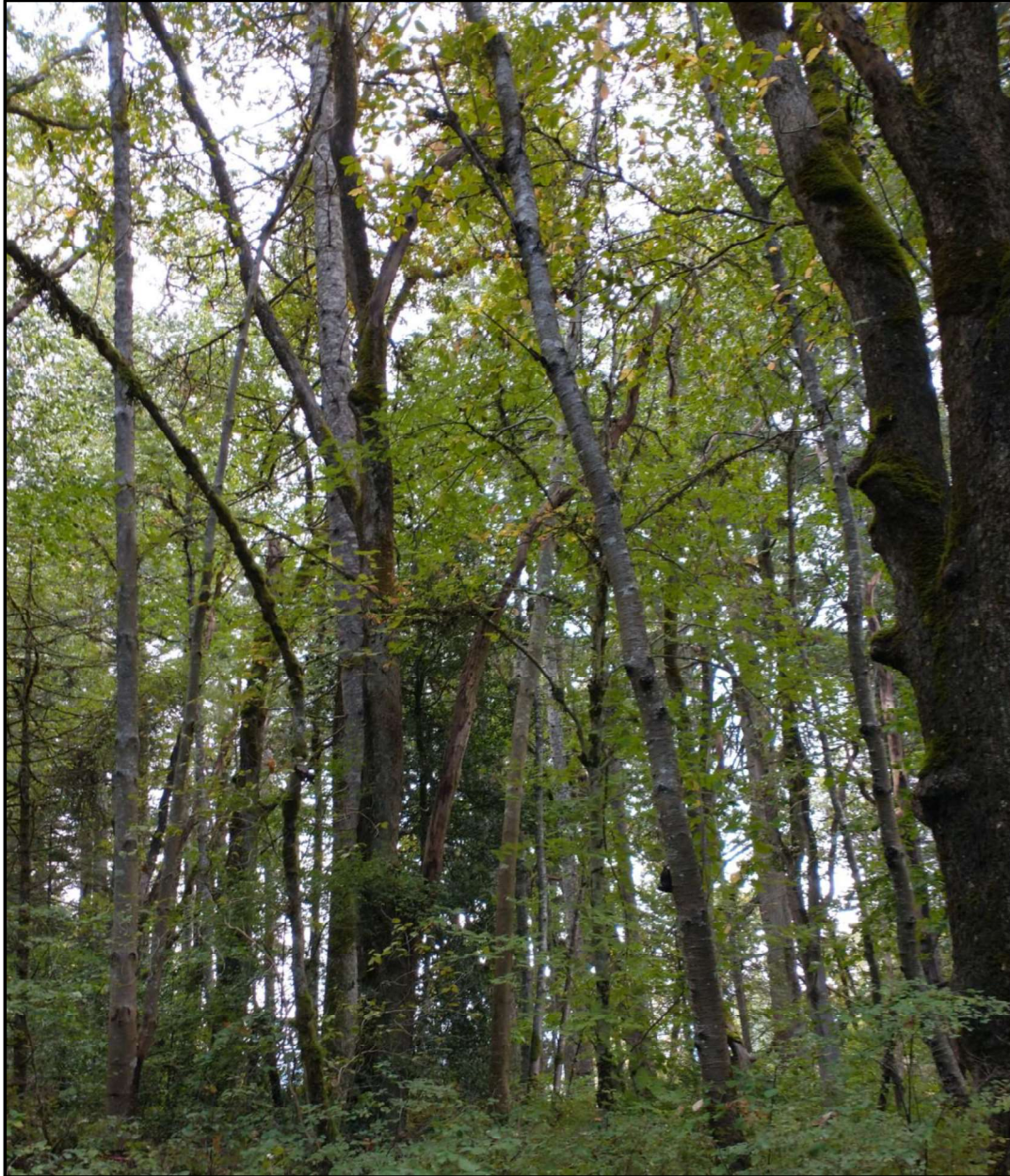


Vanier Nature Park Invasive Species Survey & Garry Oak Mapping Report



Comox Valley Naturalist Society June 28, 2023

Vanier Nature Park Invasive Species Survey & Garry Oak Mapping Report

1) Outline of Proposal

Comox Valley Naturalists Society's (CVNS) prime objective in our proposal is to return this fragment of the Tsolum River Garry Oak¹ ecosystem to dominance in the Vanier Nature Park. To do this, the Garry oaks must be released from the shade of the overtopping conifers above all else. Left to itself since indigenous peoples stopped active management of the oaks, the oak grove has been invaded by the conifers and shade tolerant invasive alien species, and oak regeneration has stopped. Without intervention the oaks will die; we estimate the youngest oaks at about 70 years old, and have found few seedlings. This oak grove needs the action promoted by the City since 2013 to counter the cause of its decline.

CVNS realizes that the City of Courtenay does not regularly budget money for the Park, and that is why we have proposed that our Vanier Oak team provide volunteer, unpaid help to remove the majority of invasives, and to assist the City in the tree subordination costs. Our hope is that a local stewardship group will take over the long term care of the Garry oaks, and that our work will help ensure this group has a better chance at establishing regeneration of the oaks.

