shoreline access that is currently not open to the public that is located north of Mukilteo Lane. The Lower Gulch is comprised of two separate properties that make up the northern portion of the Park on either side of the BNSF railroad and south of W Mukilteo Blvd. The Dog Park is located just south of W Mukilteo Blvd. and includes the location of the off-leash dog park. The largest portion is made up of the Upper Gulch planning area that is situated on the slopes and benches west of the BNSF railroad. The Precht Property is located in the southern portion of the park along 76th St. SW and includes the community garden and old cemetery. These planning areas have been given specific designations by the City based on the Conservation Easement regulations underlying the management of the property (City of Mukilteo, 2014). The "Upper Japanese Gulch" planning area has been designated for "Passive Use Only", while the remaining areas are designated for "Passive Use or Active Use".

2.2. Geology and Hydrology

Most of Japanese Gulch consists of moist forested uplands with generally well-draining soils formed from advance glacial outwash deposited sediments. Numerous wetlands and riparian forests are also present and often interspersed throughout the forested upland areas. The major soil classifications for the gulch include "Alderwood gravelly sandy loam, 2 to 8 percent slopes" generally found on the western bench that makes up the majority of the property and "Alderwood-Everett gravelly sandy loams, 25 to 70 percent slopes" found on the steep eastern slopes dropping down to Japanese Creek (USDA 2013). These soils are moderately well drained (above the hardpan) and were formed in glacial drift and outwash deposits (Soil Survey Staff, 2014). Erosion hazard is generally slight but increases with slope and can be moderate to severe on slopes greater than 15 percent (United States, 1983).

The soil in the low-lying northern portion of Japanese Gulch (north of W Mukilteo Blvd.) is classified as "Norma Loam" (USDA 2013). This soil consists of deep, poorly drained soils that formed in depressions in drainage ways from alluvial deposits. Soils in this area generally have a high water table and often experience seasonal ponding (Soil Survey Staff, 2014).

Japanese Gulch

Dominant Habitat Types and Management Planning Areas

Legend

Dominant Habitat Types

Forested Habitats

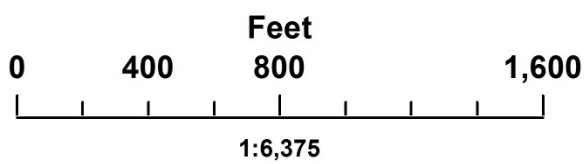
- BLF Broadleaf Landslide Forest
- DDF Dry D. Fir (Madrone) Forest
- D-MF Dry-Mesic D. Fir/Hemlock Forest
- HCS Hardwood-Conifer Swamp
- LRF Lowland Riparian Forest
- M-WF Mesic-Wet D. Fir/Hemlock Forest
- PSS Pacific Shrub Swamp

Disturbed Habitats

- D Developed
- DG Disturbed Grassland
- DSH Disturbed Shoreline
- DS Disturbed Shrubland

Features

- Japanese Gulch Boundary
- Pedestrian Access Points
- Streams
- Wetlands
- BNSF Railroad Tracks



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3. Forest and Natural Area Assessment

This analysis evaluated the existing structure and condition of the forested natural areas present on the property. The purpose of the forest assessment and analysis was to:

- Create Management Units to prioritize and track habitat restoration and management efforts
- Develop specific recommendations to restore and increase the health and structure of existing vegetation communities
- Provide baseline data on the existing structure and composition of the vegetation communities

3.1. Management Units

Japanese Gulch was initially divided into areas of similar habitat types based on dominant plant species associations, topography, or other existing features during GPS (global positioning system) assisted field surveys (Map 1). Overall, a total of 33 discrete Management Units (MUs) were delineated that include 13 different broad habitat types (Table 1). These habitat types were adapted from the ecological classification system developed by NatureServe and utilized by the Washington Dept. of Natural Resources (WADNR) (Rocchio, 2008). These broad habitat types were then further separated based on unique species associations within these typings, topography, or other pertinent features (Map 1). Seven of the dominant habitat types were adapted directly from the WADNR classifications while the remaining six represent disturbed or developed habitat types that are not represented by this system. These developed and disturbed areas represent only approximately 7% of the total area. Table 1 shows a summary of these broad habitat types found throughout the park. These general Management Unit delineations can be used to plan, prioritize, and track management and restoration efforts throughout the property.

3.2. Assessment Procedures

Each Management Unit was inventoried using a rapid visual assessment procedure to provide a general understanding of the composition of the existing vegetation present throughout the Park. Information collected for each area included dominant native plant species (trees, shrubs, groundcovers), presence of dominant non-native invasive plant species, and the presence of other habitat features or general site characteristics. This information was used to develop an overall assessment of the structure, composition, and health of the overall properties. All field surveys were conducted in late October of 2014 by EarthCorps ecologists.

4. Results and Findings

The following sections of the report describe the general conditions of the property (section 4.1) and a more detailed description of each of the dominant habitat types (section 4.2).

Table 1. NatureServe and developed/disturbed ecological system units and the acres and percent of each type present in Japanese Gulch.

| Habitat Type* | Acres | Percent of Total |
|---|--------------|------------------|
| Forested (93% - 136.7 Acres) | | |
| North Pacific Broadleaf Landslide Forest and Shrubland | 28.6 | 19% |
| North Pacific Dry Douglas-fir-(Madrone) Forest and Woodland | 2.5 | 2% |
| North Pacific Hardwood-Conifer Swamp | 1.4 | 1% |
| North Pacific Lowland Riparian Forest and Shrubland | 15.8 | 11% |
| North Pacific Maritime Dry-Mesic Douglas-fir-Western Hemlock Forest | 15.0 | 10% |
| North Pacific Maritime Mesic-Wet Douglas-fir-Western Hemlock Forest | 73.3 | 50% |
| Open (4% - 5.6 Acres) | | |
| Disturbed Grassland* | 2.1 | 1% |
| Disturbed Shrubland* | 3.0 | 2% |
| North Pacific Shrub Swamp | 0.5 | 0.3% |
| Developed (3% - 4.8 Acres) | | |
| Community Garden* | 0.4 | 0.3% |
| Dog Park* | 1.0 | 1% |
| Parking/Roads* | 2.0 | 1% |
| Shorline/Industrial* | 1.4 | 1% |
| Grand Total | 147.1 | |

*Indicates a type that does not correspond to a NatureServe System.

