Portland State University

PDXScholar

Master of Environmental Management Project
Reports

Environmental Science and Management

7-2018

Nadaka 2023 Management Plan

Andrea Hurzeler
Portland State University

Follow this and additional works at: https://pdxscholar.library.pdx.edu/mem_gradprojects

Part of the [Natural Resources Management and Policy Commons](#), and the [Recreation, Parks and Tourism Administration Commons](#)

Let us know how access to this document benefits you.

Recommended Citation

Hurzeler, Andrea, "Nadaka 2023 Management Plan" (2018). *Master of Environmental Management Project Reports*. 40.

https://pdxscholar.library.pdx.edu/mem_gradprojects/40

<https://doi.org/10.15760/mem.43>

This Project is brought to you for free and open access. It has been accepted for inclusion in Master of Environmental Management Project Reports by an authorized administrator of PDXScholar. Please contact us if we can make this document more accessible: pdxscholar@pdx.edu.

Nadaka 2023 Management Plan

Submitted to: Friends of Nadaka

Submit Date: July 2018

Submitted by: Andrea Hurzeler

Table of Contents

I.	Introduction.....	1
	Purpose.	1
	How to use this Document.	2
II.	Background of Previous Management Plans.....	3
	Previous Management Plans	3
	Previous Surveys/Memorandum.....	3
	Overview	3
III.	Overview of Management Plan.....	5
IV.	Methods.....	6
	Establishing Desired Conditions.....	6
	Assessing Current Conditions.....	6
	Laminated Root Rot Survey	7
	Vegetation Survey.....	7
	Percent Coverage of Invasive and Noxious Species Survey.....	7
	References.....	9
V.	Management Goals, Practices, and Priorities of Nadaka.....	10
	Goals and Practices.....	10
	Priorities.....	11
VI.	Vegetation.....	12
	Definitions	12
	Overview	12
	Nelson Property	13
	Existing Conditions.....	13
	Desired Conditions.....	13
	Recommendations	14
	Poison-Hemlock.....	14
	Meadow.....	15
	Existing Conditions.....	15
	Desired Conditions.....	16
	Recommendations	16

Mixed Conifer-Broadleaf Forest	17
Existing Conditions.....	17
Desired Conditions.....	18
Recommendations	18
Invasive and Noxious Species of Concern.....	18
Established Invasive and Noxious Species of Concern.....	18
Encroaching Invasive and Noxious Species of Concern.....	19
Management Recommendations for Established Invasive and Noxious Species	19
<i>Clematis vitalba</i> (Traveler’s Joy/Old Man’s Beard)	19
<i>Geranium robertianum</i> (Herb Robert)	20
<i>Hedera helix</i> (English Ivy)	21
<i>Ilex aquifolium</i> (English Holly)	22
<i>Prunus laurocerasus</i> (English Laurel).....	23
<i>Rubus armeniacus</i> (Himalayan Blackberry).....	25
Management Recommendations for Encroaching Invasive and Noxious Species	26
<i>Arum italicum</i> (Italian Arum)	26
<i>Conium maculatum</i> (Poison-Hemlock).....	27
<i>Ficaria verna</i> (Lesser Celandine).....	27
Unknown Plant Species	28
Chemical Use.....	29
Migratory Bird Treaty Act (MBTA).....	29
References	29
VII. Laminated Root Rot.....	32
Previous Laminated Root Rot Surveys at Nadaka	32
Nomenclature.....	32
Background and Spread.....	33
Management Recommendations	34
Migratory Bird Treaty Act.....	35
Recommended Laminated Root Rot Resistant Species.....	35
Tree Removal and Replacement Requirements	36
References	36
VIII. Trails	37

	Overview	37
	Commissioning Trails	37
	Future Recommendations.....	37
	Decommissioning Trails	38
	Recommended Actions	38
	Trail Decommissioning Steps.....	39
	References	41
IX.	Signage.....	42
	Overview	42
	Sign Plan Considerations	42
	Current Signs	43
	Recommended Permanent Signs.....	44
	Recommended Temporary Signs.....	44
	Maintenance	44
X.	Illicit Use of Nadaka	45
	Overview	45
	Nadakas Stance	45
	Current Practices	45
	Recommendations.....	46
	Not for Nadaka.....	47
	References	48
XI.	Monitoring and Evaluation.....	49
	Overview	49
	Meetings.....	49
	Planning Meeting	49
	Follow-Up Meeting.....	50
	Project Log.....	50
	5 Year Management Plan Update.....	50
XII.	Appendices.....	52
	A Property Report and Resource Inventory	
	B Organizations that Steward and Contribute to Nadaka Nature Park	

- C Crime Prevention Through Environmental Design (CPTED)
- D Known Plant Species in Nadaka Nature Park
- E Native Species Plant Restoration List
- F Meadow Restoration Recommendations
- G Percent Coverage of Invasive/Noxious Species of Concern
- H Oregon Department of Forestry Pathology Report
- I Nesting Bird Survey
- J Conifer Susceptibility to Laminated Root Rot
- K Advantages and Disadvantages of Vegetation Species Propagation Methods
- L Gresham Park Rules and Non-Emergency Numbers

Introduction

Nadaka Nature Park (Nadaka) is a publically owned nature area and park space located in the Wilkes East Neighborhood and bordering the Rockwood Neighborhood of Gresham, Oregon. In 1995 a 10 acre parcel of Nadaka, originally used by The Camp Fire Organization as a nature day kamp (Na da ka), was obtained by the City of Gresham. When Nadaka was purchased it was surrounded by a locked 8 foot tall chain link fence topped with barbed wire. While Nadaka was closed to the public the City of Gresham installed a ¼ mile loop trail and an irrigation line to the site. Nadaka opened to the public in 2001. In 2009 an additional 2 acre parcel, known as the Nelson property, was acquired by Nadaka. At that time, the Nelson property was primarily open space. Currently, the Nelson property consists of community spaces including: community gardens, a children's nature based play area/playground, covered picnic area, and a public restroom. The original 10 acres of Nadaka are comprised of roughly 1 acre of meadow land and 9 acres of mixed conifer-broadleaf forest. Douglas-fir (*Pseudotsuga menziesii*) is the dominant tree species. The community spaces and the forested area are connected by the ¼ mile loop trail mentioned above. See Appendix A for a detailed Property Report and Resource Inventory.

Nadaka is managed by Friends of Nadaka and the City of Gresham. Other stewards of Nadaka include Metro, East Multnomah Soil and Water Conservation District, and the Columbia Slough Watershed Council. Nadaka is dedicated to community involvement and outreach. See Appendix B for a complete list of stewards and contributors.

Purpose

This 5-year management plan proposes strategies to address vegetation and habitat health, illicit use and safety concerns, and trail management at Nadaka. Since 2009, several management plans, surveys, and recommendations were submitted to Nadaka. While pieces of these plans have been successfully implemented, no cohesive management plan is currently being followed. An updated management plan addressing current conditions and issues is needed. This management plan will help to improve health and safety, while moving Nadaka towards a desired future condition.

Fig. 1: A bronze otter donated by Troutdale sculptor Rip Caswell stands in the nature play area.

How to use this Document

Major sections of Nadaka 2023 are intended to stand alone. Stand alone sections allow the reader to access relevant information without referencing other sections, unless specifically instructed to. Each major section begins on a new page.

Background of Previous Management Plans

Previous Management Plans

- 2010 – Nelson Property Neighborhood Park Master Plan and Vegetation Plan (NPMP)
  - City of Gresham
- 2010 – Nadaka Nature Park Vegetation Management Plan (Vegetation Plan)
  - City of Gresham Urban Design & Planning
- 2014 – Nadaka 2020 - Maintenance, Operation and Programming Plan (Nadaka 2020)
  - Under leadership of Columbia Slough Watershed Council

Previous Surveys/Memorandum

- 2009 – Vegetation Management Recommendations for Nadaka
  - Pacific Habitat Services, Inc.
- 2014 – Nadaka Nature Park: Trail Decommission and Survey
  - Environmental Green Keepers & Mt. Hood Community Collage
- 2014 – Nadaka Nature Park Nesting Bird Survey
  - Pacific Habitat Services, Inc.
- 2014 – Vegetation Type at Nadaka Park
  - Mt. Hood Community Collage

Overview

Nadaka's first major management plan, the Nelson Property Neighborhood Park Master Plan and Vegetation Plan (NPMP), was created in 2010 in response to the Nelson property acquisition. The NPMP was a five year management/development plan that successfully created community space in the newly acquired 2 acre Nelson property. The community space includes: a nature play area, covered picnic area, public restrooms, and community gardens. A second management plan, the Nadaka Nature Park Vegetation Management Plan (Vegetation Plan), was created in 2010 to supplement the NPMP. The Vegetation Plan was created by the City of Gresham's Urban Design & Planning and Environmental Services Departments.

In 2011 the Declaration of Cooperation (DOC) was created in an effort to create a cohesive stewardship team. The DOC united 17 community and local government organizations with two main goals: to follow the NPMP and to manage and operate the entire 12 acres for 5 years.

To assist in achieving the DOC goal of operating the entire park for 5 years, the third major management plan, the Nadaka 2020-Maintenance, Operation, and Programming Plan (Nadaka 2020) was created in 2014. Building on the NPMP, Nadaka 2020 was intended to be a 5 year management plan with 7 main goals:

- Prioritize management and monitoring of site according to available financial resources.
- Improve habitat and promote ecological values.
- Remove Douglas-firs (*Pseudotsuga menziesii*) infested with laminated root rot and replant with alternative native tree species.
- Retain healthy Douglas-firs on the 2 acre Nelson property.
- Close informal trails to reduce fragmentation of habitat.
- Prevent fire.
- Develop volunteer and staff work plan priorities.

To this date Nadaka 2020 and the NPMP have not been fully implemented. Creation of an updated plan will help to ensure implementation will be effective in light of the current conditions of the park.

Overview of Management Plan

Nadaka is composed of 2 acres of nature play area and community gardens (Nelson property), 10 acres of primarily forested area, and a small meadow (natural area). Currently the Nelson property has few issues of concern and is managed following the basic guidelines set by Nadaka 2020-Maintenance, Operation, and Programming Plan. However, a cohesive management plan is not being implemented for the natural area. The natural area has multiple issues of concern which must be addressed to meet desired future conditions. This 5 year management plan addresses current issues and sets the stage to achieve long-term goals. Issues addressed in the plan include:

- Vegetation. Nine invasive and noxious species have been flagged as a priority for removal at Nadaka. Six species are considered established and three encroaching. This plan suggests management practice for control of the species of concern listed below:
  - *Clematis vitalba* (Traveler's Joy/Old Man's Beard)
  - *Geranium robertianum* (Herb Robert)
  - *Hedera helix* (English Ivy)
  - *Ilex aquifolium* (English Holly)
  - *Prunus laurocerasus* (English Laurel)
  - *Rubus armeniacus* (Himalayan Blackberry)
  - *Arum italicum* (Italian Arum)
  - *Conium maculatum* (Poison-Hemlock)
  - *Ficaria verna* (Lesser Celandine)
- Laminated Root Rot (LRR). LRR has been identified within the forested area of Nadaka. This plan maps currently infected Douglas-fir trees (*Pseudotsuga menziesii*) and provides management recommendations.
- Trails. The forested area of Nadaka consists of one main loop trail and many unsanctioned pedestrian-made trails. Most unsanctioned trails are unwanted primarily due to destruction of habitat and soil erosion. Some unsanctioned trails, however, are now wanted by Nadaka. This management plan suggests methods to decommission unwanted trails and to commission wanted trails.
- Signage. There are few signs within the forested area of Nadaka. Most signs are located in the Nelson property. Sign considerations and suggestions are included in this plan.
- Illicit Use. Illicit use such as camping, fires, litter, and drug/alcohol use are a problem at Nadaka. This plan proposes strategies to help curb illicit use with a socially conscious approach.
- Monitoring and Evaluation. Nadaka is managed and stewarded by multiple agencies which can complicate project implementation. This plan proposes strategies to help make communication clear between agencies and thus increase the chances of project success.

Methods

Establishing Desired Conditions

Nadaka 2023 is a 5 year plan designed to move Nadaka Nature Park towards long-term desired future condition. Need for Nadaka 2023 was originally expressed in Nadaka 2020-Maintenance, Operation and Programming plan (Nadaka 2020). Nadaka 2020 is a 5 year management plan focusing primarily on the management of the 2 acre Nelson property. According to Nadaka 2020 the primary need for a second 5 year plan is to obtain the desired future conditions of the forested and meadow areas (natural area). Nadaka 2020 established the following desired future conditions for the natural area:

- Restore healthy native habitat to enhance and diversify wildlife habitat and food sources.
- Restore native vegetation in areas where disturbance has occurred, species have been removed, trees have been felled, or holes in canopy cover exist.
- Remove invasive and noxious weeds.
- Manage Douglas-fir (*Pseudotsuga menziesii*) trees for laminated root rot.

Meetings and communications for Nadaka 2023 between Friends of Nadaka, the City of Gresham, the East Multnomah Soil and Water Conservation District, and other relevant agencies expanded desired future conditions, including:

- Reduce illicit activities. This includes but is not limited to, camping, fires, and drug/alcohol use.
- Remove unsanctioned and unwanted trails.
- Establish new trails.
- Develop a clearer sign presence.

Assessing Current Conditions

Current conditions were assessed through discussions with Friends of Nadaka, the City of Gresham, the East Multnomah Soil and Water Conservation District, and Nadaka stewards and volunteers. Current conditions deemed to need improvement include:

- Invasive and noxious species, especially in the forested area.
- Unsanctioned trails.
- Illicit activities; included but not limited to camping, fires, and drug/alcohol use.
- Laminated root rot.
- Lack of signage in forested area.

During discussions regarding current conditions it was decided that three following surveys should be performed to obtain a fuller understanding of current conditions:

- Laminated root rot survey.
- Vegetation survey.
- Percent coverage of invasive and noxious species survey.

Laminated Root Rot Survey

The first Laminated Root Rot (LRR) survey at Nadaka was performed on May 4, 2010 by the Oregon Department of Forestry (ODF). Nadaka's second LRR survey (see Appendix H) was performed on April 3, 2018 by Sarah Navarro, forest pathologist of ODF. Suspected LRR zones were determined by identifying above ground indicators such as reduced terminal growth, thinning of the crown, and yellowing (chlorosis) of Douglas-fir trees (*Pseudotsuga menziesii*). Previous LRR zones determined in the 2010 LRR survey were also located using GPS coordinates. Roots within suspected LRR zones were cut using a Pulaski and inspected for disease indicators. Stumps of windthrown and felled trees were also inspected for disease indicators. Disease indicators include laminate decay along annual growth rings, *Ectotrophic mycelium* on roots, reddish-brown coloration of heartwood in the lower bole, and decay within the root. Roots and stumps within an 8 foot radius of found LRR disease indicators were also checked. An 8 foot radius was chosen because LRR spreads at a rate of about 1 foot per year (Thies and Sturrock, 1995; Hagle, 2009) and it had been 8 years since the original LRR survey. Standing trees found to have LRR were numbered with aluminum tags nailed to the north side of the tree base. All standing, windthrown, and felled trees were marked with GPS coordinates and mapped.

Vegetation Survey

Pacific Habitat Services (PHS) conducted the first vegetation survey listing all known vegetative species at Nadaka in 2009. In 2018 a second vegetation survey was conducted (see Appendix D). The 2018 list of all known vegetative species was conducted by building off the original PHS survey. Friends of Nadaka, having extensive on the ground knowledge, was asked to review the PHS survey. Multiple vegetation species, known by Friends of Nadaka to be within the park, were added to the original PHS list. A walk through Nadaka was scheduled with the East Multnomah Soil and Water Conservation District (EMSWCD). The EMSWCD identified remaining unknown vegetation. The new known vegetation species list was compiled using the same format as the original PHS survey to make it easier to analyze vegetative changes in future comparison studies.

Percent Coverage of Invasive and Noxious Species Survey

On May 27 and June 3, 2018 a percent coverage of invasive and noxious species survey was conducted using student volunteers from Portland State University (see Appendix G). This survey focused on the forested and meadow areas (natural area). The south two acres of Nadaka (Nelson property) was excluded from this survey due to the low amount of invasive and noxious species. Six established invasive and noxious species were chosen by Friends of Nadaka as a priority for removal within the natural area. This survey aimed to identify the distribution of these six invasive and noxious species. The six species surveyed include:

- *Clematis vitalba* (Traveler's Joy/Old Man's Beard)
- *Geranium robertianum* (Herb Robert)
- *Hedera helix* (English Ivy)
- *Ilex aquifolium* (English Holly)
- *Prunus laurocerasus* (English Laurel)
- *Rubus armeniacus* (Himalayan Blackberry)

The "Nadaka Open Space Work Zone Map" (see Appendix G) was used to break up the natural area into sixteen equal grids. The "Nadaka Open Space Work Zone Map" was originally created by the City of Gresham for the "Nadaka Nature Park Vegetation Management Plan". The sixteen equal grids were labeled A through P and measure 165 by 165 feet. Grids M, N, and O overlay the meadow area. Two distinct distributions of invasive and noxious species exist on either side of the meadow; therefore, grids M, N, and O were cut into two sections along the length of the meadow. Section 1 covers the southern half of the grids while section 2 covers the northern half (see "Nadaka Open Space Work Zone Map" in Appendix G).

The grids on the ground were mapped using a laser tape measure, compass, and white piece of paper. One volunteer pointed the laser tape measure along the grid lines which run north/south and east/west. The second volunteer walked along the grid line using the compass to keep direction while holding the white piece of paper up towards the first volunteer with the laser tape measure. The first volunteer pointed the laser tape measure onto the white piece of paper. The second volunteer with the paper stopped when either a) the first volunteer could not see the laser on the paper any longer, or b) the second volunteer was stopped by an obstruction such as a large tree. The first volunteer recorded the distance with the laser tape measure and moved to where the second volunteer stopped. This process was repeated until 165 feet were marked and repeated again to mark remaining grid lines. Flagging ribbon was used to mark the corners of an established grid.

Once a grid was established, volunteers individually searched the grid for the six invasive and noxious species. Percent cover charts were used as an aid to estimate the percent coverage of each species. Estimated percent coverage was recorded by each individual. Volunteers then discussed their findings and agreed upon a final estimated percent coverage for each of the six invasive and noxious species.

After all grids were evaluated for percent coverage of the six invasive and noxious species, the total percent coverage of each of the six species was calculated for the entire natural area. Total percent coverage was calculated by first by taking the mean of the percent coverage of all six species in sections 1 and 2 of grids M, N, and O. Then using the same method as in grids M, N, and O, the average of each of the six invasive and noxious species was taken for grids A through P.

$$\bar{x} = \left(\frac{\frac{\%_1}{100} + \frac{\%_2}{100} + \dots + \frac{\%_n}{100}}{n} \right) 100 \quad (1)$$

where:

$\bar{x}$ = mean

$\frac{\%}{100}$ = percent in decimal form

n = total number of percentages

The total percent coverage, or overall coverage, of each of the six invasive and noxious species in the natural area was given by Eq. (1). Square foot coverage of each species was found by taking the square footage of each grid and multiplying by the decimal percentage of each of the six invasive and noxious species.

$$ft^2 = (165ft \cdot 165ft) \left(\frac{\%}{100} \right) \quad (2)$$

where:

$\frac{\%}{100}$ = percent in decimal form

Total square foot coverage was found by summing the square footage of grids A through P found in Eq. (2) for each of the six invasive and noxious species.