2) Purpose of this Report

This is our second progress report on the activities we have undertaken in the Garry oak grove in Vanier Nature Park, and it incorporates and updates information from our "Garry Oak Tree Survey" of April, 2022, and data from the Mumby "Stem Survey"

The City of Courtenay requested a map of the non-native invasive plants of concern, and our suggested methods of species-specific control. The four non-native target species CVNS is concerned with are English holly (*Ilex aquifolium*), sweet cherry (*Prunus avium*), Ivy (*Hedera sp.*), and Daphne (*Daphne laureola*). CVNS volunteers performed a visual survey of the Garry oak grove over the course of a few days, totalling approximately 24 hours.

Additionally, we will also update our report on other ongoing initiatives in the Park.

¹ City of Courtenay's "Tsolum River Garry Oak Ecosystem" is registered in Historic Canada

3) Specific Requests to the City of Courtenay

3a) A positive recommendation and support from the Parks Department to the CAO for our proposal to release the oaks in a 1 hectare Garry Oak wetland ecosystem in Vanier Nature Park from shading by the taller conifers to the south and south west in the grove, with costs for tree work shared between the City and CVNS.

3b) Permission from the City allowing CVNS to begin invasive controls within the 1 Ha Garry oak grove this year.

3c) Permission from City allowing CVNS to work directly with City Staff in assessing the best method of subordination the identified competing sweet cherries, Grand and Douglas firs to ensure low risk, etc.

3d) An inspection and report on recommendations and actions initiated by the City arborist by the fall of 2023 to remove the hazard posed by partially failed and other high-hazard trees in the vicinity of the main grove, in order to reduce the hazard to volunteers and other park users.

4) Methodology for Invasive Mapping

In general, a team of 6 or 7 volunteers used the method outlined in the Invasive Alien Plant Program (IAPP²) of BC as a “cursory” survey, targeting specific species. The IAPP was designed for use over large areas of many hectares or even square kilometers, with pockets of invasive species scattered through the area under study. In addition to its main purpose as a BC-wide spatial database of alien invasives, the purpose of performing a detailed invasive survey is to create a plan for removing the invasives, using best current practices, and to be able to relocate the species for revisits to treat and monitor the area invaded.

Under normal conditions and area the size of the principle grove of oaks would likely be treated as one polygon within the IAPP, with a variety of invasives plants scattered throughout the polygon. In our case we have gone to a finer resolution than normal, and have identified infested areas smaller than 10 square meters, and in some cases individual specimens such as hawthorns and Daphne. The work entailed a number of visits to the Park. The area, although not large, is heavily overgrown with English holly and sweet cherries, in addition to the native snow berries. This work was done during the

² IAAP Reference Guide https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/iapp-resources/iapp_reference_guide_part_i.pdf

months of March and April in 2023, before the late spring growth, and some invasive species, e.g. Herb-Robert, were not noted in our survey. We mapped the blackberry, but will be leaving its control to the School District.

5) Invasive Polygons and Observations

The four main invasives species which have the largest negative effects on the Garry oaks (*Quercus garryana*) in this grove are sweet cherry (*Prunus avium*), English holly (*Ilex aquifolium*), ivy (*Hedera sp.*) and Himalayan blackberry (*Rubus armeniacus*). An additional species of concern is the Daphne (*Daphne laureola*), which has toxic characteristics, but poses little direct threat at this time. The cherry trees are in direct competition with the oaks, while the dense Holly shade as well as ivy or blackberry ground covers reduce the ability of oak acorns to germinate and grow. Although the conifers we have recommended for subordination are the greatest cause in the decline of this grove, they are native species.

It is important that as many of the invasive plants as possible be removed before any subordination of the conifers takes place so that the increase of sunlight to the forest floor benefits the oak and other native plant regeneration not the invasives. All parts of an invasive species should be removed from the site to prevent vegetative reproduction and treated as toxic waste in landfills.

Each species has a range of possible methods of removal, and best practices would be used. In all cases we will endeavour to use the least invasive methods of removal, timed for the best season in which to do the removal. Hollies and cherry, for instance would be worked on in the fall after any chance of bird nesting is past, while Daphne and ivy can be pulled from late fall until very early spring or when any existing ephemeral perennials begin to grow and the soil remains moist.

5a) Cherry and Blackberry Distribution

Our survey indicates that the highest density of sweet cherries occur where the Garry oaks currently dominate the upper story. As discussed in the Garry Oak Mapping section, the younger oaks are clustered on the east side of Tributary 1, the trench, and are in direct competition with nearby conifers and cherries. The cherry trees grow to approximately the same height as the oaks, but quicker and hence tend to dominate the oaks once they are established. In some cases cherry crowns have grown into the old oak crowns.

Cherry trees are present throughout the grove, with some very substantial, older specimens scattered about. The Mumby Report data indicates that there are likely more cherry trees than oaks in the grove.