4.1. Property-wide Conditions

In general, the natural areas located on the property are predominately mixed conifer-deciduous forests typical of the Western Washington Puget lowlands. The majority of the property (more than 90%) is forested (Figure 1). The remaining land area is split between open canopied habitats (4%) and developed areas (3%). The major topographical landform that defines the property is the “gulch” that runs along the eastern boundary of the park that drops down to Japanese Creek and the BNSF railroad tracks. The western portion of the property is relatively flat and includes numerous perched wetlands and moist valleys that either drain east to Japanese Creek or to the northwest into a related prominent drainage system. Together, these wetlands and associated valleys create a dynamic and diverse system of forested and wetland habitats. These forests generally consist of wet to moist conifer-deciduous mixed forests with some areas of dryer conifer dominated patches. The forests to the east are generally comprised of deciduous dominated slopes and valleys that are indicative of unstable soils and past slides. Some slopes show more stability and are conifer dominated or have a more mature tree composition. The northern section of the ravine near the mouth of Japanese Creek includes lower slope areas that exhibit saturated and swampy wetland conditions. Overall, the forests and wetlands that make up Japanese Gulch represent a variety of unique and representative Pacific Northwest habitat types.

Figure 1. Proportion of general land cover types present throughout Japanese Gulch.

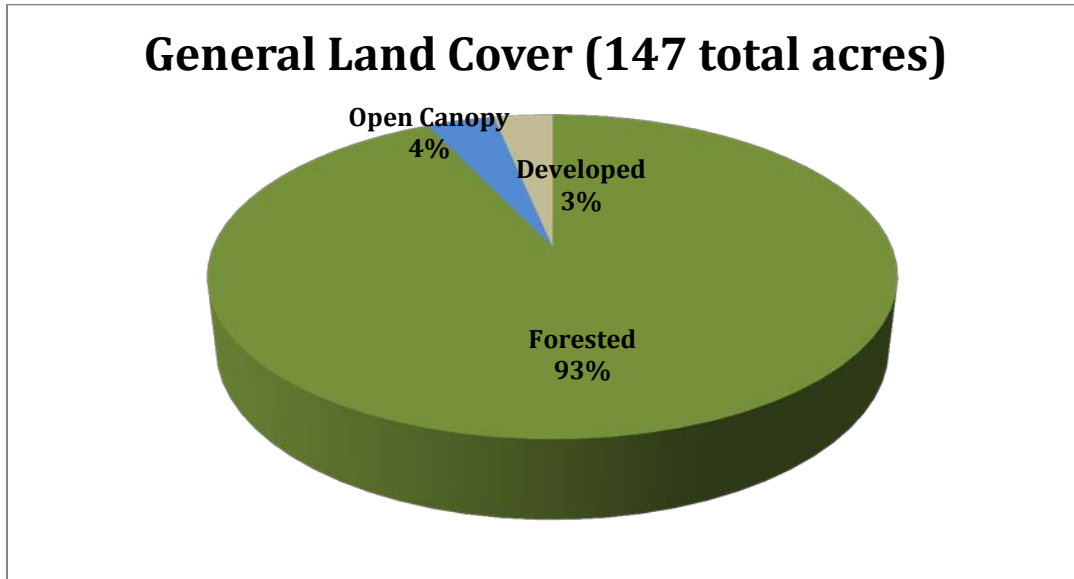
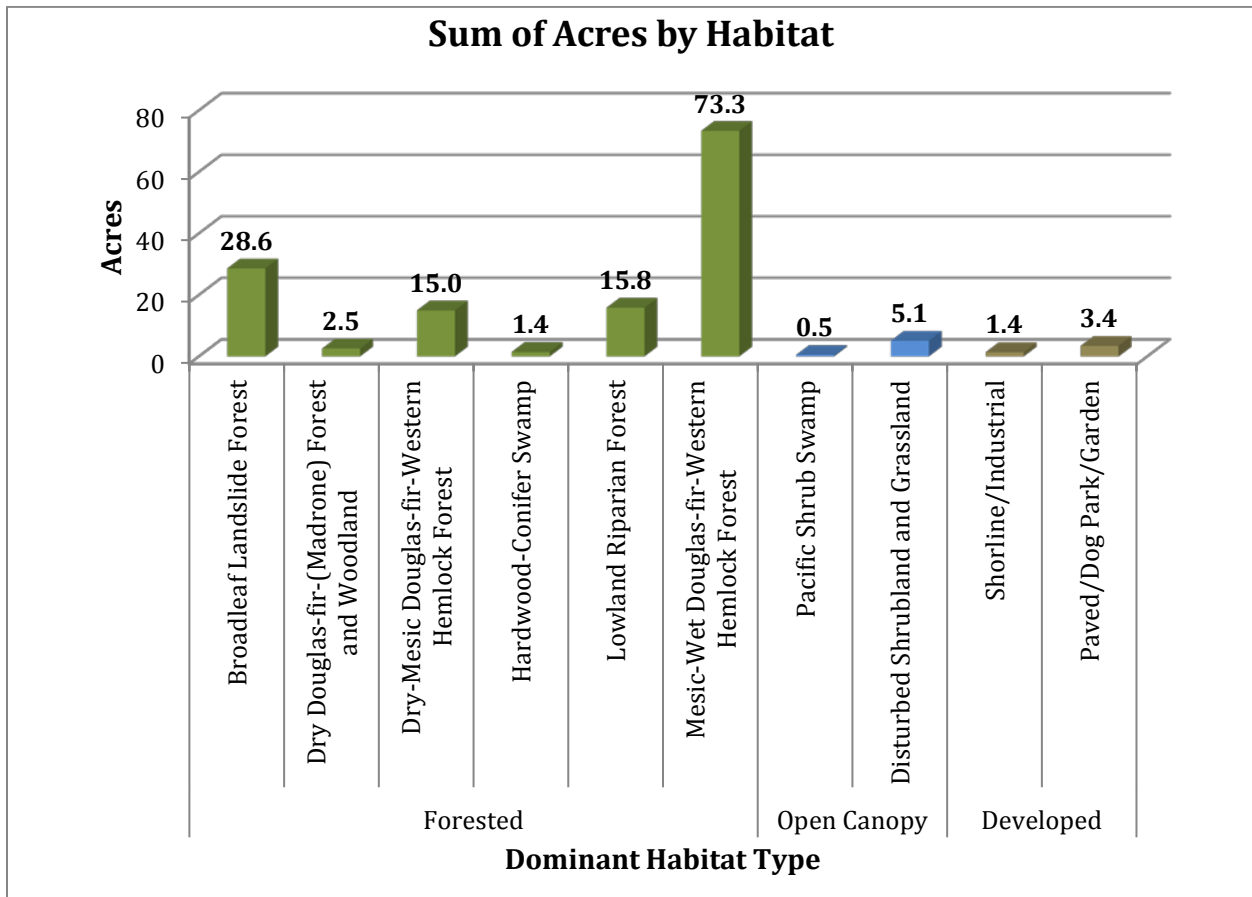


Figure 2. Cumulative acres of each habitat type present in Japanese Gulch by general land cover.