References

Hagle, S. K. (2009). *Laminated root rot ecology and management*. Forest insect and disease management guide for the northern and central Rocky Mountains. USDA Forest Service, Northern Region, State and Private Forestry. (Ch. 11.2, p. 20) Online at: http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/99471_FSPLT3_2336694.pdf

Thies, W. G. and R. N. Sturrock. (1995). *Laminated root rot in western North America*. Gen. Tech. Rep. PNW-GTR-349. Portland, OR: U.S. Dept. of Agric., For. Serv., Pacific Northwest Res. Sta. 32 p.

Management Goals, Practices, and Priorities of Nadaka

Management goals, practices, and priorities are included here to guide relevant agencies when considering project planning and implementation at Nadaka. Management goals, practices, and priorities were developed through meetings and communications with Friends of Nadaka, Metro, the East Multnomah Soil and Water Conservation District, and other relevant agencies. Goals and practices from previous Nadaka management plans were also assessed and chosen for applicability considering current conditions. Priorities were ranked by Friends of Nadaka to assist in implementing goals and practices when two or more priorities come into conflict.

Goals and Practices

- Prevent fire.
- Follow Crime Prevention Through Environmental Design (CPTED) guidelines whenever possible (see Appendix C).
- Implement socially conscious practices to reduce camping and drug use within the park.
- Provide information about available services for community members experiencing homelessness, substance addiction, and/or other crises.
- Promote equitable and inclusive partnerships within the community that protect and enhance ecological systems.
- Improvement of habitat and ecological values.
- Limit use of chemicals.
- Safeguard water quality in local rivers and streams.
- Close informal trails to decrease fragmentation of site for plants and wildlife.
- Remove laminated root rot infested Douglas-firs (*Pseudotsuga menziesii*) and replace with appropriate resistant species.
- Retain healthy Douglas-firs on the Nelson property.
- Prioritize management and monitoring of site according to available financial resources.
- Develop volunteer and staff priorities.
- Restrict use. Use of any portion of the site for intensive forms of recreation, including but not limited to ball fields, dog parks, basketball, or skate parks is specifically excluded.
- The City of Gresham shall manage the site using appropriate sustainability practices and materials. This includes but is not limited to: avoidance or minimization of the use of toxic substances; consideration of product life-cycle issues in design, purchasing decisions, and control of invasive species.

Priorities

Priorities in order of consideration:

1. Public and Neighborhood safety. This includes but is not limited to:
  - Fire prevention practices.
  - Crime Prevention Through Environmental Design (see Appendix C).
  - Keep loose rocks out of mowing areas as they can be thrown by mower and cause injury.
  - Take consideration when planting in child play area; no thorny or poisonous plantings.
  - Monitor trees, especially Douglas-firs (*Pseudotsuga menziesii*) known to have or known to be susceptible to contracting laminated root rot, for hazardous conditions.
2. Equitable treatment of all citizens of the community.
3. Improve habitat and ecological values.

Vegetation

Definitions

The following definitions regarding the categories of vegetation were established by the East Multnomah Soil and Water Conservation District (“Weeds: Control Them”, 2014):

- **Non-Native.** Non-indigenous to the Willamette Valley
- **Invasive.** Those that spread into areas where they are not native and cause ecosystem level damage
- **Noxious.** Species or groups of species that have been legally designated as pests, for example by a county, state, or federal agency

Overview

Nadaka is composed of 2 acres of nature park and community garden (Nelson property) and 10 acres of forest and meadow area (natural area, see Figure 2). The natural area is roughly 1 acre of mowed meadow land and 9 acres of mixed conifer-broadleaf forest. The park, community garden, and meadow spaces are well kept by current practices. The 9 acres of conifer-broadleaf forest have been harder to maintain. Many invasive and noxious species have established within the wooded area of Nadaka. Invasive and noxious species compete with and crowd out desirable native species. For a list of known vegetative species in Nadaka see Appendix D.

Fig. 2: Aerial view of Nadaka. The Nelson property is outlined in white. The meadow area is outlined in blue. The forested area along with the meadow area (natural area) is outlined in orange.

Six species of established and three species of encroaching invasive and noxious plants have been identified as high priorities for removal. Established invasive and noxious species:

- *Clematis vitalba* (Traveler's joy/Old man's beard)
- *Geranium robertianum* (Herb Robert)
- *Hedera helix* (English ivy)
- *Ilex aquifolium* (English holly)
- *Prunus laurocerasus* (English laurel)
- *Rubus armeniacus* (Himalayan blackberry)

Encroaching invasive and noxious species:

- *Arum italicum* (Italian arum)
- *Conium maculatum* (Poison-hemlock)
- *Ficaria verna* (Lesser celandine)

This section will look at the existing vegetative conditions, desired vegetative conditions, and recommendations to achieve desired conditions within the three main sections of the park. Management recommendations for the six established and three encroaching invasive and noxious species are also addressed in this section.

Nelson Property

Existing Conditions

The Nelson property consists of the south 2 acres of Nadaka (see Figure 2) and is composed primarily of a nature play area/playground, picnic shelter, and community garden. It is well maintained. Along the west side of the play area is a sloped hill with a backyard habitat display. One rain garden dots the Nelson property. In spring 2018, one poison-hemlock (*Conium maculatum*) and a small amount of Italian arum (*Arum italicum*) were found in the backyard habitat display.

The south side of the Nelson property, which runs along Northeast Glisan Street, is lined with Douglas-fir trees (*Pseudotsuga menziesii*). In the spring of 2018, the City of Gresham installed a camera on the light post in the nature play area. The Douglas-fir trees were trimmed by roughly 15 feet to create a line of sight from the street. The property is mowed by the City of Gresham.

Desired Conditions

Currently, there is discussion of planting along the south side of the Nelson property that runs along Northeast Glisan Street.

Recommendations

Species planted along the south side of the Nelson property should not grow more than 2 feet tall to maintain line of sight (see Appendix C). Moreover, because the Nelson property is a play area for children, no thorny or poisonous plants should be planted. For a list of recommended plantings see Appendix E.

The City of Gresham should continue to mow the Nelson property. It should be noted that no rocks should be placed around the Nelson property of a size that could be thrown by the mower. Rocks thrown by mowers can cause injury or death.

Poison-hemlock (*Conium maculatum*) and Italian arum (*Arum italicum*) have been found in the backyard habitat display on the Nelson property. Both poison-hemlock and Italian arum are poisonous and should be a high priority for removal. Information about poison-hemlock can be found below in the “Poison-Hemlock” section. Management recommendations for poison-hemlock and Italian arum are listed in the “Management Recommendations for Encroaching Invasive and Noxious Species” section below. The Nelson property should be frequently monitored for invasive and noxious species.

Poison-Hemlock

In the spring of 2018 a poison-hemlock (*Conium maculatum*) was discovered in the backyard habitat space. The backyard habitat, along with the rest of the park, needs to be monitored for poison-hemlock as it is a highly toxic plant to both humans and animals. Specific removal techniques should be followed (see “*Conium maculatum*, Poison-Hemlock” section below). Below are lists of symptoms compiled by King County (“Poison-Hemlock”, 2018):

Symptoms of poison-hemlock poisoning in humans:

- Dilation of the pupils
- Dizziness/Trembling
- Slow heartbeat
- Paralysis of the central nervous system
- Muscle paralysis
- Death due to respiratory failure

Fig. 3: Poison-hemlock (*Conium maculatum*). Photo by Audrey Driscoll (2017) Retrieved from <https://audrydriscoll.com/tag/poison-hemlock/>.

Symptoms of poison-hemlock poisoning in animals:

- Nervous trembling
- Salivation
- Lack of coordination
- Pupil dilation
- Rapid weak pulse
- Respiratory paralysis
- Coma
- Death

Quick medical attention for both humans and animals can reverse poison-hemlock effects. If a person is experiencing symptoms of poison-hemlock poisoning, call 911 or poison-control at 1-800-222-1222. If a pet is experiencing symptoms of poison-hemlock poisoning, call a veterinarian. The two nearest veterinarians to Nadaka are Wildwood Animal Hospital at 1-503-665-1126 or Halsey East Animal Clinic at 1-503-255-0261. If a pet is experiencing symptoms after hours call the 24 hour VCA Southeast Portland Animal Hospital at 1-503-610-6974.

Meadow

Fig. 4: The meadow area at Nadaka Nature Park.

Existing Conditions

A survey by Pacific Habitat Services (Small, 2009) characterized the meadow area (see Figure 4) as turfgrass and forb dominated lawn. According to Small (2009), the majority of grasses are common lawn species with a few meadow species which can grow tall if not mowed. Small (2009) reports that the majority of species found in the meadow area are non-native species. The City of Gresham is responsible for mowing the meadow area.

The south end of the meadow contains a thin band of wooded area, primarily small trees and shrubs. Invasive and noxious species, especially herb Robert (*Geranium robertianum*), Himalayan blackberry (*Rubus armeniacus*), and English ivy (*Hedera helix*) are found in the southern wooded band along the parking area. Illicit activity such as camping and drug/alcohol use has been reported in the southern wooded band. Following the Crime Prevention Through Environmental Design principles (see Appendix C), this band of wooded area has been thinned to create a line of sight. Friends of Nadaka have reported that thinning this area has reduced illicit activity.

Desired Conditions

Due to cost and the current use of the meadow as a gathering space, Friends of Nadaka does not wish to attempt to re-colonize the meadow with native species at this time. If Friends of Nadaka chooses to convert the meadow area to native species in the future, suggested actions are provided in Appendix F.

Removal or reduction of invasive and noxious species in the southern wooded band of the meadow area is desired. Replanting with native species is preferred. However, non-native species can be considered especially if beneficial to pollinators.

Recommendations

Removal efforts of invasive and noxious species such as herb Robert (*Geranium robertianum*), Himalayan blackberry (*Rubus armeniacus*), and English ivy (*Hedera helix*) should be continued. Suggestions for control of herb Robert, Himalayan blackberry, and English ivy can be found in the “Management Recommendations for Established Invasive and Noxious Species” section below.

Annual thinning of the southern wooded band by the City of Gresham is recommended. New plantings in the southern wooded band should conform to the Crime Prevention Through Environmental Design principles (see Appendix C) and not grow over a height of 2 feet. Keeping trees thinned and new plantings less than 2 feet tall provides a line of sight which helps to reduce illicit activity and improve safety. Planting prickly and thorny species such as dwarf Oregon grape (*Mahonia nervosa*) and native rose species, such as bald-hip rose (*Rosa gymnocarpa*) can also help reduce illicit activity.

The City of Gresham should continue to mow the meadow area. It should be noted that no rocks should be placed in the meadow area of a size that could be thrown by the mower. Rocks thrown by the mower can cause injury or death.

Mixed Conifer-Broadleaf Forest

Existing Conditions

The forested area of Nadaka (see Figure 2) has many vegetation management issues with invasive/noxious species and Laminated Root Rot (LRR) being the two main vegetative concerns. Information and management recommendations for LRR are discussed in depth in the “Laminated Root Rot” section below.

Many non-native, invasive, and noxious species have established themselves in the understory of the forested area. Non-native species are not a major threat and can sometimes be desirable. However, many invasive and noxious species need to be controlled in the forested area. Six invasive and noxious species have been identified as a priority for removal within Nadaka’s forested area. Table I shows the total percent and square foot coverage of the six invasive and noxious species within the forested and meadow areas (natural area). For a further breakdown of the percent and square foot coverage of the six invasive and noxious species within the natural area see Appendix G.

Table I: Total percent and square foot coverage of six invasive and noxious species flagged as a removal priority within Nadaka’s natural area.

Total Percent and Square Foot Coverage in Natural Area			
Scientific Name	Common Name	Percent Coverage (%)	Square Foot Coverage (ft²)
<i>Clematis vitalba</i>	Traveler’s joy/Old man’s beard	0*	0*
<i>Geranium robertianum</i>	Herb Robert	37.2	162,125
<i>Hedera helix</i>	English ivy	27.3	118,837
<i>Ilex aquifolium</i>	English holly	4.2	18,486
<i>Prunus laurocerasus</i>	English laurel	7.8	34,140
<i>Rubus armeniacus</i>	Himalayan blackberry	13.4	58,561

Table I: *Traveler’s joy (*Clematis vitalba*) was pulled one week before the percent coverage survey was completed. However, it is known to be on the north side of Nadaka’s natural area along Northeast Pacific Street.

In 2018 lesser celandine (*Ficaria verna*) was found within the forested area in grid A of the “Nadaka Open Space Work Zone Map”. Lesser celandine is a newly encroaching, noxious species that spreads rapidly and has been marked as a high priority for removal.

Currently, bundles of cuttings from invasive and noxious species removal efforts are left throughout the forested area in an attempt to create further habitat for wildlife. As of 2018, removal of invasive and noxious species is implemented by:

- Friends of Nadaka
- City of Gresham
- Nadaka Ambassadors
- Nadaka summer interns
- Neighborhood volunteers
- HB Lee Middle School SUN Program

Desired Conditions

While complete removal is unrealistic, significant reduction and control of invasive and noxious species along with restoration of native vegetation is possible. Restoring a healthy native habitat is hoped to enhance and diversify wildlife habitat and food sources. A variety of native vegetation will provide educational opportunities about native forest habitat in the Pacific Northwest for park visitors.

Recommendations

A solid management plan combined with diligence can significantly lower the presence of invasive and noxious species while increasing desirable native and non-native species. It should be noted that complete eradication of invasive/noxious species is unrealistic; work to combat invasive/noxious species will be continual.

Current weed removal practices should be continued and enhanced by the information in the “Management Recommendations for Established/Encroaching Invasive and Noxious Species” sections below. Native vegetation should be planted in areas where disturbance has occurred, such as areas where invasive species have been removed, trees have been felled, or holes in the canopy cover exist. See Appendix E for a list of recommended plantings for Nadaka.

The practice of leaving bundles of vegetation cuttings in the forested area for habitat should be discontinued. According to Whitney Bailey of the East Multnomah Soil and Water Conservation District, dried bundles of vegetation create a fire hazard and are not effective in creating habitat in forested areas such as Nadaka (personal communication, May 23, 2018).

Invasive and Noxious Species of Concern

Established Invasive and Noxious Species

<u>Scientific Name</u>	<u>Common Name</u>	<u>Invasive or Noxious*</u>
<i>Clematis vitalba</i>	Traveler’s joy or Old man’s beard	Noxious
<i>Geranium robertianum</i>	Herb Robert	Noxious
<i>Hedera helix</i>	English ivy	Noxious
<i>Ilex aquifolium</i>	English holly	Invasive
<i>Prunus laurocerasus</i>	English laurel	Invasive
<i>Rubus armeniacus</i>	Himalayan blackberry	Noxious

* (“Oregon Noxious Weed Profiles”, 2017)

Encroaching Invasive and Noxious Species

<u>Scientific Name</u>	<u>Common Name</u>	<u>Invasive or Noxious*</u>
<i>Arum italicum</i>	Italian arum	Invasive
<i>Conium maculatum</i>	Poison-hemlock	Noxious
<i>Ficaria verna</i>	Lesser celandine	Noxious

*("Oregon Noxious Weed Profiles", 2017)

Management Recommendations for Established Invasive and Noxious Species

Clematis vitalba (Traveler's Joy/Old Man's Beard)

Traveler's joy is a perennial, deciduous vine that grows rapidly. During spring, summer, and early fall, traveler's joy has compound leaves. Leaves are opposite and usually have five serrated leaflets. In late fall and early winter, traveler's joy blooms white flowers. In winter the seeds grow white featherlike tails giving it its other common name, old man's beard. In the winter when all leaves and seeds have shed, a woody vine is left. The vines of traveler's joy wrap around objects such as branches and grow primarily on the edge of forests, streams, and fence lines. Left uncontrolled vines will cover trees and shrubs blocking sunlight and weighing down the supporting vegetation.

Fig. 5: Traveler's joy (*Clematis vitalba*). Photo by Eike Wulfmeyer (2004). Retrieved from http://wikidwelling.wikia.com/wiki/File:Clematis_vitalba.JPG.

Control. As of 2018 traveler's joy is reoccurring at Nadaka but well controlled. Seedlings are dug up and pulled out regularly. Continue pulling seedlings, making sure to extract the root system, and traveler's joy should not become an overwhelming problem at Nadaka. Monitor for new seedlings around the forested areas edge. If traveler's joy becomes established and begins to blanket a tree or shrub, cut vines at roughly waist height, killing the upper vine, and apply herbicide to the root side of the cut stock ("Noxious Weed Identification", 2017). Using an herbicide will kill the vine; However, Nadaka is committed to using as little chemical as possible. If herbicide is not used, vines will need to be dug up (be sure to extract the root ball). Cutting traveler's joy at the base only encourages growth (Whitney Bailey, personal communication, May 23, 2018). Gloves, long sleeves, and pants should be worn when handling traveler's joy. Contact with sap can cause skin blistering ("Control Options for Old Man's Beard", n.d.)

Disposal. All parts of traveler's joy should be disposed of in the trash and not composted.

***Geranium robertianum* (Herb Robert)**

Fig 6: Herb Robert (*Geranium robertianum*) at Nadaka.

Herb Robert (*Geranium robertianum*) is an annual (and sometimes a biannual) that emerges in late winter and early spring. Herb Robert is a ground covering forb that has outcompeted native desirable ground cover in Nadaka. Patches of herb Robert can contain up to 250 plants per square meter (“ODA Plant Division”, 2009) making it a prolific competitor to native species. It has five petal flowers that can be pinkish or white. It should be noted that flowers of herb Robert at Nadaka are pinkish purple. New growth sprouts as rosettes and branches as it matures. Leaves are compound with deeply dissected leaflets and have a strong odor when crushed. Stems are covered with fine glandular hairs. Herb Robert reproduces by seeds which are long and sticky. Seeds can stick to people or animals and be dispersed to other locations. Herb Robert seeds can also shoot more than 15 feet when the plant is disturbed. Seeds are viable for 5 years or more in soil or compost (“Invasive Herb-Robert”, 2018). As herb Robert ends its seasonal cycle the stems and leaves turn red and brittle. Herb Robert is often mistaken with the native western fringed bleeding heart (*Dicentra formosa*).