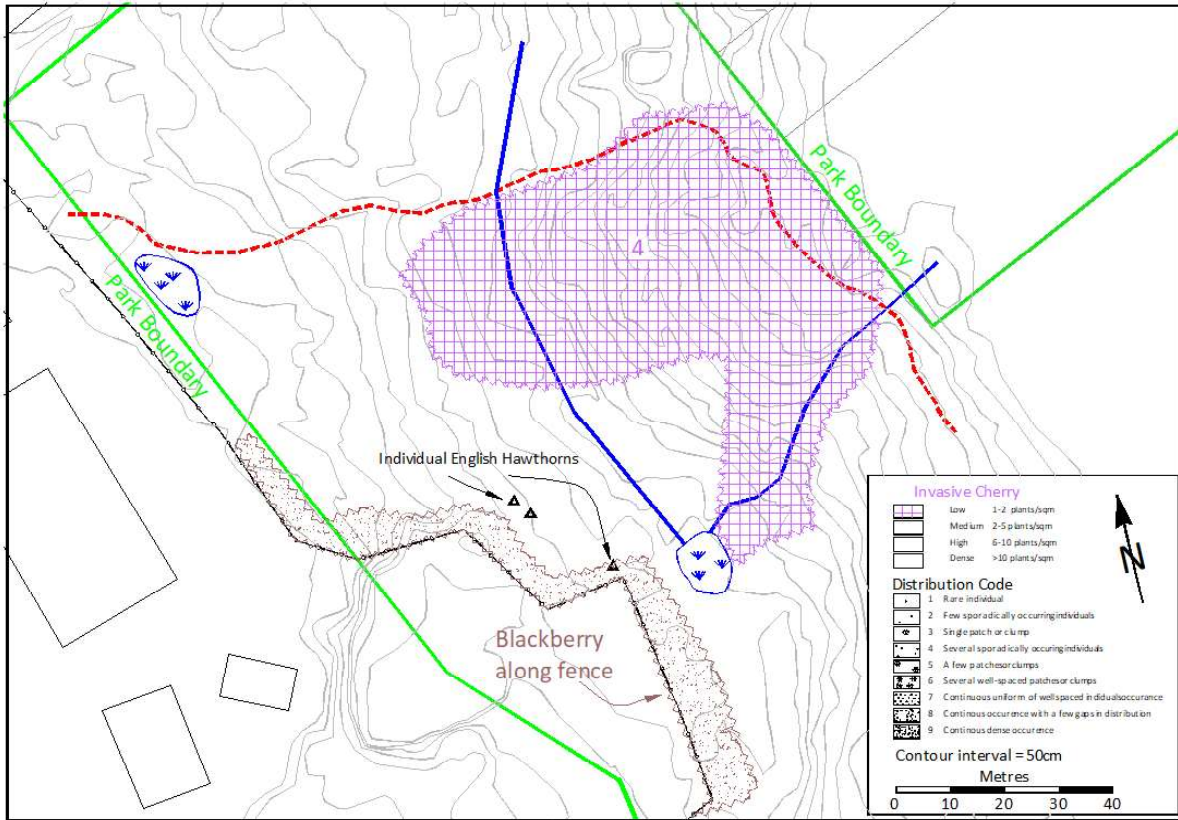


Figure 1: Cherry and Blackberry Distribution



Figure 2: Oaks (O) and cherry (C) trees in direct competition

The heavy concentration of blackberry along the SD71 fence also needs to be removed. We have been advised that the blackberry came in with backfill when the School District expanded their storage area onto City park property, and that the School District has admitted its responsibility to remove the blackberry cane. We have not included blackberry removal in our invasive control. The School District is currently removing invasives in their portion of the Vanier Forest.