The natural areas that make up Japanese Gulch generally represent a very healthy urban forested system. Although much of the forest is relatively even aged, the mixed canopy in general exhibits some level of structural diversity throughout the different habitat types and management units. Perhaps due to the relatively intact nature of the property, there appears to be a fair amount of natural conifer regeneration present. This is also enhanced by the reasonably large amounts of coarse woody debris (CWD) present throughout much of the gulch. CWD is an important component of Pacific Northwest forests and plays a vital role by adding organic material to the soil and providing habitat for decomposer fungi, animals, birds, bacteria and insects. In the Pacific Northwest, 47 vertebrate bird and animal species utilize downed wood for foraging, shelter and cover (Bunnell et al. 2002). CWD also acts as “nurse logs” for seedlings of plants such as western hemlock, red huckleberry, and salal, and helps retain sediment and prevent erosion (Stevens 1997). Much of the CWD present in Japanese Gulch is leftover from historic logging practices that left large stumps throughout the property. In fact, much of the regenerating western hemlock trees found in the gulch can be seen growing directly out of these persisting stumps. As the existing canopy continues to age and senesce, new recruitment will continue to occur.

Dominant tree species throughout the forested habitat types include red alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllum*), Douglas fir (*Pseudotsuga menziesii*), western red cedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*). Tree species that are present in relatively small amounts or limited areas include Sitka spruce (*Picea sitchensis*), black cottonwood (*Populus trichocarpa*), Pacific Madrone (*Arbutus menziesii*), bitter cherry (*Prunus emarginata*), and western yew (*Taxus brevifolia*). The most dominant native shrub that is present and abundant throughout the property is salmonberry (*Rubus spectabilis*). Other dominant species that make up the shrub layer include red huckleberry (*Vaccinium parvifolium*), ocean-spray (*Holodiscus discolor*), red elderberry (*Sambucus racemosa*), beaked hazelnut (*Corylus cornuta*), dull Oregongrape (*Berberis nervosa*), and salal (*Gaultheria shallon*). Less common shrubs include Indian plum (*Oemleria cerasiformis*), thimbleberry (*Rubus parviflorus*), swamp current (*Ribes lacustre*), snowberry (*Symphoricarpos albus*), and others. The herbaceous/groundcover layer is well developed throughout most of the property and is heavily dominated by western sword fern (*Polystichum munitum*), and creeping blackberry (*Rubus ursinus*). Other prevalent species include piggyback plant (*Tolmiea menziesii*), wood fern, (*Dryopteris expansa*), fringcup (*Tellima grandiflora*), lady fern (*Athyrium filix-femina*), skunk cabbage (*Lysitichiton Americana*), stinging nettle (*Urtica dioica*), Dewey's sedge (*Carex leptopoda*), false lily-of-the-valley (*Maianthemum dilatatum*), and licorice fern (*Polypodium glycyrrhiza*). Other species of note include American twinflower (*Linnaea borealis*), western maidenhair fern (*Adiantum aleuticum*), deer fern (*Blechnum spicant*), devil's club (*Oplopanax horridus*), Pacific bleeding heart (*Dicentra formosa*), slough sedge (*Carex obnupta*), and many other species common to moist forests in the Pacific Northwest. In addition, Japanese Gulch also supports a wide diversity of non-vascular lichens, bryophytes and mushrooms.

The biggest threat to the health and function of these forests is the continued spread and introduction of non-native invasive plant species. Currently, the Gulch has relatively low

presence of invasive species, especially in the interior of the park. However, several locations have become substantially invaded and these areas will continue to spread to the adjacent forests and natural areas (Map 2). Map 2 shows the locations of selected invasive species concerns. Note that most of the concerns are located near the edges and entrances to the park or in areas where significant land disturbance had occurred. The rest of the interior of the park has only limited invasive species present throughout and is generally well vegetated with native species assemblages. The dominant invasive species present include Himalayan blackberry (*Rubus bifrons*), English ivy (*Hedera helix*), English holly (*Ilex aquifolium*), and Scotch broom (*Cytisus scoparius*). Other invasive species that are less dominant include bittersweet nightshade (*Solanum dulcamara*), yellow archangel (*Lamium galeobdolon*), creeping buttercup (*Ranunculus repens*), cherry laurel (*Prunus laurocerasus*), common periwinkle (*Vinca minor*), herb Robert (*Geranium robertianum*), and reed canarygrass (*Phalaris arundinacea*).

The vast majority of the properties that make up Japanese Gulch are comprised of relatively intact forested natural areas. These forests provide a remarkable diversity of habitats and native plant species assemblages that create a unique natural experience in an increasingly developed urban area. These natural areas provide invaluable resources for wildlife including mammals, birds, amphibians, insects, salmon, trout and other fish, as well as providing varied recreational opportunities and urban respite for the surrounding communities. Wildlife species that were noted during the inventory included bald eagles, great blue herons, pileated woodpeckers, Douglas squirrels, mountain beavers, and many species of songbirds.

Generally, the forested systems of Japanese Gulch are relatively intact and represent an important resource to the surrounding community for the recreational and ecosystem services that they provide. Urban forests face increasing human pressures and disturbances and maintaining the health and stability of these natural areas will ensure that they continue to provide these processes and functions for years to come. Active management and restoration of Japanese Gulch will help to maintain and increase the ability for these forests to support the valuable ecosystem services that they provide.