Control. Herb Robert has shallow roots that pull up easily. Because seeds can shoot more than 15 feet when disturbed, it is best to pull in late winter or early spring before seeds are able to form. Continue pulling any new growth throughout the year. Although it would be ideal to pull all herb Robert at one time, it is not realistic to do so due to the pervasiveness of the infestation. Two suggestions for pulling herb Robert are:

1. Pull all herb Robert within the line of sight of established trails. This method has two advantages. First, clearing herb Robert from sight helps inform visitors that it is not a desired forest species. Second, keeping herb Robert away from trafficked trails can help reduce the amount of seed spread due to disturbance. This method is recommended by the East Multnomah Soil and Water Conservation District.
2. Determine specific sections to target and pull herb Robert there. Expand sections yearly. This method can start with smaller areas than pulling all herb Robert along the trails line of sight. This can be an advantage due to limited resources.

Whichever method above is chosen, it is important to keep the area that has been cleared of herb Robert clear of other invasive species. Invasive species are prone to take over disturbed soil. In the fall, new desirable species should be planted. It is recommended to plant a variety of species and take note of which species colonizes the best for future planting. A variety of robust plants that can survive diverse stressors is ideal. For example, during a drought some intolerant plants may die out while the rest live. If only the drought intolerant species was planted (monoculture) the entire understory would be wiped out. Care should also be taken to pull new rosettes of herb Robert every late winter and early spring. Look for new growth of herb Robert throughout the year as sometimes this plant can act as a biannual. Suggested groundcover plantings that have worked well in Nadaka:

- *Polystichum munitum* (Sword fern)
- *Dicentra formosa* (Western fringed bleeding heart)
- *Fragaria chiloensis* (Beach strawberry)
- *Arctostaphylos uva-ursi* (Kinnikinnick)
- *Tellima grandiflora* (Fringecup)

See Appendix E for a list of recommended native plantings. Exact planting methods should be researched. Sword fern should be pot planted as bare root planting has not been successful at Nadaka in the past.

Disposal. If herb Robert is not yet in seed, plants can be composted in city compost or disposed of in the trash (“Best Management Practices”, n.d.). It is not recommended to compost in yard compost. If plants have gone to seed they should be bagged and placed in the trash (“Best Management Practices”, n.d.). However, removing herb Robert when in seed creates a much larger seed bank than leaving it until next year and is not recommended.

***Hedera helix* (English Ivy)**

English ivy is an evergreen vine with alternate waxy leaves. It creates large dense mats in the understory and ascends up trees and other vegetation. English ivy blocks out light and competes for nutrients in the understory outcompeting most native ground cover. Vines can grow rootlets which attach to trees and other vegetation as the vine climbs. Trees and shrubs can be completely covered by English ivy vines which deplete the host tree of sun and add significant weight contributing to windthrow. English ivy can climb over 100 feet and is a significant problem at Nadaka.

Fig. 7: English ivy (*Hedera helix*) mingles with herb Robert at Nadaka.

Control. The majority of English ivy at Nadaka is in the form of ground cover. Roots of English ivy are shallow. Removing vines from the ground is a matter of cutting and pulling. Herbicides do not work well on English ivy due to its waxy leaves (“The Weed Bulletin”, 2004). In addition, the use of herbicides on ground covering English ivy is not recommended due to the large spray area. Hand pulling is the best method for removal at Nadaka.

English ivy vines that have grown up trees should be cut at the base of the tree and again at shoulder height. Cut sections should be carefully pulled from the tree taking care to not pull off too much bark. Leave the vines above shoulder height as they will die on their own. Pulling down tall vines can damage the tree, disturb bird nests, and create dangerous falling debris. It is important to make sure all vines have been cut. If some vines are left uncut, nutrients can reach the top vines and they will not die. Ground covering English ivy surrounding the tree should also be pulled in roughly a 6 foot radius (“The Ivy Files”, n.d.).

Disposal. English ivy vines can be disposed of in the trash or composted. If composting it is important to dry out the vines completely first or they will resprout.

To dry out large clearings of English ivy (“The Weed Bulletin”, 2004):

1. Roll English ivy into bundles.
2. If possible place out of contact with soil to dry.
3. If placed on soil, roll bundles regularly to keep roots from establishing.
4. When dry, place in compost or allow dried bundle to decompose.

Drying English ivy onsite contributes to fire hazard and may not always be appropriate for Nadaka.

***Ilex aquifolium* (English Holly)**

English holly is an evergreen shrub or small tree. English holly can grow up to 30 feet tall with spiny dark green leaves. It blooms four lobed white flowers which turn into bright red berries. Leaves are alternate, spiny, 1-3 inches long, and waxy. Birds eat English holly berries and disperse seeds over long distances. English holly can also reproduce vegetatively. English holly outcompetes many native plants for nutrients, especially water. Water consumption is

notoriously high for English holly. In years of drought English holly removal should be a priority.

Between grids G and K of the “Nadaka Open Space Work Zone Map” (see Appendix G) is a large, established area of English holly and English laurel. The line of sight in this area has been greatly obscured by this overgrowth. Large amounts of garbage, including sanitary waste, were found in this area during a June 2018 survey. Designating this area as a restoration site will clear a line of sight following Crime Prevention Through

Fig. 8: English holly (*Ilex aquifolium*) grows alongside native Oregon grape (*Mahonia aquifolium*) at Nadaka.

Environmental Design (see Appendix C) principles and help reduce illicit activity in Nadaka.

Control. English holly seedlings can be pulled up by hand or small shovel. All parts of the root must be removed and the area must be monitored for new sprouts. Removal of seedlings is best accomplished when soil is moist as even small plants have long deep taproots (“King County”, 2018). Survey Nadaka for English holly seedlings in the spring when the soil is still moist and remove seedlings.

Mature English holly is difficult to remove. Cut back branches at the base of the English holly to access the trunk and fell the shrub/small tree. Whitney Bailey of the East Multnomah Soil and Water Conservation District (EMSWCD) recommends digging a trench around the stump to expose the roots, which can be large and thick (personal communication, May 23, 2018). Sever the roots if possible with a small saw or ax, and pull the stump out. Use a shovel, crowbar, landscaping bar, or other similar tool to gain leverage in removing the stump. Monitor the area in spring for new seedlings. English holly roots are extensive. If digging out the stump is prohibitive, EMSWCD recommends applying herbicide (undiluted glyphosate) to the stump within 15 minutes of cutting (personal communication, July 2, 2018). Simply monitoring the stump for sprouts is not recommended. English holly stumps will not die and will continue to sprout; this can cause multi-branched thickets (“King County”, 2018). Nadaka is committed to minimal use of chemicals; however, the small targeted amount used for English holly is warranted. English holly blooms in the winter and begins to fruit in April. Remove English holly in early spring while soil is moist and before birds can spread seed.

Removal of a large English holly or a patch of English holly creates disturbed soil. Monitoring for encroaching invasive species and new English holly seedlings throughout the growing season is necessary. Plant native ground covering in the fall and continue to monitor the area the following season. See Appendix E for a list of recommended planting options.

Disposal. English holly should be disposed of in the trash or sent to a mulching facility. Confirm that mulching facility will accept English holly.

***Prunus laurocerasus* (English Laurel)**

English laurel is an evergreen shrub or small tree growing 10 to 30 feet tall. Leaves grow up to 8 inches long with dark green waxy tops and lighter bottoms and resemble rhododendron leaves (*Rhododendron maximum*). English laurel flowers in late spring. Flowers have 5 petals and multiple yellow stamens. The flowers grow in racemes and resemble cherry flowers. English laurel fruits purplish-black clusters of cherry-like fruit in summer. They are fast growing and can adapt to many different conditions.

Fig. 9: English laurel (*Prunus laurocerasus*) at Nadaka.

Between grids G and K of the “Nadaka Open Space Work Zone Map” (see Appendix G) is a large, established area of English holly and English laurel. The line of sight in this area has been greatly obscured by this overgrowth. Large amounts of garbage, including personal hygiene products, were found in this area during a June 2018 survey. Designating this area as a restoration site will clear a line of sight following Crime Prevention Through Environmental Design (see Appendix C) principles and help slow illicit activity in Nadaka.

Control. Small English laurel seedlings can be easily dug up. Monitor the area throughout the growing season for new seedlings. Large English laurels should be cut at the base. English laurel stumps will resprout. To combat resprouting three methods can be implemented (“English Laurel”, 2017):

1. Cut trenches around the stumps and cut the roots with a small saw or ax. Stumps can then be turned on their heads (brush soil off roots) to create habitat or disposed of. English laurel roots can be very thick and extensive so digging out the stump may be prohibitive.
2. Spray or brush stumps with glyphosate immediately after cutting. Nadaka is committed to using as little chemical as possible. However, given the large amount of English laurel in the understory, and the small amount of chemical used in this method, this may be the best control option, at least at the first major clearing.
3. Monitor the stumps repeatedly throughout the growing season and pull new suckers as they form. Monitoring and pulling of suckers will have to be done for multiple years until the stump stops producing. While this method eliminates labor intensive digging and the use of chemicals, it is resource intensive given the size of the infestation at Nadaka.

For all three control methods continued monitoring and pulling of seedlings throughout the growing season is important.

Disposal. English laurel should be disposed of in the trash or sent to a mulching facility (“English Laurel”, 2017). Confirm that mulching facility will accept English laurel.

***Rubus armeniacus* (Himalayan Blackberry)**

Fig. 10: Himalayan blackberry (*Rubus armeniacus*) leaves in the sun at Nadaka.

Himalayan blackberry (*Rubus armeniacus*) is an evergreen perennial shrub. Leaves are alternate, oblong, toothed, and come in sets of 3 on side shoots and 5 on main stems. Flowers are white, and appear in the spring on second year growth or older. Berries appear in mid-summer and early fall. Canes are adorned with large curved thorns. Himalayan blackberry reproduces by seed and vegetatively. A highly aggressive invasive shrub, Himalayan blackberry can cover and shade out the understory. Covering the understory kills off native ground cover as well as shrub and tree seedlings. Though it prefers sun, Himalayan blackberry can eventually overtake the understory of forested areas such as Nadaka if it is left uncontrolled (Whitney Bailey, personal communication, May 23, 2018). Himalayan blackberry is a high removal priority in sunny edges and open spaces of the forested area.

Control. Manual control is the best option for Nadaka. Persistence is the key to successful manual control. Nadaka should be monitored multiple times a year for new cane growth. Any new cane growth found should be pulled out and roots/rootball removed. Do not confuse new Himalayan blackberry growth with native trailing blackberry (*Rubus ursinus*). The areas where new Himalayan blackberry growth is found should be noted and monitored. In established patches, start by clearing canes with shears or a machete. Once the area is cleared of excess canes, all root balls must be pulled or dug out. Pull as much excess root as possible as, Himalayan black berry can sprout from small root fragments (“Blackberry | EMSWCD”, n.d.). If root balls are not pulled out an immediate application of undiluted glyphosate (“Controlling Himalayan Blackberry”, 2004) will be necessary on cut canes. Note that established thickets of Himalayan blackberry have large seed banks that remain viable in the soil for many years. The cleared site must be mapped and regularly monitored for new sprouts. Cleared sites should be replanted with desirable natives in the fall.

Disposal. Himalayan blackberry can be dried and composted or disposed of in the trash. It should be noted that dried Himalayan blackberry canes are highly flammable and create potential fire hazard.

Management Recommendations for Encroaching Invasive and Noxious Species

***Arum italicum* (Italian Arum)**

Italian arum, normally found in warmer climates, has shown up in Oregon relatively recently. It has been found in Nadaka but as of 2018 has not become well established. Italian arum is a ground-covering forb with distinctive leaves. Leaves are roughly 6 inches long, heart shaped and pointed with white veins. Italian arum flowers from April to June. During flowering, Italian arum gives off a strong odor. Flowers have a spathe (hood-like leaf). Italian arum fruits are round and form in oblong clusters. When ripe the fruit is bright orange.

Fig. 11: Italian arum (*Arum italicum*) with flowers. Retrieved from <https://worldoffloweringplants.com/arum-italicum-italian-arum/>.

Italian arum spreads by seed and an extensive system of small underground corms (Whitney Bailey, personal communication, May 23, 2018). Over time it can create large thickets. Italian arum contains sharp crystals of calcium oxalate making the plant highly toxic and irritating to the skin (“Italian Arum – Weed of the Month”, 2016). Wear pants, long sleeves and gloves when handling Italian arum.

Control. Unfortunately, a successful control method has yet to be established. Chemical application seems to only kill leaves while leaving corms untouched. Digging up Italian arum can cause corms to break off and increase the spread (“Italian Arum | Watch Species”, 2018). At this time the best management strategy is to cut off flowers or berry clusters, bag them in plastic, and dispose of in the trash (“Italian Arum – Weed of the Month”, 2016). Pulling leaves or cutting as they sprout may weaken the roots, and will prevent visitors to Nadaka from becoming accustomed to seeing this species in the landscape. Digging up Italian arum can be attempted for small outbreaks. Remove all corms and surrounding soil, place in plastic bags and dispose of in the trash (“Report: Italian Arum”, 2015) Monitor all occurrences closely and stay informed about control techniques as they are developed.

Disposal. All Italian arum must be bagged in plastic and disposed of in the trash. Italian arum will spread in compost.

***Conium maculatum* (Poison-Hemlock)**

Poison-hemlock is extremely toxic and is often mistaken with Queen Anne's lace (*Daucus carota*). It is a biennial herb that grows up to 8 feet tall. Poison-hemlock has green, hairless, hollow stalks with purple splotches and carrot-like leaves. In its second year, poison-hemlock flowers white, umbrella shaped clusters.

One poison-hemlock plant was found in Nadakas backyard habitat, near the children's play area, in 2018. Due to its toxicity great care should be taken to make sure poison-hemlock does not return. Employees, volunteers, and ambassadors should be familiar with poison-hemlock identification and control methods. The University of California Integrated Pest Management Program (DiTomaso, Roncoroni, Swain, & Wright, 2017) has good information on identification and toxicity.

Fig. 12: Poison-hemlock (*Conium maculatum*) flower.
Retrieved from http://www.daily-journal.com/life/home_garden/it-s-not-all-queen-anne-s-lace/article_043f0d7d-2ce7-5b16-a21b-821026e38c87.html.

Control. If poison-hemlock is found at Nadaka, manual removal is recommended. Long sleeves, pants, and gloves should be worn during removal as toxins can absorb through skin. When pulling poison-hemlock, the entire taproot must be removed. Surrounding soil should be disturbed as minimally as possible to prevent germination of poison-hemlock seeds ("Poison-Hemlock", 2018). Sites where poison-hemlock has been removed should be recorded and monitored and new growth pulled.

Disposal. Poison-hemlock must be bagged in plastic and disposed of in the trash. Poison-hemlock stocks can remain poisonous for up to three years after removal ("Poison-Hemlock", 2018).

***Ficaria verna* (Lesser Celandine)**

Lesser celandine (*Ficaria verna*), formerly named *Ranunculus ficaria*, is a ground-covering forb that emerges in early spring. One of the first groundcovers of the season, lesser celandine outcompetes other desirable plants. Lesser celandine has shown up recently at Nadaka. It is a prolific spreader and has the potential to take over large areas. Lesser celandine can show up as early as November but more often emerges in January or February. It can flower from February to April. Leaves are heart shaped and flowers are bright yellow with roughly 8 to 11 petals and 3 green sepals underneath. Flowers and leaves die off by mid-spring. Lesser celandine reproduces by corms and seeds and is a very fast spreader (Whitney Bailey, personal communication, May 23, 2018).

Fig. 13: Lesser celandine (*Ficaria verna*) with flowers.
Retrieved from <http://www.fosc.org/CelandineOverview.htm>.

Control. Unfortunately, control of lesser celandine is challenging. Corms spread deep and far under the soil and are sensitive to disturbance. As of 2018 lesser celandine is only found in small patches at Nadaka. Because of this it is highly recommended to start eradication efforts in winter 2019. Once lesser celandine takes hold of a large area it is almost impossible to get rid of. It will change the composition of the understory if allowed to take hold. Two methods of removal are recommended for Nadaka: manual removal and glyphosate.

- **Manual removal.** Manual removal is recommended for small patches of lesser celandine which is the current case at Nadaka. Conduct lesser celandine surveys in winter and early spring. Record occurrences as these areas will need continued monitoring for years to come. Dig out patches of lesser celandine. Start roughly 6 inches from the outer edge of the patch and dig 8 to 12 inches deep (Whitney Bailey, personal communication, July 2, 2018). Check to make sure there are no corms in the soil. If corms are found move further away from the patch and dig deeper. Place all dug up soil and plants in plastic bags and dispose of in the trash. Do not leave dug up soil and plants on the ground as corms may be left behind. All soil surrounding the infestation patch must be removed. Monitor the area the following winter or early spring for new growth.
- **Glyphosate.** Nadaka is committed to using as little chemical as possible in its management practices. However, the threat that lesser celandine poses to the understory warrants chemical use. Whitney Bailey of the East Multnomah Soil and Water Conservation District recommends one application of glyphosate in late winter before lesser celandine flowers and a second application a few weeks later if lesser celandine leaves have not begun to die back (personal communication, May 23, 2018).

It is recommended to begin manual removal in late winter 2019. Continue to monitor throughout the year. If larger patches return in 2020 another manual removal should be performed. If lesser celandine continues to spread beyond recorded patches, glyphosate should be used.

Disposal. Lesser celandine must be placed in plastic bags and disposed of in the trash. Do not compost.

Unknown Plant Species

Unknown plant species found at Nadaka should be identified and checked against section 4.I of the Portland Plant List. Section 4.I of the Portland Plant List identifies “nuisance” plants in the Portland area and prioritizes the necessity of control efforts. The Portland Plant List can be found at <https://www.portlandoregon.gov/citycode/article/322280>.

Chemical Use

Chemicals should be used sparingly at Nadaka. When chemical use is warranted, identify the species of plant/pest targeted and select chemical appropriate to that species. Where long sleeves, pants, and gloves when applying chemicals. Always follow instructions on the label and store in original container.

Migratory Bird Treaty Act (MBTA)

The Migratory Bird Treaty Act (MBTA) is a federal law that, “makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations” (“Migratory Bird Treaty Act”, 2017). When removing invasive/noxious weeds large enough to support bird nests in the spring and summer, care should be taken to make sure there are no bird nests present. Noxious and invasive weeds with nests should not be removed until after nesting season. Identify the bird species and contact the Audubon Society or other relevant organizations to confirm when it is legal to remove.