5b) Daphne Distribution

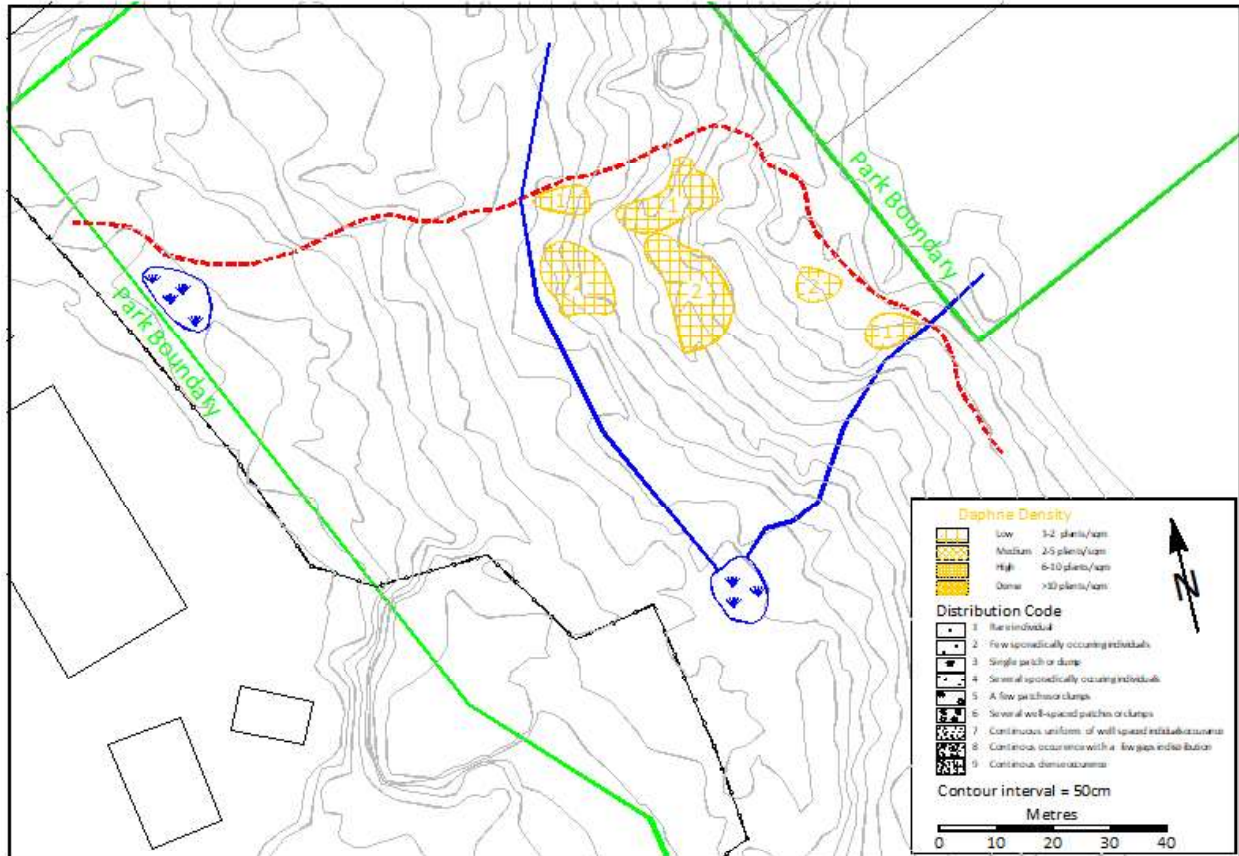


Figure 3: Areas of high density of Daphne

Daphne is a poisonous shrub which, although slow to establish itself, can spread to create large dense patches where few other plants can survive. The plant contains a number of poisonous chemicals which can produce itchy rashes when the skin is exposed to the latex sap. Crushing or burning Daphne releases a gas that can cause respiratory issues, nausea and unconsciousness. The berries, if eaten, can cause death.

Control of Daphne requires either pulling of small plants or cutting older stems below the plant's root collar. Like Scotch broom, new plants



cannot form from the roots, only above the root collar, where the stem begins. Always cut the root below the first radial root. It is not necessary to pull all the roots. Hand cutting is recommended as any form of weed-whacker will just tear the plant's skin and allow the sap to volatize. Specimens would be black bagged, wholly removed from the site and treated as toxic waste.

Daphne is not a large problem currently, but it will continue to reproduce and expand its coverage if left unattended. Seedlings are to be expected for about 3 years after the adults are removed.

5c) Holly Distribution

English holly is a shade loving understory tree or bush, and regenerates by seed, spread by birds and animals, and by clone saplings from roots. Our survey indicates that holly is most dense in the areas where the overtopping conifers create the densest shade.



Figure 4: Dense Holly grove near SD Fence

The most effective method of control is the total removal of the root system, but this is very disruptive of the soil, and likely to encourage other invasives to move into the vacated areas. In most cases we will cut the holly stems at or slightly below ground level, or pull small seedlings. Cutting will encourage clones to spring up, which will require annual cutting to discourage future growth. Hollies would be removed from the site as cut trees and treated as toxic waste.