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Japanese Gulch

Dominant Invasive Species Locations

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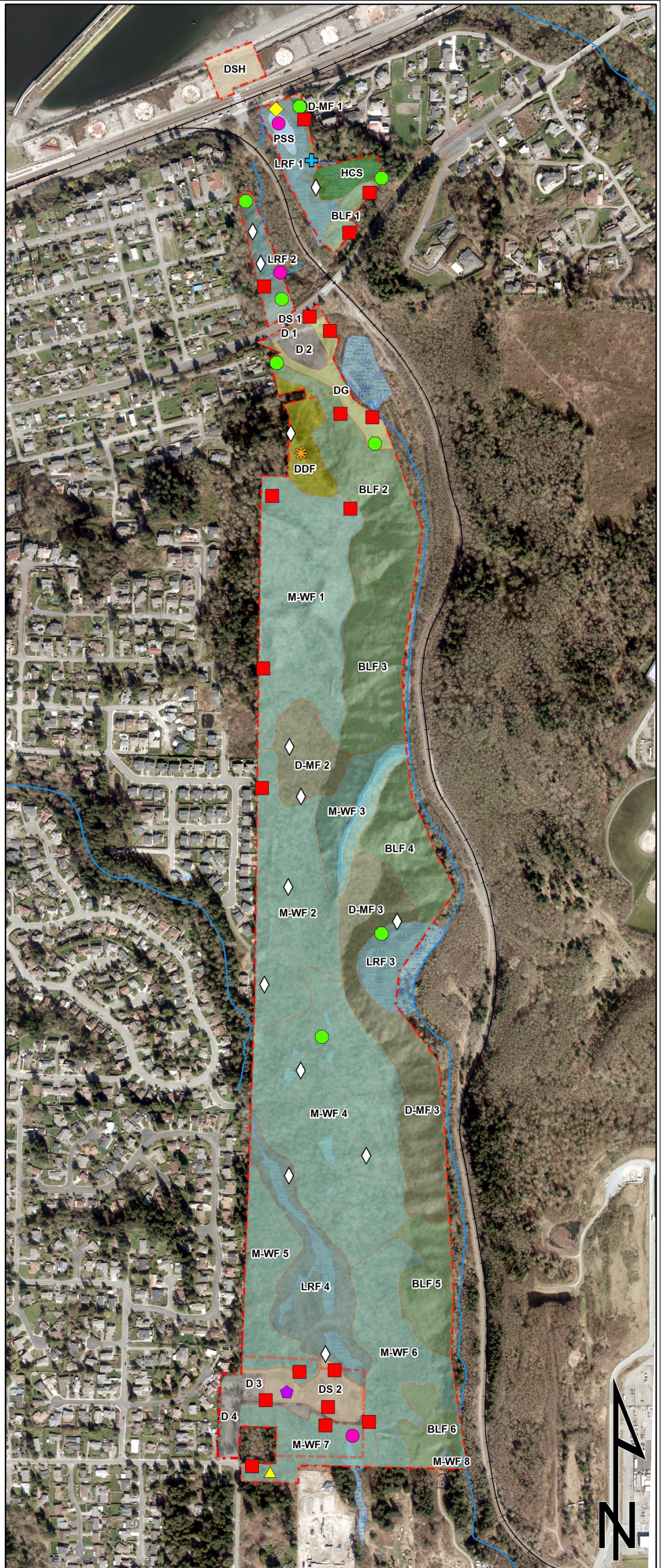
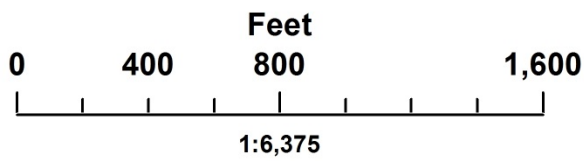
Dominant Invasive Species

- Himalayan Blackberry
- ◇ English Holly
- English Ivy
- Bittersweet Nightshade
- ▲ Yellow Archangel
- ◆ Scotch Broom
- + Common Periwinkle
- ✱ Spurge Laurel
- ◆ Yellow Flag Iris

BNSF Railroad Tracks

Features

- Japanese Gulch Boundary
- ~ Streams
- Wetlands



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4.2. Dominant Habitat Types

Seven natural habitat types were identified using the WADNR ecological classification system and six additional habitats were identified representing disturbed or developed areas of the Park. This section provides a description of each of these habitats and indicates their location and context within Japanese Gulch and associated Management Units (MUs)

4.2.1. North Pacific Broadleaf Landslide Forest and Shrubland

The North Pacific Broadleaf Landslide Forest and Shrubland habitat type represents the generally steep slope areas of the Gulch that are found predominantly on the east of the Park above and adjacent to Japanese Creek (Map 1 represented by BLF). A total of 6 MUs were identified within this general habitat type and are typified by a dominance of deciduous canopy trees. These



Photo 1: BLF 5 showing young alder dominated forest with salmonberry and sword fern understory and earthen trail heading down towards Japanese Gulch Creek.

forests are generally dominated by red alder and bigleaf maple trees with salmonberry, sword fern, and trailing blackberry in the understory. Wetter areas and areas near the creek have heavy cover of piggyback plant in the herbaceous layer, while drier areas (such as high ridges in BLF 2, 3, and 4) have substantial components of ocean-spray and beaked hazelnut. Other species common throughout these MUs include red elderberry, red huckleberry, stinging nettle, and false lily-of-the valley. Some black cottonwood is interspersed throughout the canopy in BLF 6.

Some areas, particularly in BLF 2 and 3, show signs of relatively recent slides with low tree canopy in the bottom of steep ravines. Other areas appear more stable and have large bigleaf maple trees and mid-story western red cedar components. The soils (classified as "Alderwood-Everett gravelly sandy loams" (USDA, 2013)) are generally loose and prone to erosion, especially if disturbed. The steep slopes generally transition immediately down to Japanese Creek, with little to no riparian buffer separating these slopes and the artificially realigned watercourse adjacent to the railway. As is typical in this forest type, numerous seeps can be found along the slopes near the creek. Aside from the heavy piggyback plants found on the lower slopes, other notable plant species include devil's club found in the lower, wetter areas and western maidenhair fern found along exposed trail cuts near the creek. Signs of mountain beaver were noted on the upper slopes of BLF 2.

BLF 1 is found in the northern “Lower Japanese Gulch” planning area and has the highest cover of invasive species with blackberry and English ivy encroaching in from the power line corridor along West Mukilteo Blvd (Map 2). BLF 2 has heavy English ivy on the slopes directly adjacent and to the west of the dog park and has heavy to intermittent Himalayan blackberry along the edges surrounding the dog park area. Intermittent herb Robert was noted throughout this habitat type.

4.2.2. North Pacific Dry Douglas-fir-(Madrone) Forest and Woodland

The North Pacific Dry Douglas-fir-(Madrone) Forest and Woodland habitat type is found in only one MU in Japanese Gulch. This habitat type is situated on a relatively flat bluff at the north end of the “Upper Japanese Gulch” planning area, just above and including part of the steep slope that drops off to the dog park to the northeast (Map 1 represented by DDF). This MU is identified by the comparatively dry-type plant species association dominated by a Douglas fir and bigleaf maple canopy with a smaller Pacific Madrone component. The understory is also indicative of drier, well drained soils and dominated by dull Oregongrape with ocean-spray, trailing blackberry, and snowberry in the shrub layer. Herbaceous plants include sword fern, snowberry, bedstraw (*Galium aparine*), and Columbia brome (*Bromus vulgaris*). Although this area exhibits drier conditions, there is still a strong presence of more moisture tolerant plants such as red alder trees and salmonberry shrubs, as well as a limited western red cedar presence. The shade tolerant and late-successional Pacific yew tree is also present in small amounts in this MU.