References

Best Management Practices for Herb Robert. (n.d.) Retrieved from <http://www.co.jefferson.wa.us/DocumentCenter/View/2954/Herb-Robert>

Blackberry | EMSWCD. (n.d.) Retrieved from <https://emswcd.org/on-your-land/weeds/weeds-to-know/blackberry/>

Controlling Himalayan Blackberry in the Pacific Northwest. (2004). Retrieved from <https://www.invasive.org/gist/moredocs/rubarm01.pdf>

Control Options for Old Man's Beard. (n.d.) Retrieved from https://www.nwcb.wa.gov/images/weeds/Old-Mans-Beard-Control_Whatcom.pdf

DiTomaso, J., Roncoroni, J., Swain, S., & Wright, S. (2017). Poison Hemlock Management Guidelines--UC IPM. Retrieved from <http://ipm.ucanr.edu/PMG/PESTNOTES/pn74162.html>

English Laurel Identification and Control. (2017). Retrieved from <https://www.kingcounty.gov/services/environment/animals-and-plants/noxious-weeds/weed-identification/english-laurel.aspx>

Invasive Herb Robert. (2018). Retrieved from <https://wmswcd.org/species/herb-robert/>

Italian Arum | Watch Species | The City of Portland, Oregon. (2018). Retrieved from <https://www.portlandoregon.gov/bes/article/433196>

Italian Arum – Weed of the Month. (2016). Retrieved from <https://kingcountyweeds.com/2016/03/02/italian-arum-march-2016-weed-of-the-month/>

King County Noxious Weed Alert. (2018). Retrieved from <http://your.kingcounty.gov/dnrp/library/water-and-land/weeds/Brochures/English-Holly-Fact-Sheet.pdf>

Migratory Bird Treaty Act. (2017). Retrieved from <https://www.fws.gov/birds/policies-and-regulations/laws-legislations/migratory-bird-treaty-act.php>

Noxious Weed Identification Photos - King County. (2017). Retrieved from <https://www.kingcounty.gov/services/environment/animals-and-plants/noxious-weeds/weed-identification/.aspx>

ODA Plant Division Noxious Weed Control: Herb Robert. (2009). Retrieved from <http://library.state.or.us/repository/2009/200904271125531/index.pdf>

Oregon Noxious Weed Profiles. (2017). Retrieved from <https://www.oregon.gov/ODA/programs/Weeds/OregonNoxiousWeeds/Pages/AboutOregonWeeds.aspx>

Poison-Hemlock Identification and Control: *Conium maculatum* - King County. (2018). Retrieved from <https://www.kingcounty.gov/services/environment/animals-and-plants/noxious-weeds/weed-identification/poison-hemlock.aspx>

Report: Italian Arum (*Arum italicum*). (2015). Retrieved from <https://oregoninvasiveshotline.org/reports/detail/1583>

Small, F. (2009). Vegetation Management Recommendations for Nadaka Nature Area in Gresham, OR. *Pacific Habitat Services*.

The Ivy Files. (n.d.) Retrieved from <https://www.portlandoregon.gov/parks/article/201781#Ivy%20Removal%20Methods>

The Weed Bulletin. (2004). Retrieved from <http://your.kingcounty.gov/dnrp/library/water-and-land/weeds/BMPs/english-ivy-control.pdf>

Weeds: Control them Before they Control you. (2014). Retrieved from <https://emswcd.org/wp-content/uploads/2014/06/Backyard-WEEDS.pdf>

Laminated Root Rot

Previous Laminated Root Rot surveys at Nadaka

- 2010 - Survey completed by Alan Kanaskie. Forest Pathologist. Oregon Department of Forestry.
- 2018 - Survey completed by Sarah Navarro. Forest Pathologist. Oregon Department of Forestry.

Nomenclature

1. *Phellinus weirii*
2. *Phellinus sulphurascens*
3. *Coniferiporia weirii*

Laminated Root Rot (LRR) has been assigned three different scientific names over time. Originally called *Phellinus weirii*, it was noted in 1954 that two distinct types existed. One type of *Phellinus weirii* affects primarily Douglas-fir (*Pseudotsuga menziesii*) and true firs, while the second type affects primarily western red cedar (*Thuja plicata*) (Hagel 2010; Buckland, Molnar, & Wallis, 1954). Over time, differences in the two forms were documented. These differences include host preference, germinating characteristics, and management methods (Hagel, 2010). In 1994 the two forms of LRR were separated into two distinct species. The Douglas-fir form was changed to *Phellinus sulphurascens* while the western red cedar form remained *Phellinus weirii*. In 2017 the Douglas-fir form of LRR's scientific name was again changed. This time the genus was reclassified to *Coniferiporia* while the species name returned to *weirii*.

The majority of literature concerning the Douglas-fir form of LRR, which is the form that infects Nadaka, uses *Phellinus weirii* as it was published before 1994. Also, as of 2018, internet searches of *Phellinus weirii* will lead to the Douglas-fir form as it is still commonly, although incorrectly, referred to by its original name. When researching *Phellinus weirii*, for the purposes of Nadaka, it should be confirmed that the reading is dealing with the Douglas-fir form and not the western red cedar form. *Phellinus sulphurascens* and *Coniferiporia weirii* should also be noted when conducting future research.

Background and Spread

Fig 14: Laminate decay along annual growth rings of a laminated root rot (*Coniferiporia weirii*) infected Douglas-fir stump at Nadaka.

Laminated Root Rot (LRR) is a fungal infection that affects primarily Douglas-fir (*Pseudotsuga menziesii*), Western hemlock (*Tsuga heterophylla*), and true firs. It should be noted that all conifers can be affected. Advanced LRR causes laminate decay, or separation, of the wood along annual growth lines giving it its common name. LRR is widely found in the Pacific Northwest, Idaho, western Montana, and southern British Columbia. LRR can infect a site for many decades and can pass to multiple generations of trees. For this reason, LRR is considered a disease of the site. There is no cure for LRR.

The spread of LRR occurs underground when a healthy root comes into contact with an infected root. LRR spreads up the root and eventually into the bole of the tree. Infected trees effectively decay from the roots up and lose structural integrity. LRR itself will eventually kill the tree or the tree will succumb to windthrow.

Because of the underground spread, LRR can be hard to detect on the surface. Below the surface, *Ectotrophic mycelium* can be looked for on trees suspected to have LRR. *Ectotrophic mycelium* appears as a white crust on the root. It should be noted that during the 2018 survey for LRR at Nadaka no *Ectotrophic mycelium* was observed at Nadaka. Above ground large crops of small stress-induced cones may be seen a year or two before the tree completely succumbs to LRR (Sturrock and Garbutt, 1994). Other above ground symptoms of LRR may include chlorosis (yellowing) and thinning of the crown of infected trees. However, according to the Oregon Department of Forestry, these symptoms may not be visible until the tree roots are already structurally compromised (Sarah Navarro, personal communication, April 3, 2018). This can result in trees that appear healthy to suddenly fail to windthrow. Sudden failure of Douglas-firs without obvious signs of LRR has been noted in Nadaka.

Management Recommendations

In April 2018 the Oregon Department of Forestry (ODF) conducted a Laminated Root Rot (LRR) survey at Nadaka (see Appendix H). This survey updated the previous LRR survey conducted by ODF in 2010 and expanded LRR infection zones. During the survey three trees were marked for definite removal (see map in Appendix H).

Nadaka is surrounded by neighborhoods and busy streets. Because of Nadaka proximity to structures and roads and the possibility of sudden tree fall of infected trees, the area within 140 feet of the perimeter of the park is considered a management priority to insure public safety. Within the 140 foot perimeter zone two management options have been discussed.

1. Remove trees with active signs of LRR and replace with resistant species. Continue to monitor remaining Douglas-fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), and true firs yearly and remove as LRR signs are found. This is the preferred course of action by Friends of Nadaka.
2. Remove all Douglas-fir, western hemlock, and true fir species within the 140 foot perimeter zone. Replace with LRR resistant species such as ponderosa pine (*Pinus ponderosa*) and western red cedar (*Thuja plicata*). This is the preferred course of action by the City of Gresham and ODF.

Friends of Nadaka will need to discuss the plans above, and any other future tree removal plans, with the City of Gresham's Parks Department and Natural Resource Department.

The interior of the park (within the 140 foot perimeter) is less trafficked with no structures and therefore a lower priority for safety concerns. ODF recommends: 1) cut all susceptible tree species and replant with resistant tree species, or 2) do nothing and let nature take its course (see Appendix H). The second option is preferred by Friends of Nadaka and the Gresham Parks Department at this time. However, trees discovered with signs of LRR should be felled as discovered to mitigate potential injury. Placing signs at the southeast and northwest entrances to the park warning of potential windthrow hazards can help raise awareness of potential dangers. Signs may be especially warranted given Nadaka's location near the Columbia River Gorge and in the path of the east winds.

Yearly LRR surveys are recommended to track disease spread and mark trees with LRR indicators for removal. LRR surveys can be completed by the ODF forest pathologist free of charge. LRR is a disease of the site and will need to be continually managed at Nadaka.

According to ODF, felled tree trunks may be left as habitat but branches should be removed for fire safety, stumps may be left on site for habitat. Removal of trees can create openings leaving other trees susceptible to windthrow. Trees surrounding the removal site should be evaluated for susceptibility to windthrow at the time of felling. Trees found to be susceptible to windthrow should be cut or topped for habitat. Douglas-fir, western hemlock, and true fir seedlings found in or adjacent to known LRR infection zones should be removed to prevent future generational infection.

Migratory Bird Treaty Act (MBTA)

The Migratory Bird Treaty Act (MBTA) is a federal law that, “makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations” (“Migratory Bird Treaty Act”, 2017). In 2014, Pacific Habitat Services Inc. completed the Nadaka Nature Park Nesting Bird Survey (NBS). The NBS looked specifically at six Douglas-fir (*Pseudotsuga menziesii*) trees that were scheduled to be felled due to LRR infection. The NBS found 13 different bird species that fall under the protection of the MBTA (see Appendix I). None of the 13 bird species observed were found nesting in the trees scheduled to be felled.

Similar surveys of trees under consideration to be felled should be completed prior to removal. If a bird species protected under the MBTA is found nesting or displaying nesting behavior, the tree in which it is found should not be felled until after nesting season. Due diligence should be performed by the City of Gresham concerning the specific type of bird found and when it is legal under the MBTA to remove the tree where the nest was observed.

More information about the MBTA, including an updated list of bird species protected under the MBTA, can be found at <https://www.fws.gov/birds/policies-and-regulations/laws-legislations/migratory-bird-treaty-act.php>.

Recommended Laminated Root Rot Resistant Species

Resistant species (Ksnell, 1998):

- Incense cedar (*Calocedrus decurrens*).
- Western red cedar (*Thuja plicata*).
- Willamette Valley ponderosa pine (*Pinus ponderosa*).
- Hard woods such as Big-leaf maple (*Acer macrophyllum*).

Fig. 15: A young western red cedar (*Thuja plicata*) growing in Nadaka.

It is important that susceptibility of tree species to Laminated Root Rot (LRR) is evaluated when selecting plantings at Nadaka to prevent reoccurrence of the disease. While the resistant species listed above are the best recommendations, they may not always be available within the constraints of Nadaka’s resources. In Appendix J, conifer tree species and their susceptibility to LRR are listed. When the resistant species listed above are not feasible, Appendix J serves as a guide for selecting alternative species.

Tree Removal and Replacement Requirements

The City of Gresham tree removal and replacement requirements can be found in the, “City of Gresham Community Development Code, Volume 3”, in Article 9, Section [9.10]-10. This can be accessed at <https://greshamoregon.gov/Development-Code/>

References

Buckland, D., Molnar, A., & Wallis, G. (1954). Yellow Laminated Root Rot of Douglas Fir. *Canadian Journal Of Botany*, 32(1), 69-81. doi: 10.1139/b54-009

Hagle, S. K. (2009). *Laminated root rot ecology and management*. Forest insect and disease management guide for the northern and central Rocky Mountains. USDA Forest Service, Northern Region, State and Private Forestry. (Ch. 11.2, p. 20) Retrieved from http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/99471_FSPLT3_2336694.pdf

Ksnell. (1998). *Forest Disease Management Notes*. Retrieved from <https://www.oregon.gov/ODF/Documents/ForestBenefits/laminatedrootrot.pdf>

Migratory Bird Treaty Act. (2017). Retrieved from <https://www.fws.gov/birds/policies-and-regulations/laws-legislations/migratory-bird-treaty-act.php>

Trails

Overview

Between purchasing Nadaka in 1995 and opening to the public in 2001, the City of Gresham installed a 0.46 mile loop trail within the forested area of Nadaka. The loop trail has a northwest and southeast entrance. It is graveled and roughly 9 feet wide to accommodate service and fire vehicles. The City of Gresham maintains the trail. Originally, the loop trail was intended to be the only trail at Nadaka. Over the years however, many unsanctioned pedestrian-made trails have been created. Unsanctioned trails harm habitat and can contribute to soil erosion. In addition, many unsanctioned trails are used for illicit activities such as drug/alcohol use, littering, and camping. Some unsanctioned trails are well established. A few well-established trails are now part of the fabric of Nadaka. Friends of Nadaka and other relevant organizations are interested in commissioning permanent trails from some of the well-established, unsanctioned trails. This section looks at methods for commissioning wanted trails and decommissioning unwanted trails.

Fig. 16: The loop trail at Nadaka.

Commissioning Trails

There are some pedestrian-made trails within Nadaka that will become permanent trails. Friends of Nadaka, the City of Gresham, and other relevant agencies will need to choose and mark trails to be commissioned. Trails should be surveyed for drainage issues, holes, and exposed root systems before commissioning. Mitigation plans should be put in place to address any issues found. Common trail commissioning practices include mulching trails to define the trail and to stabilize against soil erosion. However, due to Nadakas close proximity to neighboring structures and roads, the City of Gresham has discouraged the use of flammable mulch, such as wood chips, within the forested area of Nadaka. A good alternative mulch is gravel, which is also used on the main loop trail. Gravel will help stabilize the trail and define the trail boundaries. Signs should be placed on the trail heads with a map of the trail and walking distance (see “Signage” section below).

Future Recommendations

- The City of Gresham remains in charge of yearly loop trail maintenance and adds the newly commissioned trails to the maintenance schedule.
- Signs at trail heads with maps and mileage (see “Signage” section below).
- Decorative fencing along trail borders to influence visitors to remain on trail.

Decommissioning Trails

Fig. 17: The entrance to an unsanctioned trail at Nadaka.

Many years of unsanctioned camping, illicit activity, and off trail exploring have created numerous unsanctioned trails and camping sites which need to be decommissioned in Nadaka. Use of the park in unsanctioned areas creates safety concerns, degraded wildlife and vegetation habitat, areas littered with garbage and drug paraphernalia, root damage, and problems with soil erosion. Past attempts to decommission trails at Nadaka have been passive in nature. Placing downed trees and logs, planting ground cover, and lining appropriate trails with large rocks have not been effective. Some reasons for the lack of success include: the small size of the park in a heavily trafficked urban environment, lack of signage and/or fencing signaling that an area is off limits/under development, and visitors moving trail lining rocks. Small plantings along trails being decommissioned are often trampled by people who simply step over or go around placed barriers at trail heads. These actions have resulted in failed trail decommission efforts.

Recommended Actions

Due to the heavy traffic of Nadaka and the well established illicit activities within the park an active decommission plan is recommended. The goal of this plan is to completely blend the decommissioned trail into its surroundings at least as far as the line of sight from the trail head. Decommissioned trails that are not within the line of site can be given a more passive approach. However, given the small size of Nadaka and its established misuse, the active approach is recommended for the entire trail if resources allow.

To fully hide the trails Friends of Nadaka, the City of Gresham, and other relevant organizations should work together to develop a comprehensive trail decommission plan.

Having a well thought out plan specific to Nadaka will be necessary for decommissioning to be successful. If resources allow, it would be beneficial to decommission all unwanted trails and open spaces at the same time. The fall planting season would be the best time to accomplish this as new plantings will have a better chance to survive and the park has fewer visitors. Appropriate signage should be placed in the park during the decommission process to let visitors know that replanting is in progress and to stay on appropriate trails. Informational signs displaying the proposed project and start date can help educate the public about the importance of staying on marked trails. Unsanctioned trails to be maintained should be established, mulched, and appropriate trail head maps added before the decommissioning process begins. A large scale invasive species removal and garbage clean up before trail decommissioning begins is recommended. The pre-decommissioning clean-up period is also a good opportunity to communicate with campers and off trail users about the upcoming project and its importance. Public education is an important step for eliciting cooperation. It may also be beneficial to line sanctioned trails with orange safety fencing or temporary chain link fencing during the first fall/winter season of decommissioning.

Trail Decommissioning Steps

Exact methods of trail decommissioning will be planned by Friends of Nadaka, the City of Gresham, and other relevant organizations. A well thought out decommission plan is necessary for the success of the project. The steps below are a guideline for an active decommissioning plan at Nadaka.

Step 1: Identify and Map. New unsanctioned trails appear in Nadaka yearly while some old unsanctioned trails grow over. Because of this, trails to be decommissioned should be identified and mapped just prior to decommissioning efforts.

Step2: Drainage. Survey trails marked for decommissioning for drainage problems. Because improper drainage along trails is a major cause of soil erosion, trails should be evaluated and drainage issues mitigated before trail decommissioning.

Step 3: Closure. Clearly mark trails to be decommissioned. Downed trees, “replanting in progress” signs, and orange safety fencing can be effective.

Step 4: Scarification. Scarify, or break up, the soil of the trail to be decommissioned. This is especially important on highly compacted trails but may not be necessary if soil is already loose. Scarification helps to aerate the soil and makes it easier for seeds to take hold and roots of plantings to establish. Scarification also helps to blend the trail in with the surrounding ground.

Step 5: Naturalization. The purpose of naturalization is to blend the decommissioned trail into its surroundings effectively hiding it. Naturalization also helps to establish seamless habitat zones. One way to naturalize can include moving irregular rocks onto the trail bed. The Pacific Coast Trail Association Trail Maintenance Education Program (“Course 207”, 2011) suggests digging holes 1/3 the thickness of the rock, placing the rock in the hole, and tamping the soil down around the rock to make it look as though it has always been there. Another way to

naturalize is to spread duff and other debris such as logs and downed trees along the trail bed. Choose materials for naturalization that do not add additional fire hazard.

Step 6: Revegetation. The need to blend decommissioned trails as best as possible at Nadaka warrant an active revegetation approach. This is especially true in areas that are within the line of sight of the trail head. Active revegetation may include collecting shrubs and small trees at Nadaka, purchasing desired shrubs and trees, and reseeding. If available, disguising the trail head with plants that are already dead or not likely to survive can be appropriate. This process is called vertical mulching. However, due to fire hazard vertical mulching should only be implemented during the fall/winter season. Dead debris should be promptly removed in the spring. Disturbed soil can be taken over by invasive species; careful attention to ground cover can help combat invasive species colonization. It is recommended to plant native thorny plants, such as native rose, in the first few feet of the decommissioned trail head. Thorny plants can help prevent visitors from recreating the decommissioned trail. Proper plant species and replanting methods will be developed by Friends of Nadaka, the City of Gresham, and other relevant organizations. A list of onsite and offsite propagation methods and their advantages/disadvantages can be found in Appendix K.