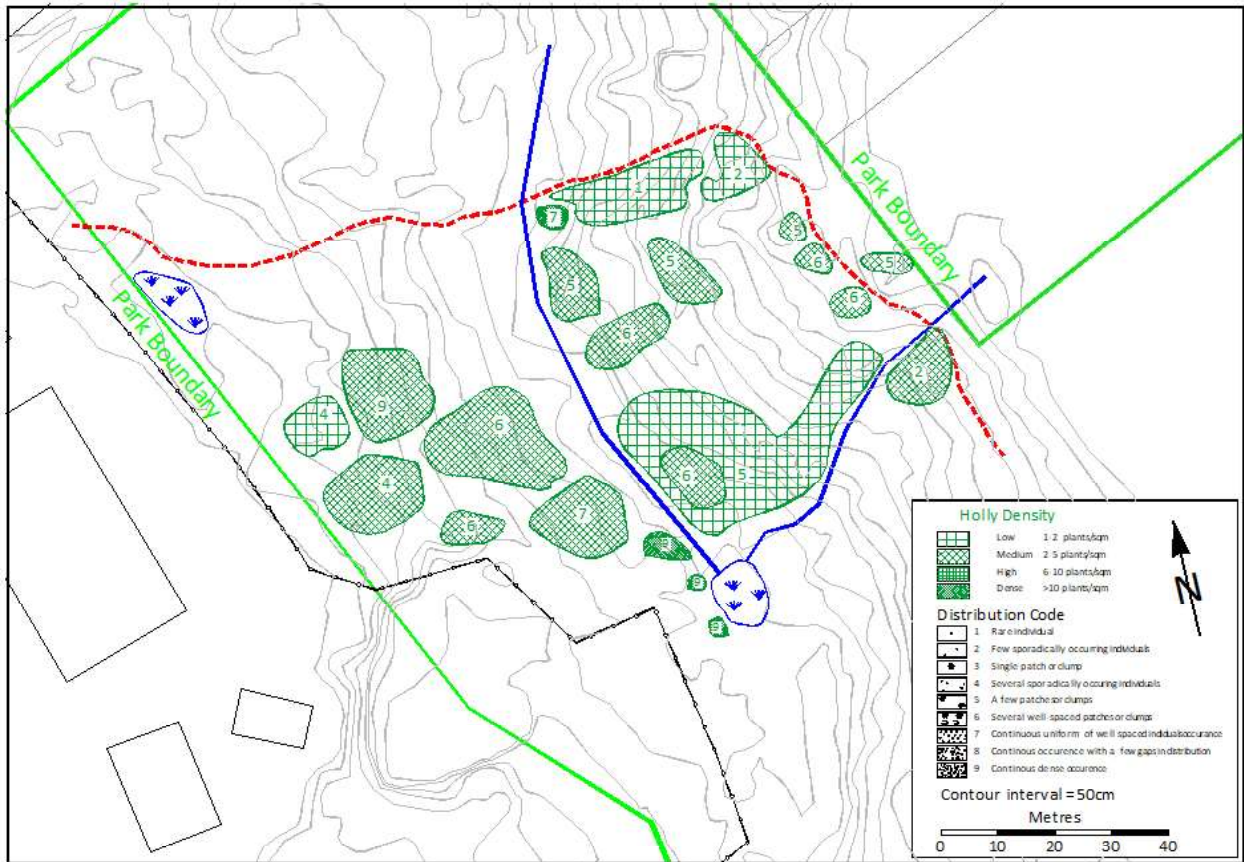


Figure 5: Holly Density and Distribution



5d) Ivy Distribution

English ivy is present at some level throughout much of the Park where surface water rarely flows. In dense mats, it can prevent most native species, including the oaks, from germinating and gaining a toe hold to grow to maturity. Ivy can also scale a tree, and contribute to its decline and possible failure. .