Photo 2: DDF showing dominant dull Oregongrape with sword fern, trailing blackberry, and ocean-spray.

The steep slopes of the NE portion of MU DDF support a relatively closed Douglas fir canopy and dominated by sword fern in the understory. This MU transitions down into the more maple and alder dominated forests of BLF 2 to the east. English holly and blackberry are present in limited quantities in this habitat. Of particular concern is the relatively high presence of spurge laurel that was found here but not noted in other areas of the park. The property boundary is not evident or clear for the western portion of this MU and cooperation with adjacent landowners should be considered.

4.2.3. North Pacific Hardwood-Conifer Swamp



Photo 3: HCS showing low topography with ladyfern, western red cedar, and invasive common periwinkle, with salmonberry in the background.

The North Pacific Hardwood-Conifer Swamp habitat is unique to the northern portion of Japanese Gulch in the low-lying relatively flat area that drains north towards Puget Sound (Map 1 indicated as HCS). This habitat is a forested area typified by saturated mucky soils and numerous seeps. These wet hydrological conditions create a somewhat open tree canopy with high cover of shrubs and herbaceous plants in the understory. The canopy is dominated by western red cedar and alder trees, with a small component of Sitka spruce, which is tolerant of wet, swampy conditions. The shrub layer is dominated by salmonberry with both red elderberry and red huckleberry common throughout. The herbaceous layer is dominated by wetland associated plants that include lady fern, skunk cabbage, and piggyback plant. There is a small elevated area towards the western portion of this MU that exhibits more dry-type conditions where the existing trail crosses this MU. This “knoll” is dominated by Douglas fir and

bigleaf maple with Indian plum, trailing blackberry, sword fern, and fringecups and is more indicative of the Dry-Mesic and Mesic-Wet Douglas-fir-Western Hemlock Forest types described below. The remaining areas of this MU are very wet and susceptible to human disturbances. This area of Japanese Gulch is also influenced by the underlying soil type referred to as “Norma loam” (USDA, 2013), which is more poorly drained compared to the “Alderwood and Alderwood-Everett gravelly sandy loams” that make up the remainder of the upper gulch.

This MU transitions to the west towards the Lowland Riparian Forest and Shrubland classification type. Primary invasive species concerns include Himalayan blackberry and English ivy that are encroaching in from the surrounding upland areas (Map 2), as well as limited amounts of English holly noted throughout. Common periwinkle is also present in the northwest portion of this and the adjacent MUs.

4.2.4. North Pacific Lowland Riparian Forest and Shrubland

The North Pacific Lowland Riparian Forest and Shrubland habitat type is generally found adjacent to moving rivers or streams. In Japanese Gulch, this habitat in its most typical form is found in the northern portions of the Park in the “Lower Japanese Planning Areas” along both the old and newly re-constructed portions of Japanese Gulch Creek (Map 1 indicated as LRF 1 and 2). Less typical examples of this type can also be found in the upper planning area in the

center of the park in a depressional seep located along Japanese Gulch Creek and in the southwestern portion of the park that includes the wetland complexes that drain northwest away from the eastern gulch (LRF 3 and 4). These forests are comprised of a deciduous canopy that is dominated by red alder with smaller components of bigleaf maple and western red cedar. Some low-lying areas also support limited Sitka spruce populations. Shrub cover is generally high and dominated by salmonberry with relatively high cover of red elderberry. Other notable shrub species in this forest type include swamp current and devils club found in wetter microclimates. The herbaceous layer is well developed and includes sword fern, piggyback plant, false lily-of-the valley, and giant horsetail (*Equisetum telmateia*). Lower depressional areas and areas with numerous seeps support more wetland tolerant plants such as lady fern and skunk cabbage.

LRF 1 and 2 are show signs of recent disturbance including restoration and stream enhancement projects. LRF 1 is a relatively intact forested wetland along the old, realigned stream channel and transitions into a shrub swamp in the lower, most northern portion. This MU has relatively high soil moisture and exhibits swamp like and stagnant conditions in some areas. LRF 2 is situated in a

narrow and linear portion of the “Lower Japanese Gulch” planning area along the newly aligned and enhanced stream channel (Map 1). This area has seen recent restoration efforts in the riparian buffer that accompanied the in-stream construction that was designed to increase salmon and other fish habitat. Conversely, this area also exhibits some of the highest invasive species cover compared to other natural areas of the Park (Map 2). Himalayan blackberry, English holly, English ivy, bittersweet nightshade, hedge bindweed (*Convolvulus sepium*), creeping buttercup, reed canarygrass, cherry laurel, and other non-native species are present in relatively high combined cover throughout. Disturbances caused by the construction and the fragmented nature of this area likely both contributed to these conditions. Because of the high value in-stream habitat, this area should be prioritized for restoration and maintenance in order to both increase and maintain the habitat but also to maximize the value of the recently completed restoration efforts.

LRF 3 is a relatively intact forested riparian area in a basin depression that borders Japanese Creek in the east-central portion of the Park. This forested wetland complex is defined by numerous seeps that issue out of the lower slopes and drain into the creek. These seeps result in high soil moisture content resulting in frequent swampy conditions and high cover of wetland



Photo 4: LRF 3 showing red alder and Sitka spruce trees over heavy salmonberry shrub cover.

associated shrub and herbaceous species (Photo 5). Small amounts of English ivy were noted in this MU. LRF 4 in the southwest portion of the park is also relatively intact. This system is comprised of a riparian forest buffer surrounding numerous wetland complexes that are aligned

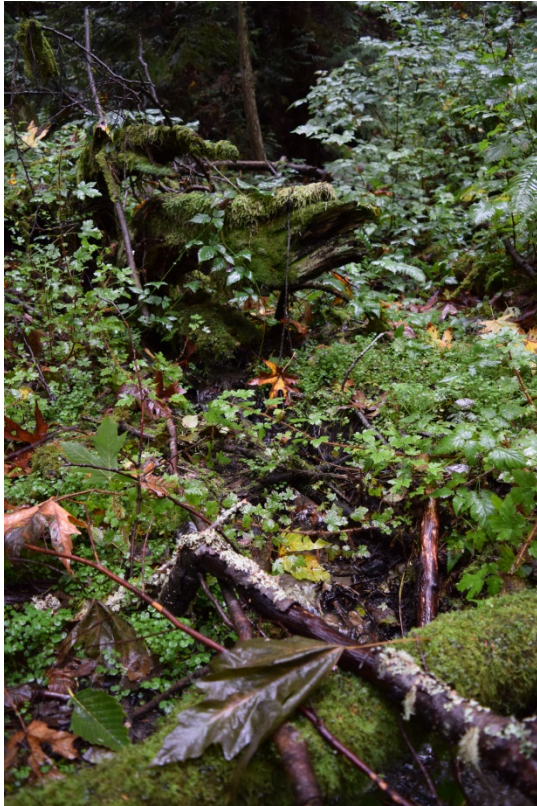


Photo 5: LRF 3 showing the vicinity of a wetland seep with swamp current, salmonberry, and large downed woody debris.