Step 7: Monitoring and Maintenance. Due to the well established misuse in Nadaka it is realistic to expect that unsanctioned trails and campsites will be a continuing issue. Nadaka should be frequently monitored for new unsanctioned trails and campsites. Steps such as signs, orange safety fencing/temporary chain link, and/or downed trees at trail heads should be implemented to help slow the use of unsanctioned trails. Cleaning up, placing temporary “No Camping, Site Monitored” signs, and continued monitoring of new campsites can help discourage use. Given the number of different agencies that work within Nadaka, a record should be created to keep all agencies working together. Friends of Nadaka, the City of Gresham, Neighborhood Enforcement Team (NET), Citizens Volunteering in Policing (CIVP), and other relevant agencies should decide on the best method to create a record. The record should include:

- Where new trails and campsites have been found (Recommend using the “Nadaka Open Space Work Zone Map” in Appendix G).
- Whether trail heads have been, or should be, signed and/or blocked.
- Interactions with campers.
- Activity within the campsites (Fire pits, alcohol containers, drug paraphernalia, etc.).
- Record placement of “No Camping, Site Monitored” signs.
- When the campsites have been monitored.

Decommissioning trails and campsites will be an ongoing process at Nadaka. If resources allow, the decommissioning process should take place yearly. Decommissioning every fall can help Nadaka from becoming overrun with unsanctioned trails and campsites again. Yearly decommissioning may also be cheaper in the long run as each year should be a smaller project than the first decommissioning effort. Also, yearly decommissioning can help update the decommissioning plan by monitoring what has been effective and adapting accordingly. Create a record documenting what has worked and what needs to be refined.

References

Course 207: Trail Decommissioning & Wildland Restoration. (2011). Retrieved from https://www.pcta.org/wp-content/uploads/2012/11/207_Trail_Decommission_v0311.pdf?x65313

Road and Trail Management Plan. (2014). Retrieved from https://www.marincountyparks.org/~media/files/departments/pk/projects/open-space/rtmp-eir/rtmp_chapter5_revised.pdf

Signage

Overview

Park signs are an important aspect of park management. Signs can tell the story of the park, educate visitors, and inform visitors of park rules. Currently, illicit use of Nadaka is a continued issue. Dumping of trash, smoking/drinking, walking/camping in undesignated areas, and off leash pets are some of the common problems facing Nadaka. Signs themselves cannot be expected to completely eradicate misuse.

However, signs educating visitors as to the purpose, goals, and rules of the park can help to create a feeling of community and responsibility. While there are signs in Nadaka, most are educational in nature and located in the nature play area. Park rule signs are located in the southern 2 acres (Nelson property) and are small and hard to read.

A clearer more robust sign presence is needed to help discourage misuse of the park and educate visitors. This section looks at current signs within Nadaka, recommended signs, and the considerations that should be taken when developing a signage plan.

Fig. 18: Park rules sign in the nature play area. Sign is located out of sight line with hard to read small print.

Sign Plan Considerations

A signage plan for Nadaka will be created by Friends of Nadaka, the City of Gresham, Metro, and other relevant agencies. Development of a successful signage plan should take into consideration:

- **Placement.** Proper placement and visibility will increase the effectiveness of signs. Time and care should be given to the placement and number of signs placed. For example, one “no camping” sign placed in the nature play area will be less effective than multiple “no camping” signs placed strategically along the trails where people are more likely to camp.
- **Sign Pollution.** Keep in mind the esthetics of the park. Too many signs can look cluttered and discourage visitors from reading them. On the other hand, too few signs can make it easy for visitors to miss them. Striking a balance must be considered when deciding sign placement.
- **Language.** Nadaka is a multi-cultural park with many languages spoken. Consideration should be taken as to which signs should have multiple languages. Signs expressed in symbols can also help bridge the language barrier. Common languages spoken at Nadaka to consider:
  - Spanish
  - Vietnamese
  - Russian
  - Somali/Arabic

- **Tone.** Signs are the parks voice. When creating a signage plan it is important to consider how you want to speak to the visitor. The tone may vary depending on the seriousness of the sign. For example, it may be appropriate to have a strong tone on a sign to discourage smoking due to fire danger while keeping a friendlier tone when asking visitors to keep their pets on leash.
- **Timing.** Timing of placement should be considered when creating a temporary signage plan.
- **Information.** The amount of information on a sign will depend on the purpose of the sign. Some signs can convey their meaning with a symbol or simple sentence. Other signs, such as some educational signs, may require more text. It is important to not overburden a sign with too much information as this will keep most visitors from reading it. Keep information concise and easy to follow.

All signs will conform to Appendix 6 of the Development Code of the City of Gresham, which can be found at <https://greshamoregon.gov/Sign-Code-Update/>.

Current Signs

Current signs posted at Nadaka include:

- Nadaka Nature Park entrance signs (Located at SW and NE entrances)
- Common Birds of Nadaka Park (Located in the Nelson property)
- Create a Habitat at Home (Located in the Backyard Habitat display)
- Nadaka Nature Park and Garden (Located in the Nelson property)
- Camp Nadaka Kiosk (Located at the SW entrance to the loop trail)
- Please Clean Up After Your Dog (Dogi Pot with baggies located in the Nelson property and the NE entrance of the loop trail)
- Operation Safe Community, Notice of video monitoring (Located in nature play area)
- Slow, Children at Nature Play (Located in nature play area)
- Park Rules (Located in nature play area)

Recommended Permanent Signs

Signs to be placed, the number, and the locations will be determined by Friends of Nadaka, the City of Gresham, and other relevant agencies.

- No Fires
- No Dumping
- No Camping
- No Pets in Play Area
- No Smoking
- No Alcohol
- Laminated Root Rot Warning (High winds/Falling branches)
- Trail Head Markers (With maps and mileage)
- Please Stay on Marked Trails
- Ground Nesting Birds (Best near “Please Stay on Marked Trails” signs)
- Plant labels in backyard habitat and rain garden (To educate and help discourage trampling)
- Kiosk with park rules (see Appendix L) and resources for people experiencing homelessness and/or chemical dependence

Recommended Temporary Signs

- Replanting in Progress
- No Camping/Site Monitored

Maintenance

Signs should be checked for maintenance needs at the beginning of spring, mid-summer, and end of fall. Common maintenance issues to look for are loose or tipped signs, vandalized signs, and overgrown signs. The City of Gresham, in partnership with Friends of Nadaka, are responsible for installation and maintenance of signs.

Illicit Use of Nadaka

Overview

Homeless camping and illicit drug use are complicated issues facing Nadaka. Safety concerns, unsanctioned trails/campsites, and excessive litter (including drug paraphernalia), are all issues that must be addressed at Nadaka. Homelessness on the west coast has been a growing problem for many years. According to the 2017 Point-in-Time Count (“2017 Point in Time Count”, 2017) which is completed nationwide every two years, Multnomah County’s homeless population has increased 9.9% from 2015 to 2017. The average rent on a one bedroom apartment is \$1,100 per month which, since 2015, has grown 20 times faster than the median income in Multnomah County (“2017 Point in Time Count”, 2017). Chemical dependence is also a large problem in Multnomah County. Chemical dependency issues contribute to people experiencing homelessness and increased crime rates. While opioid use remains a problem, it should be noted that, according to the Portland Police Bureau’s Drugs and Vice Division, methamphetamine use has increased sharply in Multnomah County in recent years (“Drugs and Vice Division”, 2015). It is important for workers and volunteers at Nadaka to be aware of increased methamphetamine use. Methamphetamine use is strongly associated with violent criminal behavior and property damage (“Northwest High Intensity”, 2008). It should also be noted that people experiencing homelessness are more likely to be victims of violent criminal acts than the housed population (“Washington State Department of Commerce”, 2016). In fact, violent criminal acts committed against the homeless are estimated to be between 14 to 21%, as compared to a reported 2% in the housed population (Meinbresse, et al., 2014).

Nadakas Stance

Nadaka is a community park that promotes inclusion of all community members including community members experiencing homelessness. Friends of Nadaka and other Nadaka stewards are dedicated to equitable treatment of all patrons.

Current Practices

Nadaka currently utilizes Friends of Nadaka Ambassador Program, Citizens Volunteering In Policing (CVIP), Neighborhood Enforcement Team (NET), and the Gresham Police Department to assist in discouraging/removing camping and substance use.

- **Nadaka Ambassadors** will primarily assist with the community engagement and outreach, helping observe and report activities at the park, and support community events at Nadaka. Some ambassadors will also assist with field-based educational and stewardship programs or assist with information collection about park usage.

Fig. 20: Fire pit at Nadaka.

Ambassadors may also collaborate on weekend community activities and stewardship events. Nadaka Ambassadors report illicit activities to the Nadaka Park Coordinator who then determines appropriate actions to take. Ambassadors should not confront visitors engaging in illicit activities on their own.

- **CVIP** is a group of citizen volunteers who regularly walk Nadaka and locate campsites. CVIP lets campers know that there is no camping in Nadaka and reports when and where campsites were found to Friends of Nadaka. Interactions with campers are encouraged to be polite and respectful. Information on useful resources is given when appropriate.
- **NET** is part of the City of Gresham that handles chronic nuisances within the city limits. NET informs campers, who have not taken down their camp after being asked to by Friends of Nadaka and/or CVIP, that they must remove their camp within 24 hours. If campers do not remove their campsite within 24 hours, NET will remove the site. A camp is defined by NET as a structure with at least 3 sides.
- **The Gresham Police Department** is called when dangerous and/or destructive behavior occurs. Calling the Gresham Police Department is done when visitors', employees', and/or volunteers' safety is perceived to be under threat. The Gresham Police Department should also be contacted when active drug use is observed. The Gresham Police Department advocates for the use of Crime Prevention Through Environmental Design principles to increase safety and reduce hidden areas that can be utilized by campers (see Appendix C).

Recommendations

Recommendations to help curb illicit use of Nadaka:

- **Continue current practices.**
- **Follow guidelines set in the “Vegetation” section of this document where Crime Prevention Through Environmental Design is concerned** (see Appendix C). Cut down large English laurel, English holly, and Himalayan blackberry to increase line of sight. Replant areas with ground cover that does not grow over 2 feet tall (see Appendix E for planting recommendations).
- **Follow guidelines set in the “Trail Commissioning” and “Trail Decommissioning” sections of this document.** Currently, Nadaka has numerous unsanctioned trails and campsites. Clearly defined commissioned trails are necessary to keep visitors in proper areas. Decommissioning new trails and campsites on a yearly basis, along with proper monitoring and maintenance throughout the year, is necessary to discourage illicit use of Nadaka.
- **Follow guideline set in the “Signage” section of this document.** Permanent signs such as “No Camping”, “Trail Head”, “Stay on Marked Trails”, and “No Drugs or Alcohol” signs help visitors understand the rules of Nadaka. Temporary signs such as “Replanting in Progress” and “No Camping/Site Monitored” can all help to discourage illicit use of Nadaka. Creation of a kiosk with Gresham park rules (see Appendix L) and the Community Resource List (“Community Resource List”, 2017) for people

experiencing homelessness and/or other issues should be implemented if resources allow. Check the Community Resource Lists website yearly to check for updates.

- **Garbage can increase.** Improper disposal of trash is a major problem in Nadaka. This is especially true in the wooded 9 acres of Nadaka. Currently there 4 garbage cans. Garbage cans are located at the picnic shelter, the public restroom, the southeast loop trail entrance, and near the Nadaka entrance sign along Northeast Glisan Street. There is one recycling container found by the public restroom. Trash found within the forested area of Nadaka in a 2018 survey include: cigarette butts and discarded packs, needles, used personal hygiene items, discarded camping items, and a full trash bag that had been scavenged by animals. The majority of the trash discovered was located on or around unsanctioned trails and campsites. Given the type and location of the majority of trash found in Nadaka it is logical to conclude that visitors experiencing homelessness and/or addiction are mainly responsible. Trash disposal is a common problem for people experiencing homelessness. Increasing the presence and visibility of trash and recycling receptacles at Nadaka can help reduce improper trash disposal. Placing multiple “animal proof” garbage cans along the loop trail would be ideal; this possibility will need to be discussed with Metro. Proper implementation of trail and campsite decommissioning will also help greatly to reduce the improper disposal of trash. Regularly scheduled cleanup of the forested area is also recommended.
- **Keep resources on hand.** Nadaka is committed to community benefit and enhancement. Individuals with Friends of Nadaka and other agencies routinely engage people experiencing homelessness and other issues. Having updated resources on hand to distribute can give important information to individuals who might not know how to access needed resources. The Multnomah Community Resource List is recommended to be on hand (“Community Resource List”, 2017). It should be noted that the Community Resource List is not always up to date. Check the Community Resource Lists website yearly to look for updated versions. Another resource guide recommended for Nadaka is the annually updated Street Roots Rose City Resource Guide. The Rose City Resource Guide is a free 104 page book that covers homelessness and poverty resources in both Multnomah and Washington counties. It is recommended to pick up a Rose City Resource Guide yearly at:

Street Roots
211 NW Davis St.
Portland, OR 97209-3922
503-228-5657

It is unreasonable to expect that all illicit activities at Nadaka will be abolished. Curbing illicit behavior will be an ongoing task.

Not for Nadaka

Friends of Nadaka currently do not want sharps boxes or needle exchange programs onsite. Information on the locations of these programs can be found in the Community Resource List and the Street Roots Rose City Resource Guide.

References

2017 Point in Time count. (2017). Retrieved from <https://multco.us/multnomah-county/news/2017-point-time-count-more-neighbors-counted-homeless-2015-more-sleeping>

Community Resource List. (2017). Retrieved from www.multco.us/sites/default/files/health/documents/community_resource_list.pdf

Drugs and Vice Division. (2015). Retrieved from <https://www.portlandoregon.gov/police/30560>

Meinbresse, M., Brinkley-Rubinstein, L., Grassetto, A., Benson, J., Hall, C., Hamilton, R., Malott, M., Jenkins, D. (2014). Exploring the Experiences of Violence Among Individuals Who Are Homeless Using a Consumer-Led Approach. *Violence and Victims*, 29(1), 122-136.
doi:10.1891/0886-6708.vv-d-12-00069

Northwest High Intensity Drug Trafficking Area (Program). (2008). Retrieved from <https://www.justice.gov/archive/ndic///pubs27/27505/27505p.pdf>

Washington State Department of Commerce. (2016). Retrieved from <http://www.commerce.wa.gov/wp-content/uploads/2016/12/hau-chg-mythsfacts-12-8-2016.pdf>

Monitoring and Evaluation

Overview

This five year management plan is designed to give Friends of Nadaka, the City of Gresham, and other relevant organizations a guideline to help combat issues facing Nadaka. Successful long-term implementation will require detailed planning and regular communication between relevant agencies. Proper record keeping by all relevant agencies is important for communication and assessment of the success of the plan. This section looks at suggested meeting and recording schedules as well as management plan update recommendations.

Meetings

Planning Meetings

Planning meetings for each topic (i.e. vegetation, illicit use, etc.) should be held before any project is implemented. Beginning a project without proper planning significantly reduces the likelihood of success. All relevant agencies should attend planning meetings. Topics at planning meetings should include but are not limited to:

- **Methods.** Determine specific methods to be implemented for each project.
- **Budget.** Relevant agencies should discuss the budget for each project and determine if additional resources are needed.
- **Assign Tasks.** Determine which agencies are responsible for which aspects of project implementation. Define specific duties/rolls of each agency. A work breakdown structure graph may be helpful for large projects such as a trail decommissioning/signage project.
- **Timeline.** Determine the best time to implement a project. Look at each specific duty assigned and plan when/how often these duties should be performed. If more planning and resources are needed, it might be useful to spend a year or more planning and gathering resources before project implementation.
- **Project Log.** Agencies should determine the best method for keeping a project log (see “Project Log” section below).
- **Follow-up.** Follow-up meetings should be scheduled at this time.

Note that most projects at Nadaka, such as weed removal etc., will be continual. Planning meetings held after the first year of project implementation should discuss the project’s previous year/years. Planning meetings for the second year and beyond should include but are not limited to:

- Evaluate what methods worked and what did not and adjust the plan accordingly.
- Create a new budget appropriate to the current condition of the project.
- Reassign relevant agencies responsibilities and incorporate new agencies if applicable.
- Create a timeline appropriate to current condition of the project.
- Schedule follow-up meetings for the upcoming season.

Follow-up Meetings

Follow-up meetings are necessary to keep a project on track. Follow-up meetings should occur throughout the year during high implementation periods. For most projects at Nadaka a spring/summer/fall follow-up meeting schedule would be appropriate. The number of meetings and when they occur should be determined during the planning meeting by all relevant agencies. Follow-up meetings should review project logs (see “Project Log” section below) and include but are not limited to:

- **Methods.** Discuss the appropriateness of chosen methods. Some methods may be more difficult than anticipated to implement or simply ineffective. Evaluate methodology issues and adjust accordingly.
- **Budget.** Look at the cost of the project, so far, and determine if the original budget is appropriate. Scaling back the project may be necessary to fit resource constraints. Conducting multiple follow-up meetings can help to keep the project within budget.
- **Assign Tasks.** Make sure all agencies are completing their assigned duties within the timeline given. Reassign tasks where appropriate.
- **Timeline.** Evaluate the determined timeline and adjust where needed.
- **Follow-up.** Schedule extra or cancel scheduled follow-up meetings as is appropriate.

Project Log

Keeping a log available to all relevant agencies is important to keep a project on track. At Nadaka most projects will be ongoing. Keeping records of projects as they progress can be a valuable resource for incoming stewards/agencies to keep a continuing project running smoothly. Recording who has done what task when, which methods work or do not, and project changes help all relevant agencies stay on task. A project log also makes refining a project simpler. Project logs should be easily accessible to all relevant agencies to encourage use. A suggested method for projects logs are online logs, such as a spreadsheet on Google Docs. Exact project log form and specifications should be decided by relevant agencies. Project logs should be broken into sections for each relevant agency. Tasks, as well as when they were completed and by whom, should be recorded. Notes about methods effectiveness and any unforeseen issue should be logged.

5 Year Management Plan Update

This management plan is intended to be a 5 year guideline to help Nadaka with current issues and move the park towards its desired future condition. In 2023 this management plan should be updated to evaluate successes and address issues facing Nadaka at that time. Careful planning of projects and detailed record keeping will help inform the future management plan. Friends of Nadaka should keep a management plan record separate from the project records. A management plan record should be an overview of projects and their effectiveness. All projects and their methods should be recorded along with their degree of success. Reasons for the success or failure of a project or method should be recorded. Recording these successes and

failures will help to inform the writer of the subsequent plan. Current practices, as of 2023, should also be included in the management plan log.

The writer of the next management plan in 2023 will be determined by Friends of Nadaka, the City of Gresham, and other relevant agencies.

Appendices

Property Report and Resource Inventory

Created by the City of Gresham Urban Design & Planning Department of Environmental Services

Property Report

Location

Nadaka Nature Park Open Space with the added Nelson Property creates a combined 12 acre site in north central Gresham Oregon, it is located west of 181st Avenue, north of Glisan Road and south of Pacific Street. It is at an elevation of 250 feet in the southeast corner of Township 1N, Range 3E Section 31 in Multnomah County.