Figure 6: Ivy and a Garry Oak

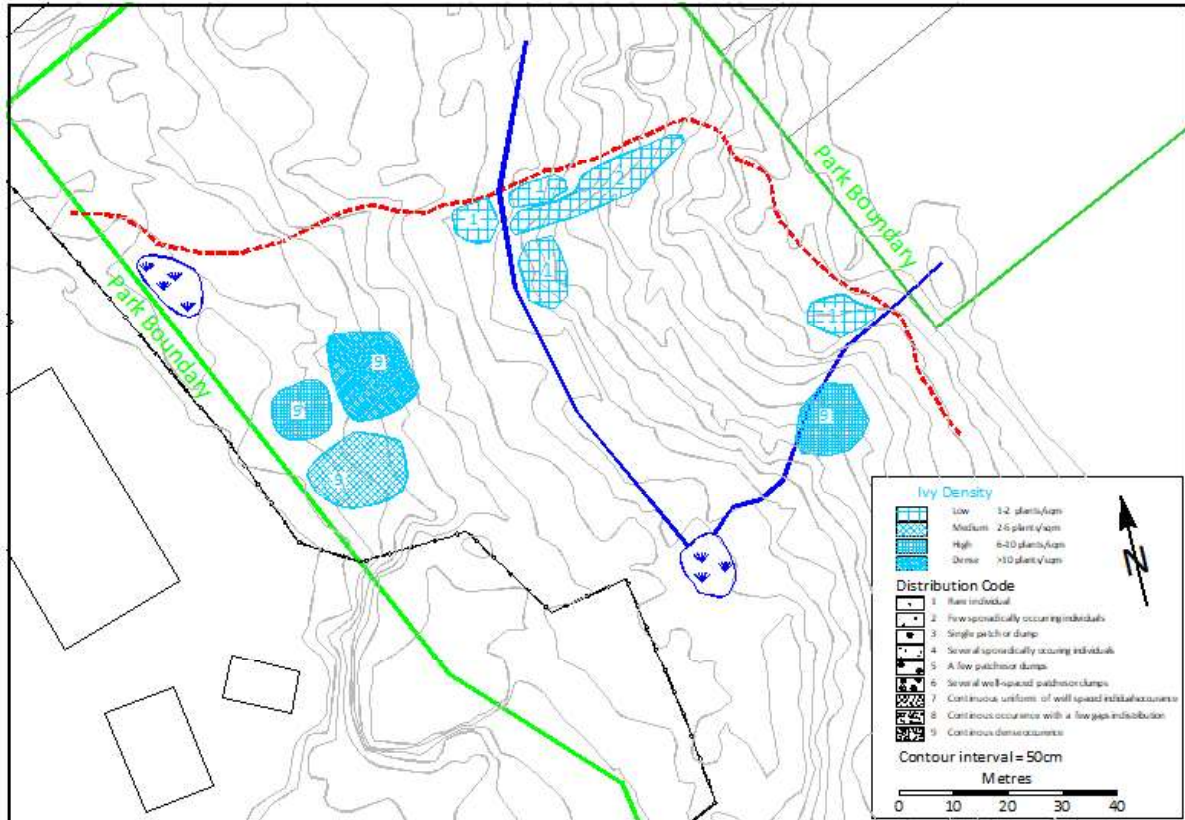


Figure 7: Ivy Density and Distribution

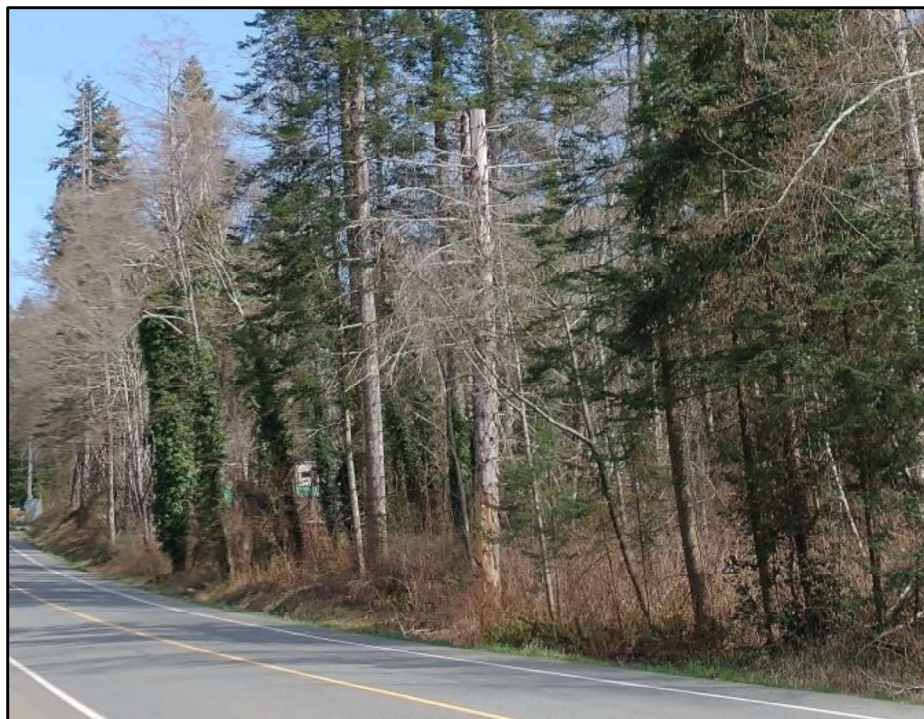


Figure 8: Ivy Climbing firs along Vanier Dr.

6) Mapping and Labeling the Garry Oaks

6a) Methodology for Mapping and Labeling Garry Oaks

We believe that all living oaks within the SD71 fence and the main trail from Vanier Drive are now labeled with metal tags, showing a number between 1701 and 1800, or between 1901 and 2000. A total of 93 live oaks have been labeled, as have 15 dead oaks, 54 non-oaks, including 9 Pacific Dogwoods (*Cornus nuttallii*). A total of 197 trees have been mapped. A few cherries were mapped, but no holly except as an invasive polygon. A total of 21 firs have been recommended for subordination to release the crop oaks.

All trees were tagged at 1.3 meters trunk height which is the height for DBH (Diameter Breast Height) measurement, on the northern side of the trees. It is hoped that future DBH measurements will be taken at these easy to locate reference points.

GPS accuracy is generally 3 meters or more.