in a linear fashion and draining to the northwest. Collectively, these wetland complexes would generally represent different habitat classifications (Shrub Swamp, Hardwood-Conifer Swamp, Emergent Wetland, etc.) but are included in this riparian forest typing for generalization purposes. These areas of low topography generally exhibit hydric soils that are too wet to support any large trees and are dominated by wetland associated shrubs and/or herbaceous species. The headwaters of this system includes a pond with substantial standing water noted at the time of the inventory (October, 2014) near the border of this MU and DS 2/M-WF 6. This area also represents the highest threat from invasive species with English holly and Himalayan blackberry encroaching in from the adjacent disturbed areas. The pond also has high cover of creeping buttercup in the area where the trail ends and human disturbance appears to be common.

disturbances, which should be limited where possible. Suitable access currently exists in portions of LRF 1 and 2 where trails and roads are currently being utilized in varying capacities.

The hydric soils associated with this habitat make it highly sensitive and susceptible to human

4.2.5. North Pacific Maritime Dry-Mesic Douglas-fir-Western Hemlock Forest

The North Pacific Maritime Dry-Mesic Douglas-fir-Western Hemlock Forest habitat type was identified in three general areas of the Park that and separated into 4 MUs (Map 1 indicated as D-MF). These forests are typified by a dominant coniferous canopy (primarily comprised of Douglas fir) with a shrub layer made up of dry-type plant species. This system is closely related to and transitions into the Mesic-Wet Douglas-fir-Western Hemlock system type and the forests in these MUs have structural aspects of both. In general, this forest type has higher conifer overstory tree cover compared to the wetter type, and all of the represented MUs identified here are dominated by Douglas fir, western hemlock, and western red cedar with lesser components of red alder and bigleaf maple. Understory shrub species present in these forests that fall into the dryer-type category include dull Oregongrape, beaked hazelnut, thimbleberry, Indian plum, oceanspray, blackcap raspberry (*Rubus leucodermis*), and wood rose (*Rosa gymnocarpa*). Other common species include salmonberry, trailing blackberry, red elderberry, and red huckleberry. The herbaceous layer is dominated by swordfern and fringcups, with

bedstraw also selectively common. Wetter areas also have piggyback plant and stinging nettle throughout, with bracken fern (*Pteridium aquilinum*) found in drier microclimates.

This habitat type is present in the "Lower Japanese Gulch" planning area as a fringe of steep upland forest along the border of the Park as represented by D-MF 1 (Map1). This MU has high invasive species cover due to its close proximity to the adjacent residential properties. Species of concern include Himalayan blackberry, common periwinkle, and English ivy, the latter seen growing into the canopy of large trees. More intact forests are found in the central portion of the upper planning area. D-MF 2 represents a unique conifer-



Photo 6: D-MF 4 showing high conifer tree density and a diversity of species (Douglas fir, western hemlock, and western red cedar) displaying a variety age classes.

dominated forest consisting of high cover of mature Douglas fir and western red cedar trees. Red alder is also present as well as small amounts of Pacific Madrone. The understory is comprised of a well-developed shrub and herbaceous layer exhibiting high species diversity. To the southeast and extending south along the steep slopes is another conifer-dominated forested system that represents this habitat type (D-MF 3 and 4). D-MF 3 is located on a central plateau



Photo 7: Western hemlock tree using a relic logging stump as a "nurse log".

above and transitioning into the forested riparian wetland identified as LRF 3. This MU exhibits a classic Pacific Northwest dry-moist conifer forest type dominated by Douglas fir, western red cedar, and western hemlock - in a variety of heights and age classes - with bigleaf maple and red alder interspersed. Twinflower and starflower (*Trientalis latifolia*) were noted on the forest floor in D-MF 3. D-MF 4 represents the Douglas fir, western hemlock, and western red cedar dominated steep slopes dropping down to Japanese Creek and the railway to the east, transitioning to more deciduous dominated forests to the south.

Overall, the MUs that make up this habitat type represent structurally diverse and intact forest systems. Fair amounts of natural conifer regeneration were noted in D-MF 2 and D-MF 3, mostly associated with decaying stumps or fallen trees. Other than D-MF 1, relatively little invasive species were seen to be present and consisted primarily of scattered English holly plants. These areas exhibit some of the drier microclimates found on the property and could therefore provide potential areas for park

recreational features such as interpretive trails, lookouts or other passive park amenities. However, they also represent some of the more intact forested areas and care should be taken to maintain and preserve these functioning systems.

4.2.6. North Pacific Maritime Mesic-Wet Douglas-fir-Western Hemlock Forest

The North Pacific Maritime Mesic-Wet Douglas-fir-Western Hemlock Forest is by far the most common and dominant forest type present in Japanese Gulch and comprises the majority of the western portion of the property (Map 1 indicates as M-WF). These forests represent a varied and dynamic habitat that is generally defined by relatively high levels of



Photo 8: M-WF 4 showing Douglas fir trees growing from elevated drier microhabitats with salmonberry and red elderberry shrubs. Red alder and western red cedar can be seen in the background.

soil moisture and mixed conifer-deciduous forest canopy. Overstory tree

species composition can vary depending on moisture; drier areas are generally made up Douglas fir and bigleaf maple while wetter areas tend to favor western hemlock and western red cedar, with varying gradients of these and other species distributed throughout. Red alder is generally present interspersed across this habitat type and can be dominant in particularly wet areas. Like the Lowland Riparian Forest represented by LRF 4, much of this habitat type (especially in the south) is interspersed with small, scattered designated wetlands that were grouped with this habitat type for generalization purposes. These wetland associated shrub and herbaceous dominated areas are particularly common throughout M-WF 4. Many other wet depressions or other low-lying areas are scattered throughout this entire habitat that have not been designated or mapped. The most common shrub in these forests, like the rest of the Park, is salmonberry which can sometimes form dominant thickets in the understory. Other common shrubs include red elderberry, red huckleberry, and trailing blackberry with patches of beaked hazelnut, Indian plum, and oceanspray occupying dryer microclimates. Salal can often be found growing on elevated mounds or decaying woody debris. The herbaceous layer is heavily dominated by sword fern with fringecups, piggyback plant, and stinging nettle common throughout. Wood fern can be a ubiquitous component of the forest floor growing from low-lying decomposing wood, while licorice fern is a common occurrence on bigleaf maple trunks and dry downed wood.