Ownership

The Nadaka Nature Park consists of six tax lots (R #s 859205410, 859205810, 859205800, 943311370) from the original 10 acre Nadaka Open Space and two tax lots (R #s 943310160 and 94331050) from the Nelson Property.

Current Land Use Zoning

The 10 acre Nadaka Open Space is zoned Low Density Residential-5 and Transit Low Density Residential which allow single-family dwellings at 8.71 and 20.0 units per acre, respectively. The 2 acre Nelson Property is zoned Corridor Multi-Family which allows attached dwellings at 12 to 24 units per acre.

Resource Inventory

Soil & Hydrology

The soils are classified as # 30A – Multnomah-Urban Land Complex by the USDA. The soil profile depths are silt loam: 0 to 8 inches, silt loam: 8-39 inches and very gravelly sand at a depth of 39 to 60 inches. Drainage class: well drained. Depth to water table: more than 80 inches.

Gresham receives 40 to 50 inches of rainfall a year, with the majority occurring from November to May. December is typically the rainiest month.

The Nadaka Nature Park Open Space and added Nelson Property are located within the Columbia Slough Watershed.

Appendix B

Organizations that Steward and Contribute to Nadaka Nature Park:

Audubon Society of Portland	Neighborhood Enforcement Team (NET)
Backyard Habitat Certification Program	North Gresham Neighborhood Association
City of Gresham	Northwest Family Services
Columbia Slough Watershed Council	Oregon Department of Forestry
Cub Scout Pack 214	Oregon Parks & Recreation Department
CVIP (Citizens Volunteering in Policing)	Outgrow Hunger
Friends of Nadaka	Rockwood Neighborhood Association
East Multnomah Soil & Water Conservation District	Rockwood Library
Eastrose Unitarian Universalist Church	Rosemary Anderson High School
Gresham Police Department	St. Aidan's Episcopal Church
HB Lee Middle School SUN Program	T. A. Nelson Family Estate
Metro	Trash for Peace/Home Forward
Meyer Memorial Trust	Trust for Public Land
National Resource Department	Wallace Medical Concern
	Wilkes Neighborhood Association

Crime Prevention Through Environmental Design (CPTED)

According to the International CPTED Association (2018), “Crime Prevention Through Environmental Design (CPTED) is defined as a multi-disciplinary approach, deterring criminal behavior through environmental design. CPTED strategies rely upon the ability to influence offender decisions that precede criminal acts by affecting the built, social and administrative environment.”

The Gresham Police Department has asked Nadaka to follow CPTED principles when possible. Specific principles Nadaka has been asked to follow are

1. Ground cover plantings (especially within forested area) **should not grow over 2 feet tall** to create a clear line of sight.
2. Tree and shrub plantings (especially within forested area) **should be trimmed up 6 feet** to create a clear line of sight.

Large, overgrown areas of invasive/noxious species should be cleared and restored with native plantings. Care should be taken to ensure that native plantings follow CPTED principles.

Below are CPTED principles for parks, open spaces, and playgrounds compiled by the National Crime Prevention Councils Crime Prevention Through Environmental Design Guidebook, (2003):

NATURAL SURVEILLANCE AND SIGHT LINES

Small parks or play areas should be clearly visible from adjacent streets

Small parks or the edges of larger parks should preferably be visible by housing or commercial developments.

Where practical walkways should have clear sight lines, especially where they curve or change grade.

ENTRAPMENT AREAS

Entrapment areas are hidden or out of sight areas where a person or persons can be taken and/or held against their will. Entrapment areas close to pathways through park design should be avoided

Pathways may have a border of low-lying vegetation or high-branching vegetation, as opposed to other types of trees and bushes that can easily create entrapment areas and reduced sight lines.

Multiple entry and exit points should be provided in parks or playgrounds.

CLUSTERING AND PROGRAMMING FOR A RANGE OF ACTIVITIES

To increase use and natural surveillance, activity areas may be clustered or programmed for a range of activities. Some examples of leisure activities include community services, cafes, snack bars, community gardens, gardening centers, childcare, adult and senior health programs and traveling libraries.

Parks and open spaces should be planned and programmed for a range of activities even if they are intended for passive use.

Space for street activities and supervised washrooms are some of the amenities that the public might appreciate.

LOCATION OF ACTIVITY GENERATORS

Park design should allow for the incorporation of activity generators such as food kiosks, information centers of special events.

Activity generators facing the park such as outdoor cafes and restaurants should be encouraged to attract users.

Activities should be located either along the edge of parks close to vehicular traffic or gathered together along pedestrian walkways.

To avoid isolation, some benches, fitness trails, tennis or basketball courts and bicycle paths in parks could be located adjacent to the perimeter of parks or along through-roads or combining them with the most used pedestrian paths.

For trails leading to dense vegetation, adequate warning signs should indicate that these trails lead users into isolated areas and suggest alternate routes.

Washrooms should be near children's playgrounds.

Food kiosks may be located near playgrounds where they are visible.

NIGHT TIME USE

The planning and design of the parks should take into account the possibility of night time use such as night tennis or evening walks. Such areas of the parks must be highly visible, properly lit and away from entrapment areas.

SIGNS AND INFORMATION

Signs should clearly indicate, using words, symbols and maps, the location of telephones, washrooms, isolated trails, less isolated alternative routes and any places where people are likely to be at most times while the park is open.

Signs should be located at decision points, such as the intersection of two major paths or the entrance to the park.

Signs should indicate where and how help can be found and where maintenance problems and cases of vandalism can be reported.

The hours of operation should also be posted. Parks and open spaces should be signed for emergency telephone or panic alarm.

LIGHTING

Lighting along paths and areas intended for night use should be provided at the same level as streets.

Appendix C

A clear demarcation in terms of lighting levels should be introduced to differentiate areas that are not likely to be used at night from areas where there is likely to have activities.

Landscaping elements should be chosen and maintained so that they do not block light.

If the parks and open spaces are intended for night use, the paths and potential entrapment areas should be lit at pedestrian scale to street lighting level.

FORMAL SURVEILLANCE

In large parks, formal surveillance should be considered either by police, park attendants, or community organized patrols.

Conducting safety audits should help identify safety and security concerns.

Park attendants or organized patrols should know how to respond to emergencies.

OPTIMISATION AND LINKAGES

Parks and open spaces should be improved to provide access to and from populated areas in order to increase the use of the park system.

Parks and open spaces should complement and be integrated with the sidewalk system to develop an open space and pedestrian network that attract more people.

MAINTENANCE

Parks and open spaces should be well maintained. Removing litter and graffiti and replacing vandalized or burned out bulbs should be a priority.

References

Crime Prevention Through Environmental Design Guidebook. (2003). Retrieved from <http://www.popcenter.org/tools/cpted/PDFs/NCPC.pdf>

International CPTED Association. (2018). Retrieved from <http://cpted.net/>

Known Plant Species in Nadaka Nature Park

Scientific Name	Common Name	Native/Introduced	Plant Community¹
Trees			
<i>Abies grandis</i>	Grand fir	N	FO
<i>Acer macrophyllum</i>	Bigleaf maple	N	FO
<i>Alnus rubra</i>	Red alder	N	FO
<i>Calocedrus decurrens</i>	Incense cedar	N	FO
<i>Cornus Kousa x nuttallii</i> (Hybrid)	Venus dogwood	N/I	GR
<i>Cornus nuttallii</i>	Pacific dogwood	N	FO
<i>Liriodendron tulipifera</i>	Tulip tree	I	FO/GR
<i>Pinus ponderosa</i>	Ponderosa pine	N	FO/GR
<i>Prunus avium</i>	Sweet cherry	I	FO
<i>Prunus emarginata</i>	Bitter cherry	N	FO
<i>Prunus virginiana</i>	Chokecherry	I	FO/GR
<i>Pseudotsuga menziesii</i>	Douglas-fir	N	FO
<i>Quercus</i> spp.	Oak	N/I	FO/GR
<i>Rhamnus purshiana</i>	Cascara	N	FO/GR
<i>Salix scouleriana</i>	Scouler's willow	N	FO
<i>Tsuga heterophylla</i>	Western hemlock	N	FO
<i>Thuja plicata</i>	Western red cedar	N	FO
Shrubs			
<i>Acer circinatum</i>	Vine maple	N	FO
<i>Arctostaphylos uva-ursi</i>	Kinnikinnik	N	FO/GR
<i>Amelanchier alnifolia</i>	Serviceberry	N	FO
<i>Barberis aquifolium</i>	Tall Oregon grape	N	FO
<i>Berberis nervosa</i>	Cascade Oregon grape	N	FO
<i>Ceanothus</i> spp.	California lilac/Wild lilac/Soap bush	N	GR
<i>Clematis vitalba</i>	Old man's beard (Travelers joy)	I**	FO
<i>Conium maculatum</i>	Poison-hemlock	I**	GR
<i>Corylus cornuta</i>	California hazel	N	FO
<i>Crataegus monogyna</i>	English hawthorn	I	FO
<i>Gaultheria shallon</i>	Salal	N	FO
<i>Hedera helix</i>	English ivy	I**	FO
<i>Holodiscus discolor</i>	Ocean spray	N	FO
<i>Ilex aquifolium</i>	English holly	I**	FO
<i>Ipomoea</i> spp.	Morning glory	I	FO/GR
<i>Oemleria cerasiformis</i>	Osoberry/Indian plum	N	FO
<i>Physocarpus capitatus</i>	Pacific ninebark	N	FO
<i>Prostanthera cuneata</i>	Alpine mint	I	FO

Appendix D

<i>Prunus laurocerasus</i>	English laurel or English cherry	I**	FO
<i>Prunus spp.</i>	Plum	?	FO
<i>Ribes divaricatum</i> *	Gooseberry	N	FO
<i>Ribes sanguineum</i>	Red flowering currant	N	FO
<i>Rosa gymnocarpa</i>	Baldhip rose	N	FO
<i>Rosa nutkana</i>	Nootka rose	N	FO/GR
<i>Rubus armeniacus</i>	Himalayan blackberry	I**	FO
<i>Rubus leucodermis</i>	Blackcap raspberry	N	FO
<i>Rubus parviflorus</i>	Thimbleberry	N	FO
<i>Rubus ursinus</i>	California dewberry	N	FO
<i>Sambucus racemosa</i>	Red elderberry	N	FO
<i>Solanum dulcamera</i>	Bitter sweet night shade	I	FO
<i>Spiraea alpine</i>	Alpine spirea	I	GR (RG)
<i>Symphoricarpos albus</i>	Snowberry	N	FO
Forbs			
<i>Achillea millefolium</i>	Yarrow	N	GR/FO
<i>Arum italicum</i>	Italian arum	I**	FO
<i>Asarum caudatum</i>	Wild ginger	N	FO
<i>Aster subspicatus</i>	Douglas aster	N	GR (RG)
<i>Barbarea vulgaris</i>	Winter cress	I	FO
<i>Bellis perennis</i>	English daisy	I	GR
<i>Cardamine oligosperma</i>	Little western bittercress	N	FO/GR
<i>Dicentra formosa</i>	Bleeding heart	N	FO
<i>Draba verna</i> *	Spring whitlow grass	N	FO/GR
<i>Eriophyllum lanatum</i>	Oregon sunshine	N	GR (RG)
<i>Ficaria verna</i>	Lesser celandine	I**	FO/GR
<i>Fragaria chiloensis</i>	Beach strawberry	N	GR
<i>Galium aperine</i>	Cleavers/stickyweed	N	FO/GR
<i>Geranium lucidum</i>	shiny-leaf geranium	I	FO/GR
<i>Geranium robertianum</i>	Herb Robert	I**	FO
<i>Hypochaeris radicata</i> *	Spotted catsear	I	GR
<i>Iris tenax</i>	Oregon iris	N	GR
<i>Lactuca muralis</i>	Wall lettuce	I	FO
<i>Lapsana communis</i>	Nipplewort	I	FO
<i>Lupines polyphyllus</i>	Large leaf lupine	N	GR
<i>Oxalis oregana</i>	Wood-sorrel	N	FO
<i>Plantago lanceolata</i> *	English plantain	I	GR
<i>Plantago major</i> *	Broadleaf plantain	I	GR
<i>Polypodium glycyrrhiza</i>	Licorice fern	N	FO
<i>Polystichum munitum</i>	Sword fern	N	FO
<i>Pteridium aquilinum</i>	Bracken fern	N	FO
<i>Rumex obtusifolius</i>	Bitter dock	N	FO/GR
<i>Stellaria media</i>	Common chickweed	I	GR

Appendix D

<i>Taraxacum officinale</i>	Dandelion	I	FO/GR
<i>Tellima grandiflora</i>	Fringecup	N	FO
<i>Trifolium repens</i>	White clover	I	GR
<i>Trillium ovatum</i>	Pacific trillium	N	FO
<i>Vancouveria hexandra</i>	Inside-out flower	N	FO
<i>Vicia spp.</i>	Vetch	I	GR
Graminoids			
<i>Agrostis capillaries</i> *	Colonial bentgrass	I	GR
<i>Bromus spp.</i> *	Bromes	N/I	FO/GR
<i>Carex hendersonii</i>	Hendersons sedge	N	FO
<i>Carex obnupta</i>	Slough sedge	N	GR (RG)
<i>Dactylis glomerata</i> *	Orchardgrass	I	GR
<i>Festuca subulata</i>	Bearded fescue	N	FO
<i>Holcus lanatus</i> *	Common velvetgrass	I	GR
<i>Juncus ensifolius</i>	Dagger-leaf rush	N	GR (RG)

*Not found in 2018 survey but noted in 2009 survey completed by Pacific Habitat Services Ltd.

**Noxious species: control efforts warranted

¹Native (**N**) or Introduced (**I**)

²Plant community:

FO = Upland mixed conifer-broadleaf forest

GR = Grass lawn/forest fringe

RG = Rain garden

Where to Order Plants for Nadaka

1. Champoeg Nursery-<http://champoegnursery.com>
2. Skipper and Jordan in Gresham- (503) 663-1125
  - a. Non-profits receive a 10% discount of potted plants (Not bare root)
3. Schools Valley Native Nursery LLC- 503-624-1766
4. Bosky Dale

Native Species Plant Restoration List

Below is a list of native plant species recommended for Nadaka by the City of Gresham Urban Design & Planning Department of Environmental Services (Nadaka Nature Park Vegetation Management Plan, 2010). Height and width has been added as reported by the East Multnomah Soil and Water Conservation District (EMSWCD, 2013) unless otherwise noted. Plantings less than 2 feet maximum height are recommended for forest understory to comply with the Crime Prevention Through Environmental Design guidelines (see Appendix C).

Scientific Name	Common Name	Maximum Height (ft)	Maximum Width (ft)
Maximum Height 4 ft			
<i>Achillea millefolium</i> *	Yarrow	3	Not given
<i>Aquilegia formosa</i>	Red columbine	3	1-2
<i>Arctostaphylos uva-ursi</i>	Kinnikinnik	< 1	2 -15
<i>Asacum caudatum</i>	Wild ginger	< 1	3
<i>Athyrium filix-femina</i>	Lady fern	4	2
<i>Berberis nervosa</i>	Cascade Oregon grape	1-2	Not given
<i>Blechnum spicant</i>	Deer fern	1-3	2
<i>Cornus stolonifera</i>	Bunchberry Dogwood	< 1	Not given
<i>Delphinium menziesii</i>	Menzies' Larkspur	4	2
<i>Dicentra formosa</i>	Pacific bleedingheart	1-1.5	1.5-2
<i>Fragaria vesca</i>	Wood strawberry	< 1	1
<i>Oxalis oregano</i>	Oxalis/Redwood sorrel	< 1	2-3
<i>Polystichum munitum</i>	Sword fern	4	2-4
<i>Viola glabella</i>	Wood violet	< 1	0.5-1
Maximum Height 4-10 ft			
<i>Berberis aquifolium</i>	Tall Oregon grape	5-8	Not given
<i>Gaultheria shallon</i>	Salal	1-5	1-5
<i>Holodiscus discolor</i>	Oceanspray	8-10	3-7
<i>Lonicera involucrata</i>	Twinberry	8-10	4-10
<i>Philadelphus lewisii</i>	Western mock orange	6-10	4-10
<i>Ribes sanguineum</i>	Red flowering current	4-10	3-10
<i>Rosa gymnocarpa</i>	Baldhip rose	5	3-5
<i>Rubus parviflorus</i>	Thimbleberry	4-6	3-6
<i>Spiraea douglasii</i>	Douglas spiraea	6	3-7
<i>Symphoricarpus albus</i>	Snowberry	3-6	2-4
<i>Vaccinium parvifolium</i>	Red huckleberry	4-8	3-6
Maximum Height 10-30 ft			
<i>Acer circinatum</i>	Vine maple	20-25	15-20
<i>Amelanchier alnifolia</i>	Serviceberry	15-30	10-20

Appendix E

<i>Osmarinia cerasiformis</i>	Oso berry/Indian plum	15	5-10
<i>Rhamnus purshiana</i>	Cascara	30	20
<i>Sambucus cerulea</i>	Blue elderberry	10-25	18
<i>Sambucus racemosa</i>	Red elderberry	10-20	6-10
Maximum Height > 30 ft			
<i>Acer macrophyllum</i>	Big leaf maple	90	70
<i>Cornus nuttallii</i> *	Pacific dogwood	50	Not given
<i>Crataegus douglasii</i>	Black hawthorn	20-40	6-10
<i>Pinus ponderosa</i>	Ponderosa pine	50+	60-30
<i>Prunus emarginata</i>	Bitter cherry	6-45	Not given
<i>Thuja plicata</i>	Western red cedar	100-200	30

*Height reported by the United States Department of Agriculture (USDA).

The list above is a guideline given by the City of Gresham. Other native species and some non-native species may also be appropriate for Nadaka. The known vegetation list in Appendix D may also provide useful planting suggestions. Research into light/water needs and invasive potential should be performed before planting.

References

City of Gresham Urban Design & Planning Department of Environmental Services. (2010). *Nadaka Nature Park Vegetation Management Plan* (p. Appendix G).

East Multnomah Soil and Water Conservation District Native Plants. (2013). Retrieved from <http://emswcd.org>

United States Department of Agriculture Natural Resources Conservation Service. (2018). Retrieved from <https://plants.sc.egov.usda.gov/java/>

Meadow Restoration Recommendations

Recommendations for replanting meadow area in Nadaka created by the City of Gresham Urban Design & Planning Department of Environmental Services (Excerpt from “Nadaka Nature Park Vegetation Management Plan” 2010):

Native bunch grasses grow in open “clumps” rather than as a dense groundcover, allowing room for native wildflowers to grow in-between the sections of groundcover. Some appropriate Willamette Valley species suitable for Nadaka and the Nelson property include Red Fescue (*Festuca rubra*), Idaho Fescue (*Festuca idahoensis*), California Oatgrass (*Danthonia californica*), and Blue Wild Rye (*Elymus glaucus*). There is a wide selection of species of wildflowers appropriate to plant in a meadow. Weeding of exotics and selective removal of any natives not desired in this location would replace mowing.