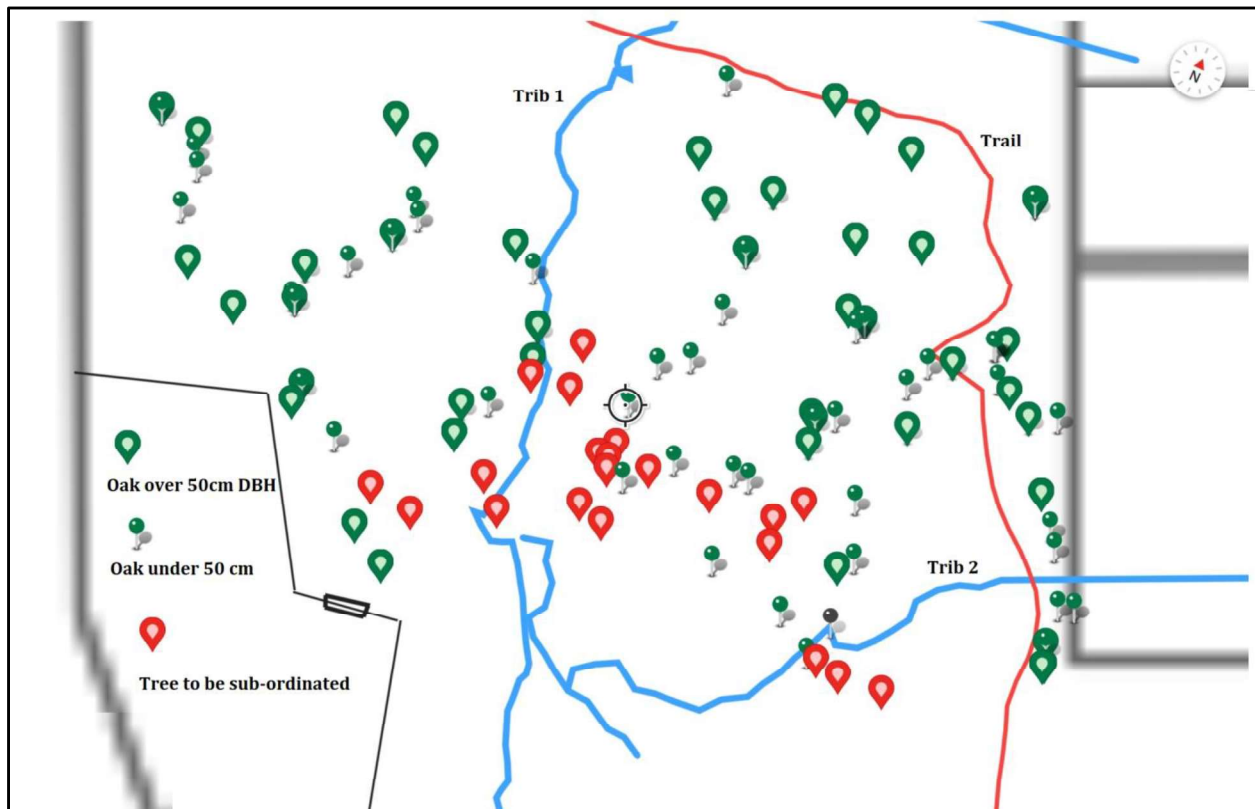


Figure 9: Oaks (green) and Sub-ordinate Trees

6b) Observations on the Garry Oaks

Few oaks exist outside of the principle grove, which we have defined as the area bound by the trail and the School District fence. Two older trees are above the trail, and a few in the southern part of the Vanier Forest, on school property. Few seedling oaks have been found, although we continue to look. Although we are showing 93 live oaks, this number is subject to correction as we'll be verifying living oak trees this fall.

A number of oaks have benefitted from being released by the removal of southern and south-western conifers when the SD works yard was constructed.

6c) Conifers recommended for sub-ordination

We have previously provided the City with our recommendations for managing the encroaching and overtopping trees³, and held discussions with Tsolum River Restoration Society (TRRS) on site. Initially TRRS had concerns regarding removal of the shade on surface water, but after consultation with others familiar with the Park, it was determined that the majority of the water is subsurface ground water, which was observed in our 5-month water table study.

CVNS now recommends that the previously flagged conifers on the south side of the trench not be treated until after the 3rd year of subordination treatments, and only considered after assessment of shade on the trench etc., and with consultation with TRRS.

Our list of 21 trees recommended for sub-ordination is:

1764, 1765, 1766 (on east side of Trib. 2B)

1905, 1906, 1768 (west side of Trib. 2B)

1773, 1915, 1917, 1918, 1919, 1920, 1921, 1922

A further seven trees are recommended on the south side; we would recommend that these 7 be treated in the final phase are: 1774, 1776, 1779, 1781, 1782, 1791 and 1992, or, in their alternate, 1911, 1912, 1913, 1909, 1910 and two others.

³ Vanier Nature Park Garry Oak Tree Survey, p. 13-19

7) Ongoing Projects

7a) iNaturalist:

The iNaturalist Project "**Vanier Nature Park (BC)**" started in March of 2023. The Botany group of CVNS hosted a bio-blitz on April 27th, 2023, and posted a large number of photographs. These listing will continue to grow of the seasons and years.

The link to the Vanier Nature Park project page in iNaturalist is:

<https://www.inaturalist.org/projects/vanier-nature-park-bc>

As of June 24, 2023, a total of 117 Observations have been made by 6 different observers, with 74 species identified so far.

7b) Water Table Data Collection

Eight shallow (1 meter or less) ground test wells were installed in 2012, and we took advantage of them to collect weekly water table depths from January 12th to May 31 (18 sample dates in total). Each well is described in Current Environmental's 2013 Eco-assessment⁴, but in general had a cemented sandy clay loam layer less than 1 meter below ground level, which could not be pierced by a hand boring tool. Each well has a 2 inch stand pipe access point. Three additional points where surface water are seasonal present are Trib 1, Trib 2 and a small culvert near the Vanier Drive entrance that handles surface waters. Trib 2 is feed by a small spring that comes from a buried sand stream up-hill on private property.

Three wells (wells 2, 3, 9) had water present on less than 1/3 of the collection dates. Wells 6 and 7 had the highest average water levels at 22 cm and 35 cm respectively. At no time during the measurement period was still water present near any of the wells, although the water table did approach 10 to 15 cm of the surface. The nearest area of still surface water was by the blackberry infestation, below the oak grove below where Trib 1 and Trib join.

⁴ "SD 71 – Vanier Oak Property Ecological Assessment and Protection Plan", Jan 11, 2013

Sources of water into the Park are from surface flow from drainage ditch along Vanier Drive, and one or more low flow seeps, predominately Trib 2. The main flow of surface water is in Trib 1 (the “Trench”) which average 8 cm deep at the discharge end of the large culvert. It collects some water from the drainage ditch alongside Vanier Drive and surface water from up slope.