The tree canopy of the northern portion of this habitat type (MUs M-WF 1, 2, and 3) has a substantial western hemlock component, whereas Douglas fir is generally more prominent in the southern portion of the Park. M-WF 1 has a relatively unique association of mature bigleaf

maple and western hemlock on the north facing slopes that begin to drop off towards Puget Sound (Photo 9). M-WF 3 is also situated on a slope and includes a narrow riparian corridor that drains to Japanese Creek. The remainder of this habitat type (excluding the small M-WF 8 MU) is located on the relatively flat bench that generally drains to the northwest away from the eastern "gulch". This flat terrain creates ample opportunities for wet depressions and microhabitats of hills and gullies. In these areas, patches and clumps of conifer trees can often be found occupying the higher topographical ridges or hills with more deciduous dominated areas located in the lower areas. Often, the existing trail networks in this habitat type naturally follow these ridges to avoid the lower, mucky areas. Future trail plans should be carefully

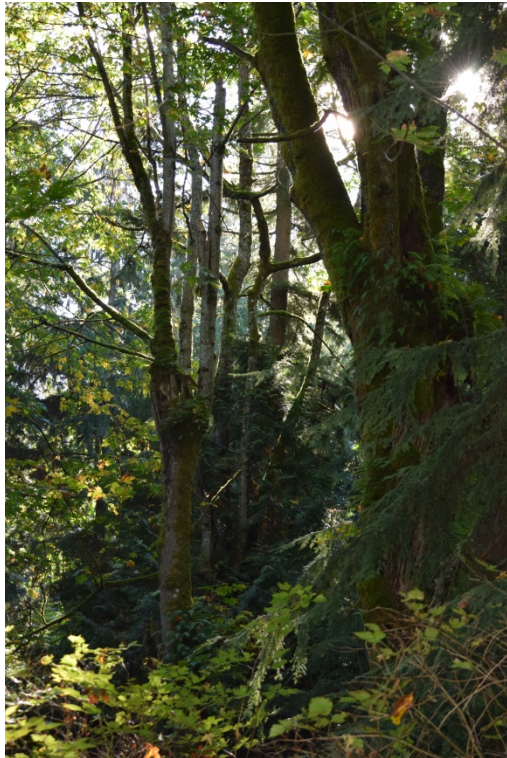


Photo 9: M-WF 1 showing mature bigleaf maples and western hemlock trees with salmonberry in the foreground.

considered to avoid damaging the delicate and sensitive low topography areas, especially throughout M-WF 4. Upland associated trees can also occasionally be seen growing directly out of small elevated mounds (Photo 8).

In general, the majority of this forest type is in relatively intact and healthy condition. The native tree canopy is well developed and there generally appears to be a fair amount of natural conifer tree regeneration, again associated with decaying wood. Because of the large expanse of these forests and difficult accessibility of this area, a more thorough analysis of regeneration may be warranted in the future. Because of the potential for disturbance to the soil and fragile vegetation (especially in areas including and adjacent to interspersed wetlands), public access should be limited to well-marked and designated trails wherever possible.

The greatest immediate threat is from the encroachment and spread of invasive species, especially from the park entrances and perimeters (Map 2). Himalayan blackberry can be found in sometimes heavy patches along the western border of

the property and English holly is common but generally sparse throughout. Small amounts of cherry laurel were also noted in this habitat type. These species are exotic shade tolerant evergreen plants that are spread by birds and can become well established in the forest understory where they can crowd and shade out native plants. Holly and laurel can persist and spread for many years, eventually becoming a major management concern. Because of the relatively low existing presence of these species, it is recommended that management actions are considered in the near future in order to prevent the continued spread and establishment within Japanese Gulch. Also of concern is the very southern portion of the park where 76th St. SW turns south into 44th Ave W at M-WF 7 (Map 1). A social trail enters the park at the end of 76th and appears to be actively used by the community as a dumping ground for yard waste and other debris. This area has become heavily invaded with yellow archangel that has become well established in the understory (Map 2). A relatively small area (approximately 17,000 sq ft) in the south-central area of M-WF 4 has seen a sustained disturbance in the form of a relatively formal BMX bicycle track/course consisting of the construction of numerous earth mounds and

associated pits. Because the “Upper Japanese Gulch” planning area has been designated for passive recreational use only (City of Mukilteo, 2014), it is recommended that the course be decommissioned and the area be restored to a more natural habitat. This will prevent further disturbance and damage to the hillside and wetlands in this area.

4.2.7. North Pacific Shrub Swamp

The North Pacific Shrub Swamp habitat type is found in the “Lower Japanese Gulch” planning area within the Lower Riparian Forest system near Mukilteo Lane (Map 1 indicated as PSS). This habitat is typified by hydric soils and slow moving water and is influenced by the last stretch of Japanese Creek before it drops beneath the road and railroad tracks and collects water from the upper riparian forest and swamp. The high soil moisture prevents large trees from rooting and the area is dominated by wetland associated shrubs and herbaceous plants. The lowest and most northern portion of the MU contains a small pond or emergent wetland area that is dominated by herbaceous wetland plants. The edges have high shrub cover dominated by salmonberry and redosier dogwood (*Cornus sericea*). The herbaceous layer is well developed and includes skunk cabbage, lady fern, piggyback plant, and giant horsetail. The northern edges of this MU consist of an engineered bank that has been restored and revegetated with native wetland plant species.

This habitat type is fairly invaded with non-native and invasive plant species. Of particular concern is the heavy cover of bittersweet nightshade extending into the emergent wetland open-canopied area. Other threats include yellow flag iris, creeping buttercup and limited amounts of reed canarygrass.

4.2.8. Disturbed and Developed Habitats

The remainder of Japanese Gulch is made up of either heavy development (such as roads) or other designated actively managed or disturbed areas. Actively managed areas include the off-leash dog park and the community garden. Some areas of disturbance are generally associated with these areas and include the grass meadow surrounding and to the south of the dog park (DG), the disturbed shrubland north of the dog park adjacent to West Mukilteo Blvd. (DS 1), and the old cemetery area to the east of the community garden (DS 2) (Map 1). The shoreline property (DSH) in the farthest northern area of the Park is a site of past heavy industrial use and is currently not open to the public. The old cemetery area in particular has become heavily invaded with Scotch broom and Himalayan blackberry due to past and recent disturbances. Because of the general upland nature of this area and the current state of disturbance, the area adjacent to the community garden and the old cemetery could offer a potential location where future active recreation features or facilities could be located. Any management activities should consider habitat restoration potentials as part of the overall strategy. The highest priority for all of these disturbed areas is to manage the existing invasive species so that they do not continue to spread into adjacent areas of the park.