List of appropriate plantings for meadow area (City of Gresham, 2010):

<i>Achillea millefolium</i> – White yarrow	<i>Gillia capitata</i> – Globe gillia
<i>Camassia leichtlinii</i> – Leichtlin’s camas	<i>Iris tenax</i> – Oregon iris
<i>Danthonia californica</i> – California oatgrass	<i>Lupinus albicaulis</i> – Sickle-keel lupine
<i>Dodecatheon hendersonii</i> – Shooting star	<i>Potentilla gracilis</i> – Slender cinquefoil
<i>Elymus glaucus</i> – Blue wildrye	<i>Prunella vulgaris</i> – Heal-all
<i>Festuca idahoensis</i> – Idaho fescue	<i>Sedum oreganum</i> – Oregon stonecrop
<i>Festuca rubra</i> – Red fescue	<i>Solidago canadensis</i> – Canadian goldenrod
<i>Fragaria chiloensis</i> – Coastal Strawberry	<i>Viola nuttallii</i> – Yellow violet

References

City of Gresham Urban Design & Planning Department of Environmental Services. (2010). *Nadaka Nature Park Vegetation Management Plan* (p. 11 and Appendix G).

Nadaka Open Space Work Zone Map.

The "Nadaka Open Space Work Zone Map" was created for the "Nadaka Nature Park Vegetation Management Plan" by the City of Gresham Urban Design & Planning Department of Environmental Services, 2010. Modified 2018.

○ = Area of overgrown English laurel (*Prunus laurocerasus*) and English holly (*Ilex aquifolium*).
Recommended for restoration.

*Grids M, N, and O have been split into two sections due to open meadow space in the center.

Percent Coverage of Invasive/Noxious Species of Concern

Invasive and Noxious Species of Concern

<u>Scientific Name</u>	<u>Common Name</u>
<i>Clematis vitalba</i>	Traveler's joy or Old man's beard
<i>Geranium robertianum</i>	Herb Robert
<i>Hedera helix</i>	English ivy
<i>Ilex aquifolium</i>	English holly
<i>Prunus laurocerasus</i>	English laurel
<i>Rubus armeniacus</i>	Himalayan blackberry

Percent Coverage and Square Footage of Invasive and Noxious Species

Organized in "Nadaka Open Space Work Zone Map" (grids A through P)

Each grid measures 165 by 165 feet or 27,225 square feet. Total square feet of surveyed area is 435,600

Square foot coverage has been rounded to the nearest whole number for clarity

Surveyed May 27 and June 3, 2018

Grid A			
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u>	<u>Square Foot Coverage (ft²)</u>
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0*	0*
<i>Geranium robertianum</i>	Herb Robert	45	12,251
<i>Hedera helix</i>	English ivy	15	4,084
<i>Ilex aquifolium</i>	English holly	5	1,361
<i>Prunus laurocerasus</i>	English laurel	8	2,178
<i>Rubus armeniacus</i>	Himalayan blackberry	3	817

*Clematis vitalba (Traveler's joy/Old man's beard) is commonly found along the north edge of grid A. Weeding efforts took place the week before survey. Area should be monitored.

Appendix G

Grid B			
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u>	<u>Square Foot Coverage (ft²)</u>
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0*	0*
<i>Geranium robertianum</i>	Herb Robert	50	13,613
<i>Hedera helix</i>	English ivy	10	2,723
<i>Ilex aquifolium</i>	English holly	1	272
<i>Prunus laurocerasus</i>	English laurel	1	272
<i>Rubus armeniacus</i>	Himalayan blackberry	1	272

*Clematis vitalba (Traveler's joy/Old man's beard) is commonly found along the north edge of grid B. Weeding efforts took place the week before survey. Area should be monitored.

Grid C			
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u>	<u>Square Foot Coverage (ft²)</u>
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0*	0*
<i>Geranium robertianum</i>	Herb Robert	55	14,974
<i>Hedera helix</i>	English ivy	10	2,723
<i>Ilex aquifolium</i>	English holly	<1	191**
<i>Prunus laurocerasus</i>	English laurel	<1	191**
<i>Rubus armeniacus</i>	Himalayan blackberry	<1	191**

*Clematis vitalba (Traveler's joy/Old man's beard) is commonly found along the north edge of grid C. Weeding efforts took place the week before survey. Area should be monitored.

**Percent coverage of <1% measured at 0.7% for square foot coverage.

Grid D			
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u>	<u>Square Foot Coverage (ft²)</u>
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0*	0*
<i>Geranium robertianum</i>	Herb Robert	57	15,518
<i>Hedera helix</i>	English ivy	15	4,084
<i>Ilex aquifolium</i>	English holly	<1	191**
<i>Prunus laurocerasus</i>	English laurel	<1	191**
<i>Rubus armeniacus</i>	Himalayan blackberry	<1	191**

*Clematis vitalba (Traveler's joy/Old man's beard) has not been found along the north edge of grid D. However, given *Clematis vitalba* has been found along the north edge of grids A through C, the north edge of grid D should be monitored.

**Percent coverage of <1% measured at 0.7% for square foot coverage.

Appendix G

Grid E			
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u>	<u>Square Foot Coverage (ft²)</u>
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0	0
<i>Geranium robertianum</i>	Herb Robert	25	6,806
<i>Hedera helix</i>	English ivy	20	5,445
<i>Ilex aquifolium</i>	English holly	10	2,723
<i>Prunus laurocerasus</i>	English laurel	10	2,723
<i>Rubus armeniacus</i>	Himalayan blackberry	<1	191*

*Percent coverage of <1% measured at 0.7% for square foot coverage.

Grid F			
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u>	<u>Square Foot Coverage (ft²)</u>
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0	0
<i>Geranium robertianum</i>	Herb Robert	35	9,529
<i>Hedera helix</i>	English ivy	20	5,445
<i>Ilex aquifolium</i>	English holly	5	1,361
<i>Prunus laurocerasus</i>	English laurel	5	1,361
<i>Rubus armeniacus</i>	Himalayan blackberry	7	1,906

Grid G			
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u>	<u>Square Foot Coverage (ft²)</u>
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0	0
<i>Geranium robertianum</i>	Herb Robert	35	9,529
<i>Hedera helix</i>	English ivy	35	9,529
<i>Ilex aquifolium</i>	English holly	10*	2,723*
<i>Prunus laurocerasus</i>	English laurel	15*	4,084*
<i>Rubus armeniacus</i>	Himalayan blackberry	3	817

*Large, dense patch of *Prunus laurocerasus* (English laurel) and *Ilex aquifolium* (English holly) found between grids G and K at the east side of the loop trail. See "Nadaka Open Space Work Zone Map".

Appendix G

Grid H			
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u>	<u>Square Foot Coverage (ft²)</u>
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0	0
<i>Geranium robertianum</i>	Herb Robert	55	14,974
<i>Hedera helix</i>	English ivy	15	4,084
<i>Ilex aquifolium</i>	English holly	10	2,723
<i>Prunus laurocerasus</i>	English laurel	20	5,445
<i>Rubus armeniacus</i>	Himalayan blackberry	7	1,906

Grid I			
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u>	<u>Square Foot Coverage (ft²)</u>
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0	0
<i>Geranium robertianum</i>	Herb Robert	10	2,723
<i>Hedera helix</i>	English ivy	40	10,890
<i>Ilex aquifolium</i>	English holly	3	817
<i>Prunus laurocerasus</i>	English laurel	15	4,084
<i>Rubus armeniacus</i>	Himalayan blackberry	22	5,990

Grid J			
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u>	<u>Square Foot Coverage (ft²)</u>
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0	0
<i>Geranium robertianum</i>	Herb Robert	35	9,529
<i>Hedera helix</i>	English ivy	35	9,529
<i>Ilex aquifolium</i>	English holly	3	817
<i>Prunus laurocerasus</i>	English laurel	10	2,723
<i>Rubus armeniacus</i>	Himalayan blackberry	35	9,529

Appendix G

Grid K			
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u>	<u>Square Foot Coverage (ft²)</u>
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0	0
<i>Geranium robertianum</i>	Herb Robert	55	14,974
<i>Hedera helix</i>	English ivy	15	4,084
<i>Ilex aquifolium</i>	English holly	10	2,723
<i>Prunus laurocerasus</i>	English laurel	20	5,445
<i>Rubus armeniacus</i>	Himalayan blackberry	7	1,906

*Large, dense patch of *Prunus laurocerasus* (English laurel) and *Ilex aquifolium* (English holly) found between grids G and K at the east side of the loop trail. See "Nadaka Open Space Work Zone Map".

Grid L			
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u>	<u>Square Foot Coverage (ft²)</u>
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0	0
<i>Geranium robertianum</i>	Herb Robert	45	12,251
<i>Hedera helix</i>	English ivy	70	19,058
<i>Ilex aquifolium</i>	English holly	2	545
<i>Prunus laurocerasus</i>	English laurel	7	1,906
<i>Rubus armeniacus</i>	Himalayan blackberry	25	6,806

Grid M					
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)*</u>			<u>Square Foot Coverage (ft²)</u>
		Section 1	Section 2	Total	Total
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0	0**	0	0
<i>Geranium robertianum</i>	Herb Robert	35	3	19	5,173
<i>Hedera helix</i>	English ivy	3	60	31.5	8,576
<i>Ilex aquifolium</i>	English holly	3	3	3	817
<i>Prunus laurocerasus</i>	English laurel	1	3	2	545
<i>Rubus armeniacus</i>	Himalayan blackberry	55	55	55	14,974

*Grid M was split into 2 sections due to large mowed area in the center. Section 1 = southern half, Section 2 = northern half (See "Nadaka Open Space Work Zone Map").

**No *Clematis vitalba* (Traveler's joy/Old man's beard) found during survey. However a small amount of *Clematis vitalba* was observed during walkthrough in early May. Area should be monitored.

Appendix G

Grid N					
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u> *			<u>Square Foot Coverage (ft²)</u>
		Section 1	Section 2	Total	Total
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0	0	0	0
<i>Geranium robertianum</i>	Herb Robert	1	3	2	545
<i>Hedera helix</i>	English ivy	10	60	35	9,529
<i>Ilex aquifolium</i>	English holly	1	1	1	272
<i>Prunus laurocerasus</i>	English laurel	0	7	3.5	953
<i>Rubus armeniacus</i>	Himalayan blackberry	20	30	25	6,806

*Grid N was split into 2 sections due to large mowed area in the center. Section 1 = southern half, Section 2 = northern half (See Map).

Grid O					
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u> *			<u>Square Foot Coverage (ft²)</u>
		Section 1	Section 2	Total	Total
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0	0	0	0
<i>Geranium robertianum</i>	Herb Robert	50	5	27.5	7,487
<i>Hedera helix</i>	English ivy	7	3	5	1,361
<i>Ilex aquifolium</i>	English holly	0	1	0.5	136
<i>Prunus laurocerasus</i>	English laurel	0	1	0.5	136
<i>Rubus armeniacus</i>	Himalayan blackberry	1	5	3	817

*Grid O was split into 2 sections due to large mowed area in the center. Section 1 = southern half, Section 2 = northern half (See Map).

Grid P			
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u>	<u>Square Foot Coverage (ft²)</u>
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0	0
<i>Geranium robertianum</i>	Herb Robert	45	12,251
<i>Hedera helix</i>	English ivy	65	17,696
<i>Ilex aquifolium</i>	English holly	3	817
<i>Prunus laurocerasus</i>	English laurel	7	1,906
<i>Rubus armeniacus</i>	Himalayan blackberry	20	5,445

Appendix G

Total (Grids A through P)			
<u>Scientific Name</u>	<u>Common Name</u>	<u>Percent Coverage (%)</u>	<u>Square Foot Coverage (ft²)</u>
<i>Clematis vitalba</i>	Traveler's joy/Old man's beard	0*	0*
<i>Geranium robertianum</i>	Herb Robert	37.2	162,125
<i>Hedera helix</i>	English ivy	27.3	118,837
<i>Ilex aquifolium</i>	English holly	4.2	18,486
<i>Prunus laurocerasus</i>	English laurel	7.8	34,140
<i>Rubus armeniacus</i>	Himalayan blackberry	13.4	58,561

* *Clematis vitalba* (Traveler's joy/Old man's beard) is commonly found along the north edge of grids A, B, and C. Weeding efforts took place the week before survey. Areas should be monitored.

Oregon

Kate Brown, Governor

Department of Forestry

State Forester's Office

2600 State Street

Salem, OR 97310-1336

503-945-7200

FAX 503-945-7212

<http://www.odf.state.or.us>

"STEWARDSHIP IN FORESTRY"

Andrea Hurzeler
Friends of Nadaka
Nadaka Nature Park
17615 NE Glisan St
Gresham, OR

April 5, 2018

Dear

Andrea;

On April 3, 2018, we completed a root disease survey of the 10-acre Nadaka Nature Park in the City of Gresham. We determined presence or absence of laminated root rot (LRR) by looking for above-ground symptoms and examining roots of standing or fallen trees and cut stumps for disease indicators. We marked standing trees with oblong aluminum numbered tags nailed at ground level on the north side of the trees. We did not tag fallen trees or cut stumps that we examined due to future decay of the wood. A list of infected trees and stumps and their GPS coordinates appears in Table I. GPS accuracy usually was +/- 10-15 feet.

Laminated root rot caused by *Coniferiporia weirii* (previously *Phellinus weirii*), causes decay and death of anchoring roots. Destruction of roots reduces tree vitality, slows growth, and ultimately leads to tree death or tree failure (falling over). LRR causes symptoms such as reduced terminal leader growth, sparse foliage, and abnormal yellowing of foliage. Unfortunately, these symptoms may not be noticeable until 50 percent of the root system has been destroyed. This is of particular importance because an infected tree may already have a high failure potential before crown symptoms are apparent. Infected trees may die standing or they may fall while the crown (foliage and branches still appears healthy. For this reason we spent considerable time excavating roots for indicators of disease in trees that appeared healthy above ground.

LRR occurs in several patches in the park (map attached). The location of disease patches is approximate because they are based on hand-held GPS data and sketch mapping. We used the GPS coordinates from the original survey to locate the originally marked trees and newly infected trees. In only a few instances the 2010 LRR trees were not found, however in most cases the small aluminum tags were not located. Since the last survey the disease patches have expanded. The disease has recently killed a few trees and has contributed to wind-throw of numerous large trees. Some infected trees have been removed by past cutting and are noted as a cut stump in Table I.

Appendix H

Many Douglas-fir in the park are quite large, with trunk diameters of 20 to 30 inches at breast height. Most of the large diameter trees are 110-140 feet tall. The tallest tree appears to be approximately 154 feet.

Because LRR is present in trees that could reach surrounding houses or roads if they fell, actions to mitigate this danger are warranted. It appeared that after the last survey Alan Kanaskie's recommendation of removal of Douglas-fir along the north and west sides of the park was followed. I recommend removal of Douglas-fir and true fir in the disease patches that are within 140 feet of the park boundary on the side of the park, these trees were tagged during our survey. The precise location of the cutting boundary should be determined during the falling operation by instructing fallers to ensure that the last trees cut along the patch perimeter are free of LRR indicators (characteristic stain or decay).

In the park interior there is less urgency to cut infected trees because there are no structures or highway traffic, just dispersed pedestrian use. Between 2010 and 2018, many of the Douglas-fir in this area have either fallen over or been cut. With the remaining firs in this area there are at least two good options: 1) cut all Douglas-fir and other susceptible hosts in the disease patches as described for the perimeter area (above), and; 2) do nothing and let nature take its course (LRR is a native disease and quite common in Douglas-fir ecosystems).

The removal of Douglas-fir will result in large openings, and these openings could increase the susceptibility of residual trees to wind-throw, in which case some uninfected trees may need to be removed (or topped for wildlife trees) to reduce hazard from wind-throw. I recommend planting the openings with resistant species such as western red cedar and Willamette Valley Ponderosa pine, or immune hardwoods such as big-leaf maple, red alder, or any other broadleaf tree or shrub species that is suited to the park environment.

Please call if you have any questions.

Sincerely,

Sarah Navarro
Forest
Pathologist 503-
945-7394
sarah.navarro@oregon.gov

Appendix H

Table 1. List of trees infected by *Phellinus weirii*, Nadaka Nature Park, Gresham, OR, April 3, 2018. Numbered trees have an oblong aluminum tag nailed to the tree at ground level on the north side of the tree. Other infected trees (RRI, RRB, etc.) have no tags. GPS coordinate system is WGS1984. GPS accuracy +/- 10-15 feet.