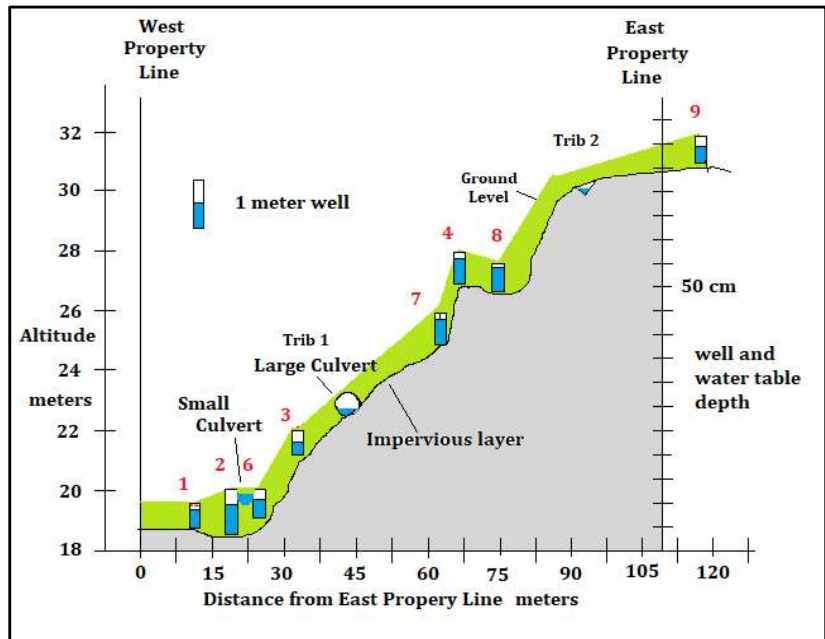


Figure 10: Well location, Altitude vs Distance

General Observations of Park Hydrology:

Some concern was raised by TRRS that removal of the overtopping conifer shade would tend to overheat the surface waters flowing through the grove. After pro-bono consultations with a hydrologist in Nanaimo, it was suggested that the impact of our small scale proposal on surface water temperature could not be easily predicted, but that the majority of the water charge into the Towhee would likely be sub-surface flows, which vary little in temperature over the seasons.

During our many visits to the grove over the last 3 years, we have not found any area north of Trib 2 where flowing surface water was present for an extended period of time, except for known seeps up-hill from the Park and the drainage trench called Trib 1. Trib 2 is itself sourced at a seep, and is the only regular source of surface water in the Park. Where Trib 2 and Trib 1 unite, south and below the oak grove is a large slough sedge (*Carex obnupta*) meadow⁵. Well #7 is in the general vicinity and showed the highest average water table during the observation dates. This may be the wetland named 3A in the 2013 Eco-Asset report.

A small sedge meadow of approximately 25 m² is also present in western side of the grove, where a level area allows the water table to exceed ground level during raining seasons when the soil is fully saturated.

⁵ 2013 Eco-Asset, pp. referred to as wetland 3

Most of the surface water in the oak grove is vernal, and due to rain storms and runoff, with at least one regular surface seep above the Park.

1) Ground well (GW) 7 had the highest average water level at 35 cm

2) Lowest averages were at GW 4 (1.8cm), GW2 and GW9. These 3 wells also were dry on 2/3 of the collection dates

3) Trib 2 starts at a spring on property above the Park boundary and is the only surface water seen year round

4) Trib 1 receives most of its water surface run off and little from base flow (sub-surface recharging the running water in trench). During the storms in late December 2023, water was seen entering the Park from the drainage ditch alongside Vanier Drive.

5) All measurable sub-surface water was gone 14 days after last rain on May 24th.

7c) Bird Studies:

The CVNS Binding Group hosted a bird survey on May 6th, 2023, with 4 members and a total of 17 birds identified, in 12 species. The Group has a pending request that Vanier Nature Park be declared a hot spot on the eBird site , which would attract a wider group of citizen scientists. The link to the Park is here:

<https://ebird.org/checklist/S136333860>

Appendix: Volunteer Time at Vanier Nature Park from Dec 2022 to Present

Date	Total # of Hours	Purpose Of Visit	# of People.	
Dec 26	3	Video surface storm water	1	
Jan 9	6	Water table data collected	2	
Jan 12	2	Water table	1	
Jan 18	2	Water table	1	
Jan 25	2	Water table	1	
Jan 25	2	Water table	1	
Feb 5	2	Water table	1	
Feb 12	2	Water table	1	
Feb 18	2	Water table data	1	
Feb 21	2	Weed wench test on Daphne	1	
Feb 22	2	Water table	1	
Feb 24	18	Botany & Birder walk	9	
Mar 7	1	Pre-locate first 10 oaks	1	
Mar 8	21	Metal tags on Oaks day 1	7	
Mar 9	2	Water table data collected	1	
Mar 15	18	Metal tags on Oaks day 2	6	
Mar 16	2	Water table	1	
Mar 27	17.5	Invasive polygons day 1	5	
Apr 12	2	Water table	1	
Apr 18	20	Walk with Susie	8	
Apr 25	2.5	Trees tag and Water table	1	
Apr 27	10	Bio-blitz with Jocie	4	
Apr 27	6	Invasive polygon mapping	3	
May 2	2.5	Water Table & Tree Tagging	1	
May 6	4	Bird Survey with Kelly	4	
May 9	1.5	Water Table	1	
May 24	1.5	Water Table	1	
Total Hours	156.5 Hrs	Person Visits	66 person-visits	