4.3. Summary Management Recommendations

One of the highest priority actions for restoration in Japanese Gulch is the removal and mitigation of invasive species from the interior areas of the park. In particular, it is recommended that English holly removal efforts occur as a priority in order to prevent this species from maturing and continuing to spread. Areas of high English ivy should also be targeted for control. Because of the currently limited presence of these two species, eradication efforts can potentially be successfully accomplished with relatively little effort. Both of these species will continue to spread and have the potential to create larger management concerns if left unaddressed. Refer to Appendix A for best management practices for selected invasive species.

Other general management considerations include:

- Addressing the high occurrence and diversity of invasive plants in LRF 2 to ensure the adequate function and long-term success of the recent stream enhancement project.
- Control of the yellow archangel infestation in M-WF 7. Follow best management practices for control (King County, 2013). Consider signage at the corner of 76th St SW and 44th Ave W. in order to discourage illegal dumping.
- Control of the heavy English ivy infestation in the north end of BLF 2, taking into account the steep slopes in this area (recommend contracted crews) and potentially working with neighboring landowners to cooperate across property boundaries.
- Control of English ivy, Himalayan blackberry, and common periwinkle in D-MF 1 and potentially looking into community outreach opportunities to work with adjacent landowners.
- Addressing heavy cover of Himalayan blackberry in the vicinity of the dog park to prevent further spread into adjacent areas of the Park.
- Addressing heavy cover of Scotch broom in DS 2.
- Developing a formalized trail system that balances access with protecting sensitive habitat, including the closing of redundant and inappropriate social trails.

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Appendix A: Invasive Species Best Management Practices

English Ivy

English ivy is one of the most invasive species in the Pacific Northwest. This evergreen climbing vine is capable of forming dense mats in the forest understory and excluding all other understory species. It can also climb up trees, preventing light from reaching the leaves and adding weight to the tree canopy, causing trees to weaken and fall during wind storms.

The most effective method for controlling English ivy is manual removal. Because English ivy can impact tree health by growing vertically, the first priority is to remove any vines growing on tree trunks and in the canopy. Install "survival rings" around trees by cutting or prying vines at shoulder height with the aid of a hand tool, killing any upper vines and leaving them to decompose on the tree. Lower vines then need to be cleared, along with roots and vines found within at least a five foot radius of the base of the tree. For ivy growing along the ground, use hands or a small tool such as a hand tiller to pull or dig out the leaves and vines growing above the soil, as well as the woody roots growing just below the surface of the soil (King County 2004).

For disposal of hand-removed English ivy, several options are available. Disposal at a municipal vegetation waste facility is preferred. If the site will be monitored regularly, ivy can be piled on site on top of raised debris hummocks, a paved area or tarp to prevent stems from re-rooting. Allow the pile to dry out, flipping periodically to ensure complete decomposition. (King County 2004).

Best Management Practices for this plant can be found at:

<http://your.kingcounty.gov/dnrp/library/water-and-land/weeds/BMPs/english-ivy-control.pdf>

Cherry laurel and English holly

Cherry laurel and English holly are evergreen trees that can reach up to 50 feet in height, but are usually shorter and often shrub-like when present in the forest understory. Both species can form thickets in the forest understory, reproducing in low-light conditions and excluding native plant species. These trees can be difficult to control as they form extensive root sprouts after being cut down. The most effective method of control is to remove the entire root while the plant is small and can be pulled. If the plant is larger, it is possible to remove it using a weed wrench. If the tree is too large to be either hand pulled or removed with a weed wrench, cutting the stem at or above ground level and applying an herbicide concentration directly to the cut portion of the stem as soon as possible is effective. Other methods of herbicide application include frilling (cutting into the cambium and applying herbicide to the wounds) and stem injection where time-release dosages are placed directly into the stem. These methods kill the trees in place which can be left to fall and naturally decompose or can be cut once the tree has died. A recent unpublished study (EarthCorps 2013) found that triclopyr formulations were more effective than glyphosate for cut stump and frilling applications. Treatment with imazapyr stem injection was found to be very effective and should be the method of choice where plants can be left standing until they are dead. Because these trees tend to root sprout and have many seedlings, monitoring around the infested areas on a regular basis will be necessary for several years after removal. These species should not be cut without the

immediate application of herbicide to prevent extensive re-sprouting from the cut stems and associated roots. Follow all applicable laws and regulations regarding the handling and application of herbicide. Depending on the chemical and formulation, use of herbicide may require a licensed herbicide applicator to be present at the time of application. Contact the King County Noxious Weed Control Program regarding permitting requirements or restrictions: noxious.weeds@kingcounty.gov.

Best Management Practices for these plants can be found at:

Cherry laurel: <http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds/weed-identification/english-laurel.aspx>.

English holly: <http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds/weed-identification/english-holly.aspx>.

Himalayan blackberry

Himalayan blackberry is a vigorous evergreen shrub armed with prickles on the stems. This plant thrives in open, disturbed areas but can also invade forested areas on both wet and dry sites. Invasive blackberries often form large thickets that exclude all other species and can also climb and smother small trees.

Control of invasive blackberries requires management over a number of years. Based on the size of the site, various strategies can be effective. For small infestations of invasive blackberries, manual removal is appropriate. For larger infestations, mechanical methods such as mowing or brush cutting can be effective. Manual control consists of cutting blackberry canes with loppers or pruners one foot above the ground. Depending on the size of the plants, dig up the root balls using tools such as a hand tiller, shovel, pulaski, or pick mattock. Canes can be piled on site on top of a tarp or an impervious surface and left to decompose. Place any root balls on top of the pile to avoid re-rooting. Due to possible vigorous re-sprouting from the root crown, monitoring the infested area on a regular basis will be necessary for several years after removal. Removal procedures are repeated as necessary for complete control. After removing invasive blackberries, the area should be replanted with natives and mulched to help deter future invasive growth (King County 2010). Another potential chemical control method being tested on steep slopes and in areas with dense cover of native species is the cut and dab method. This technique involves the application of herbicide directly to freshly cut blackberry canes. The advantages of this method include minimizing soil disturbance and damage to existing vegetation.

Biological methods of controlling blackberry are also an option. The introduction of animals such as goats or pigs can be useful in controlling infestations from one to four years old. Chemical methods of controlling large blackberry infestations are also known to be effective, especially if combined with other methods such as mechanical control and monitoring (King County 2010).

Best Management Practices for this plant can be found at:

<http://your.kingcounty.gov/dnrp/library/water-and-land/weeds/BMPs/blackberry-control.pdf>