NUMBER/NAME 2018	NUMBER/NAME 2010	LAT	LONG	DESCRIPTION
799	799	45.528671	-122.483448	Cut stump. Found tag
901	813	45.528562	-122.481903	Thinning crown, standing, LRR in roots
902		45.528665	-122.483424	Standing tree. Thinning crown. LRR found in roots
903		45.528000	-122.48264	Dead tree. Recommend to fall and adjacent stem. LRR found in roots
FALLEN TREE 1		45.528721	-122.482229	LRR found.
FALLEN TREE 2	RR4	45.52897	-122.483372	
FALLEN TREE 3	358	45.528842	-122.482906	Tipped out. LRR in roots
FALLEN TREE 4		45.528586	-122.482975	Tipped out. LRR in roots
FALLEN TREE 5	352	45.528088	-122.483063	Tipped over. LRR in roots
FALLEN TREE 6		45.528118	-122.483106	Cow pie fungus and LRR on roots
FALLEN TREE 7	800	45.528093	-122.48302	Tipped over. LRR in roots
FALLEN TREE 8		45.528045	-122.482594	LRR in roots
FALLEN TREE 9		45.528099	-122.482548	
FALLEN TREE 10	RRF	45.528272	-122.482673	Tipped over. LRR in roots
FALLEN TREE 11	RRA	45.528162	-122.482733	Tipped over. LRR in roots
DECAYED STUMP	3893	45.52902935	-122.4821854	Almost completely decayed
DECAYED STUMP	356	45.52833893	-122.4827913	Almost completely decayed.
DECAYED STUMP	RR6	45.52869726	-122.483475	Almost completely decayed
DECAYED STUMP	798	45.52888837	-122.4831371	Almost completely decayed
DECAYED STUMP	RRJ	45.52882651	-122.4828821	Next to Fallen Tree 3
SNAG 1	RR8	45.528164	-122.482946	LRR in roots
SNAG 2	RR9	45.528179	-122.482897	LRR in roots
SNAG 3		45.528038	-122.482856	LRR in roots
STUMP 0	3594	45.528871	-122.482217	Tipped Out. LRR in roots

Appendix H

NUMBER/NAME 2018	NUMBER/NAME 2010	LAT	LONG	DESCRIPTION
STUMP 1	3896	45.528764	-122.482321	Stump found
STUMP 2	3899	45.52914	-122.482038	Tipped out. Cut stump. No tag
STUMP 3	3897	45.529057	-122.482099	More advanced decay
STUMP 4	3892	45.528934	-122.482115	Advanced decay
STUMP 5		45.528849	-122.483338	Cut stump. LRR in roots
STUMP 6		45.528838	-122.483438	Tipped out. LRR in roots
STUMP 7	RR5	45.528632	-122.483395	Cut stump. LRR in roots
STUMP 8	797	45.528928	-122.483252	Cut stump. No evidence of LRR in roots. Possible canopy symptoms in 2010
STUMP 9	355	45.528472	-122.4831	Tipped out. Cut stump. LRR in roots
STUMP 10		45.528581	-122.482979	Bole snapped. LRR found
STUMP 11		45.528577	-122.48301	Bole snapped. LRR found
STUMP 12		45.528065	-122.483072	
STUMP 13		45.528044	-122.482702	Cut stump. LRR in roots
STUMP 14	400	45.528103	-122.482783	Cut stump. LRR in roots
STUMP 15	RRG	45.528329	-122.48219	Tipped out. Cut stump with LRR in roots
STUMP 16	RR3	45.528342	-122.482001	Cut stump. LRR in roots
STUMP 17	RR2	45.528178	-122.48202	Rotted out stump with LRR
STUMP 18		45.528123	-122.4818	Cut stump. LRR in roots
STUMP 19		45.528143	-122.481877	Cut stump. LRR in roots
STUMP 20		45.528129	-122.481932	Cut stump. LRR in roots
STUMP 21		45.528133	-122.481924	Tipped out. Cut stump
STUMP 22	RR1	45.528063	-122.481893	Cut stump with LRR in roots
STUMP 23		45.527914	-122.481687	Freshly cut stump in tree not marked during first survey. Right along trail/road. LRR in roots and stump.
STUMP 24		45.528122	-122.481667	Freshly cut stump in tree not marked during first survey. Right along trail/road. LRR in roots and stump.
	357	45.52849073	-122.4825826	Tree not found in 2018. Checked roots of adjacent trees to GPS point. All looked healthy.
	399	45.52796041	-122.4827557	Tree not found

Appendix H

NUMBER/NAME 2018	NUMBER/NAME 2010	LAT	LONG	DESCRIPTION
	794	45.52814196	-122.4819885	Tree not found
	RRB	45.52785547	-122.4827099	Tree not found
	RRC	45.52823944	-122.4826716	Tree not found
	RRD	45.52796166	-122.4829963	Tree not found
	RRE	45.528077	-122.4826652	Tree not found
	RRH	45.52815914	-122.4827723	Tree not found
	RRI	45.52818412	-122.4829708	Tree not found

Appendix H

Appendix I

Pacific Habitat Services, Inc.

9450 SW Commerce Circle, Suite 180

Wilsonville, Oregon 97070

Telephone number: (503) 570-0800

Fax number: (503) 570-0855

MEMORANDUM

Date: April 16, 2014 Kathy

To: Majidi

From: Craig Tomer, PWS, PWD

Re: Nadaka Nature Park Nesting Bird Survey

(PHS#4455)

On April 16, 2014 I visited the Nadaka Nature Park to determine if trees marked for removal contain nests of bird species protected by the Migratory Bird Treaty Act (MBTA). The goal of the survey was to reduce the likelihood that the City could violate the MBTA through the removal of these trees. As such, the scope of my work included determining if any occupied bird nests were present in trees marked for removal and marking any trees that contained an occupied nest.

Survey Methodology

Previous correspondence with Tami Tate-Hall and Kelsey Boehme of the United States Fish and Wildlife Service (USFWS) Migratory Bird Program office in Portland indicated that the USFWS does not have a standard, recommended protocol to survey for nesting birds. To search for occupied bird nests, I walked the entire project area and examined all trees to be removed, as identified by the Gresham Department of Parks and Recreation. Smaller trees not shown on the Tree Preservation Plan and shrubs within the work zone were also searched for nests. All nests found were examined through Swarovski EL 10x42 binoculars to determine their condition (i.e., if the nest was old and disintegrating or if it showed evidence of recent construction) and to determine if the nest contained incubating birds. All trees were also examined for potential nesting cavities. Potential nest cavities were

Appendix I

examined for evidence of recent excavation. All birds encountered during the survey were observed for evidence of nesting behavior (i.e., courtship, gathering and carrying nesting material, agitation toward potential predators, entering and/or leaving potential nest cavities, etc.). If nesting behavior was observed, the birds were watched from a distance sufficient to prevent disturbance of the birds to determine if they had a nest in the trees slated for removal. The survey was performed between 8:00 and 9:30 AM on April 16, 2014.

Survey Results

Six large Douglas-fir trees (*Pseudotsuga menziesii*) and one small Douglas-fir less than 8 inches in diameter have been marked for removal at Nadaka Nature Park. All are infected with laminated root rot. Five of the trees are dead and completely lack green needles; and two are in decline and have very small crowns. No nests were observed in any of the trees marked for removal; however, numerous potential nest cavities were observed in one large, dead Douglas-fir, and a red-breasted nuthatch was observed entering and leaving one of the cavities located approximately 20 to 25 feet above the ground. This behavior suggests that the birds are still in the nest-building stage of breeding; however, it is not possible to determine the contents of the nest, if any, at this time. The tree with the potential nest cavities and the potential red-breasted nuthatch nest was marked with a spot of orange spray paint at the base placed by Parks.

Thirteen species of birds were observed in Nadaka Nature Park during the nesting bird survey (Table I). Of these species, one, red-breasted nuthatch (*Sitta canadensis*), was observed exhibiting nesting behavior (i.e., entering and leaving a potential nest cavity). Of the remaining species, ten could potentially have nests with eggs or young in the Gresham area mid-April, as described in *Birds of Oregon* (Marshall et al., 2006). However, the trees to be removed do not provide suitable nest sites for several of the observed species, and no occupied nests or evidence of nesting activity by any other species were observed, as noted in Table I, below.

Table I. Birds Observed During the Nadaka Nature Park Nesting Bird Survey on April 16, 2014

CommonName	Scientific Name	Notes
Bewick 's wren*	<i>Thyromanes bewickii</i>	Nests in cavities in trees and artificial structures; nests usually placed within 6 feet of the ground; no potential nest cavities observed
Golden-crowned kinglet	<i>Regulus satrapa</i>	Nests high in the canopy of living conifers; trees to be removed not likely to provide suitable nestingsites.
Hermit thrush	<i>Catharus guttatus</i>	Does not nest in project area
American robin*	<i>Turdus migratorius</i>	No nests observed in trees to be removed.
Spotted towhee*	<i>Pipilo maculatus</i>	Nests on or near the ground; not likely to nest in trees to be removed.
Song sparrow*	<i>Melospiza melodia</i>	Nests on or near the ground; not likely to nest in trees to be removed.

Appendix I

Common Name	Scientific Name	Notes
Northern flicker*	<i>Colaptes auratus</i>	Nests in tree cavities; no evidence of active nests in trees to be removed.
American crow*	<i>Corvus brachyrhynchos</i>	No evidence of active nests in trees to be removed.
Black-capped chickadee*	<i>Poecile atricapillus</i>	Nests in tree cavities; no evidence of active nests in trees to be removed.
Chestnut-backed chickadee*	<i>Poecile rufescens</i>	Nests in tree cavities; no evidence of active nests in trees to be removed.
Red-breasted nuthatch	<i>Sitta canadensis</i>	Observed entering and leaving potential nest cavity in tree marked for removal.
Pacific wren*	<i>Troglodytes pacificus</i>	Nests on or near the ground; not likely to nest in trees to be removed.
House finch*	<i>Carpodacus mexicanus</i>	Nests low in dense shrubs or small trees; not likely to nest in trees to be removed.

*Species that could potentially have nests with eggs or young in early April, based on species accounts contained in Marshall, D.B., M.G. Hunter, and A.L. Contreras, Eds. 2003, 2006. *Birds of Oregon: A General Reference*. Oregon State University Press, Corvallis, OR. 768

Summary

On April 16, 2014, I searched trees marked for removal at Nadaka Nature Park for active nests of bird species protected by the MBTA. One tree that is proposed for removal contains numerous potential nesting cavities, and a red-breasted nuthatch was observed entering and leaving one of the cavities, suggesting that it has an active nest in that cavity. The tree was marked with orange spray paint, and it is recommended that removal of this tree wait until after the end of the nesting season (i.e., after July 31) to avoid potential violation of the MBTA. No active nests or evidence of nesting activity were observed in any other trees marked for removal. If the tree removal contractors encounter occupied bird nests or nests with eggs in any other trees to be removed, they should avoid disturbing the nest and contact the City's Natural Resources Program Coordinator.

Conifer Susceptibility to Laminated Root Rot

Listed below are conifer species and their susceptibility to Laminated Root Rot (LRR) according to the United States Department of Agriculture and the Oregon Department of Forestry (Ksnell, 1998). When planting new tree species in Nadaka, it is recommended to plant species with a rank of low – very low susceptibility.

Scientific Name	Common Name	Susceptibility
<i>Thuja plicata</i>	Western red cedar	Very low
<i>Calocedrus decurrens</i>	Incense cedar	Very low
<i>Pinus ponderosa</i>	Ponderosa pine	Very low
<i>Pinus contorta</i>	Lodgepole pine	Low
<i>Pinus monticola</i>	Western white pine	Low
<i>Picea engelmannii</i>	Engelmann spruce	Low
<i>Tsuga heterophylla</i>	Western hemlock	Moderate
<i>Abies magnifica</i>	Red fir	Moderate
<i>Abies procera</i>	Noble fir	Moderate
<i>Abies lasiocarpa</i>	Subalpine fir	Moderate
<i>Abies amabilis</i>	Pacific fir	High
<i>Abies grandis</i>	Grand fir	High
<i>Abies concolor</i>	White fir	High
<i>Pseudotsuga menziesii</i>	Douglas-fir	High
<i>Tsuga mertensiana</i>	Mountain hemlock	High

Note: Other hard-wood, non-conifer, trees (for example Big-leaf maple) are not susceptible to LRR and are good alternatives to plant in Nadaka.

References

Ksnell. (1998). *Forest Disease Management Notes*. Retrieved from <https://www.oregon.gov/ODF/Documents/ForestBenefits/laminatedrootrot.pdf>

Onsite and offsite plant propagation methods compiled by New York State office of Parks, Recreation, and Historic Preservation (NYS, 2010):

Onsite Propagation Method	Advantages	Disadvantages
Common to all methods of onsite propagation.	All methods, if successful, are less expensive than offsite propagation and generally eliminate the time required to propagate plants.	Plant materials for propagation often are limited. Success can be limited in many environments.
Onsite seeding – Native seeds are collected and sown directly onto the area to be restored.	If successful, this method is relatively inexpensive. For small areas, onsite seeding can be accomplished without special equipment. Most seeds would not require special treatment to break dormancy. Treatment can be done without delay while plants are growing in a nursery. The genetic diversity of the plant community is maintained.	Germination rates are low in many environments, such as in arid lands and in the subalpine zone. Seeds sown on arid lands could be dormant for years before rainfall is adequate to induce germination. Seed production and viability can vary tremendously from year to year. Seed may have to be collected several years in advance. It can take many years for seedling plants to mature and establish stand structures similar to the target plant community. Rodents, birds, or insects can eat the seeds.
Onsite rooting of cuttings – A limited number of species will root when the cuttings are planted directly in moist soil on the area to be restored.	If successful, this method is relatively inexpensive. Treatment can be done without the delay of growing plants in a nursery. Onsite rooting of cuttings works well with bioengineering methods of slope stabilization. Larger plants are more visible at the restoration site and could deter use.	This technique requires that the soil be moist long enough for the seedling to develop an adequate root system; generally limited to riparian areas. Success is limited to genera and species that root readily, such as willow (<i>Salix</i> spp.), some dogwoods (<i>Cornus</i> spp.), cottonwood and poplar (<i>Populus</i> spp.), some alder (<i>Alnus</i> spp.), some elderberry (<i>Sambucus</i> spp.), and honeysuckle (<i>Lonicera</i> spp.). Plant material for cuttings may be limited.

Appendix K

		New plants are a clone of the parent plant, limiting genetic diversity. This technique is more labor intensive than seeding.
Onsite divisions – Species with fibrous root systems, rhizomes, or stolons can be dug up, broken apart at the roots into multiple plants, and transplanted. <i>Sprigging</i> is a variation where small plant parts are scattered across the site and raked or tilled into the soil without planting each part individually.	If successful, this method is relatively inexpensive. Treatment can be done without the delay of growing plants in a nursery.	Plant material to be broken apart may be limited. New plants are a clone of the parent plant, limited diversity. Onsite divisions require more labor than seeding. Onsite divisions can damage undisturbed areas where material is collected. Holes need to be filled after transplants are dug up.
Onsite layering – The attached branch or shoot of a parent plant is rooted.	Works well on trails that have shrubs growing alongside the trail.	Success is limited to species that layer or root readily. Onsite layering generally is useful only where appropriate shrubs, trees, or vines are growing alongside the site being treated. The new plants are a clone of the parent plant, limiting diversity.
Transplanting wildlings – Native local plants are dug up and transplanted.	Ground-disturbing projects that are occurring nearby, such as trail or road construction, can be a source of transplants. Local plants are adapted to the area. This technique produces results immediately with more mature plants. Larger plants are more visible at restoration site and could help deter use while the site is recovering.	Not all wildlings will transplant well, especially large plants, plants with taproots, or plants with very specific requirements for establishment. Unless transplants are salvaged, transplanting damages the undisturbed area where the transplants are collected. Salvage operations often require holding plant materials until they can be replanted.

Appendix K

		This increases the labor required and can complicate the logistics.

Offsite Propagation Method	Advantages	Disadvantages
Common to all methods of offsite propagation. Nursery stock types range from bareroot plants, to small containers or plugs, and to larger containers. The preferred stock type is based on predicted survival requirements and project goals.	For many environments, offsite propagation allows for much more rapid stabilization of the site and establishment of the plants at the site. Offsite propagation is the best way to propagate plants that are difficult to establish with onsite techniques. Offsite propagation prevents damage to the collection site caused by over collection of materials that are needed for most onsite propagation techniques.	All offsite propagation techniques require varying amounts of facilities, equipment, staff expertise, and daily care, raising costs considerably above those for onsite treatments. The time needed to propagate species may range from 6 months to several years. Pathogens or other nonnative insect or plant species may be introduced. Transportation of plants to roadless project locations increases the cost and adds logistical difficulties. Plants may need to be held at the nursery until they can be out planted. This increases logistical difficulties and the possibility that plants may not survive. Animals are most likely to eat fertilized nursery- grown stock once it's out planted.
Offsite seedlings – Native seeds are collected and sown into nursery beds, flats, or containers.	Offsite propagation can produce better germination and survival rates than onsite seeding. The diversity of the plant community is generally maintained.	Seed production and viability can vary tremendously from year to year. It may be necessary to collect seed several years in advance. Offsite germination and growing conditions may select for or against certain traits, changing the genetics of propagated plants.

Appendix K

Offsite rooting of cuttings – A portion of the plant, usually the stem, is cut off and rooted. Different species respond to different types of cuttings.	Offsite rooting of cuttings is a good method when seed is unavailable or difficult to work with. A wide variety of species will root from cuttings. Many species grow faster from cuttings.	New plants are a clone of the parent plant, limiting diversity.
Offsite divisions – Species with fibrous root systems, rhizomes, or stolons can be dug up, broken apart at the roots into multiple plants, and then transplanted.	Offsite divisions is a good method when seed is unavailable or difficult to work with. Divisions can be made over and over in a nursery until it is time to outplant the seedlings.	The new plant is a clone of the parent plant, limiting diversity.
Seed-increase programs – Native seed is collected onsite and grown offsite to produce a seed crop.	Seed-increase programs are the only way to multiply a small amount of seed into a large amount. This technique is best used when a large quantity of seed is needed. Seed can be used as soon as it is produced, or stored until it is needed for fire rehabilitation or mine reclamation.	The plant's genetic makeup can shift based on growing conditions, harvest timing and methods, and seed-cleaning techniques. It is difficult not to introduce weed seed.
Tissue propagation – Plants are propagated from very small pieces of plant material, such as the growing tips of shoots.	Tissue propagation is generally used with species that are difficult to propagate or with rare plants with limited vegetative material available.	This technique is very expensive. New plants are a clone of the parent plant, limiting diversity.

References

Guidelines for Closing and Resorting Trails in NYS Parks. (2010). Retrieved from <https://parks.ny.gov/recreation/trails/documents/TrailsTechnicalGuidelinesforClosing.pdf>

City of Gresham Park Rules and Non-Emergency Numbers

Parks, trails and greenways are open:

- April 1 to Sept. 30: 5 am - 10 pm
- Oct. 1 to March 31: 6 am - 8 pm

Not allowed in Gresham parks:

- Camping or building structures (Gresham Revised Code 7.10.165)
- Collecting or harming plants or wildlife (Gresham Revised Code 7.10.145)
- Defacing property (Gresham Revised Code 7.10.145)
- Devices to amplify sound (Gresham Revised Code 7.20)
- Dumping of trash, yard debris or other waste (Gresham Revised Code 7.10.145 / 7.27.040)
- Failing to clean up pet waste (Gresham Revised Code 3.37.010, Multnomah Co. Code Chapter 13)
- Hiking, biking or riding horses off designated trails (Gresham Revised Code 7.10.145)
- Hitting of golf balls (Gresham Revised Code 7.10.145)
- Illegal Drugs (State law)
- Pets off leash (Gresham Revised Code 7.35.010)
- Public drinking (without a permit from the OLCC and the City) (Gresham Revised Code 7.10.120)
- Swimming, diving or ice skating on ponds or creeks (Gresham Revised Code 7.10.145)
- Tobacco Use (Gresham Revised Code 7.10.145)
- Unauthorized vehicles (Gresham Revised Code 7.10.145)
- Weapons, fireworks or explosives of any kind (Gresham Revised Code 7.10.040 / 7.10.145)

Tobacco Use:

The City Council adopted a tobacco-free parks law in 2017. Tobacco use in parks may result in a fine up to \$500.

Banned products include:

• Cigarettes	• E-cigarettes	• Pipes
• Cigars	• Nicotine vaporizers	• Chew
• Cigarillos	• Nicotine liquids	• Snuff
• Bidis	• Hookahs	• Smokeless tobacco
• Clove cigarettes	• Kreteks	

Appendix L

Non-emergency numbers:

- Code Compliance: 503-618-2463
- Fire Non-Emergency: 503-823-3333
- Graffiti Reporting: 503-618-3089
- Parks Maintenance: 503-618-2300
- Parks Reservations: 503-618-2300
- Police Non-Emergency: 503-823-3333
- Police Tip Line: 503-661-3784