Invasive Plant Presence in North Saanich Parks: A Multiple Year Study
Results for 2024

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Introduction:

European settlement in British Columbia during the 19th Century resulted in the import of domestic plants particularly from England. Certain plants, such as English Ivy (*Hedera helix*), English Holly (*Ilex aquifolium*) and Scotch Broom (*Cytisus scoparius*) immediately dispersed into the surrounding natural ecosystems. These plants, among other invasive species, are now long term residents in natural environments throughout Greater Victoria and the Saanich Peninsula.

One acknowledged consequence of invasive plant presence is reduced native plant biodiversity. When invasive plants enter natural ecosystems they can create less favorable conditions for indigenous species. These may include: reduced available light, less available moisture, reduced physical space and less available nutrients (Ontario Invasive Plant Council Website, 2024). Some invasive species can disturb fungal/root relationships and alter soil chemistry. The last factor may, at times, depending on the invasive species, prevent indigenous plants from establishing. Invasive plants can also cause reduced soil microbe populations (Brugiel et al. 2018). In addition to these direct impacts, there may be other more indirect results from invasive plant presence such as reduced potential for some insects to flourish or reduced foraging potential for birds Biodiversity and Invasive Species (ubc.ca) Biodiversity and Invasive Species (ubc.ca).

Certain invasive species have growth or lifecycle characteristics that provide a distinct competitive advantage compared to indigenous species (Hawkes et al. 2007). These traits may include rapid yearly growth rates, early flowering, long life spans and long lasting seedbanks –some seeds can remain viable for decades. In addition, some invasive plants have profuse seed dispersal.

Some residents of the Saanich Peninsula volunteer with nonprofit groups to remove invasive species in order to restore local natural ecosystems. One of those groups is the Friends of North Saanich Parks (FNSP). Several invasive species that FNSP has encountered within North Saanich parks include: Himalayan blackberry (*Rubus armeniacus*) and Spurge Laurel (*Daphne laureola*), a toxic plant with many competitive advantages, (Strelau, Clements, Webb, & Prasad, 2018). Two other plants that are frequently encountered have already been mentioned in this document: English Holly and English Ivy. English ivy, one of the most common invasive plants in North Saanich, is relatively slow to become established but can become aerial and eventually can kill trees. It grows well in moist, open forests, but is adaptable to a range of soil and moisture conditions.

Research Objectives:

In recognition of the competitive advantages that invasive plants display in relation to indigenous species, and their continued presence in North Saanich Parks, FNSP established a series of semi-permanent plots under selected park canopies. The intent was to measure the reappearance of invasive plants growing from the roots remaining after removal in the prior year and new invasive species to the locale that might appear after one or more years.

Research Sites:

FNSP established representative plots in six North Saanich Parks with a variety of plant associations and moisture regimes. The park sites were: Green Park North, Denham Till, Nymph Point Park, Lillian Hoffar Park, Gulf View Park and Quarry Park.

Green Park North is saucer shaped with some salal and Oregon grape; it contained, at the time of the research initiation, Daphne and English ivy. Denham Till Park is a flat south facing park, with dense, homogenous salal cover. This is the dominant understory vegetation of the park. It had at the time of the plot establishment, English Ivy, H. blackberry and some Daphne. Nymph Point Park is a Douglas fir-Arbutus vegetation association initially with Daphne and English ivy. In Lillian Hoffar Park, the plots, once almost exclusively English Ivy, were located in a Cottonwood-Red osier dogwood vegetation association type. Gulf View Park, on the lower east flank of ŁÁU,WELN̲EW̲ is a Douglas fir–Ocean spray vegetation association that evolved from an agricultural field about 120 years ago. It had equal portions of ivy and Daphne at the time of plot establishment. Over several years, more than seven tons of ivy was removed from this small park. Quarry Park as the name infers, was an active quarry in the mid- 1920s. The plot, a Douglas fir-Oregon grape type initially contained ivy with Daphne predominantly.

Methods and Measurement:

The removal of invasive species within plots, the plot descriptions as well as the counting, drying and weighing procedures for plant samples have been described in prior reports: (Hope, Sharon and Anne Zerrath, 2022) and (Hope, Sharon and Haansen Christensen, 2023). In 2020, FNSP members dug all invasive materials from the plots rather than cutting or trimming in situ. The first sampling and measurement of invasive species took place in late May and early June of 2022. In 2022, FNSP members counted each plant removed and calculated the total species number per plot according to plant age categories. In that year, the main categories were: Daphne seedlings less than 2 years, 2 plus year old Daphne, English ivy seedlings less than two years and 2 plus year old English ivy. FNSP weighed and recorded the oven dried material according to the plant species and age. This pattern of removal and measurement was replicated in 2023 and in the current year, 2024.

Results Summary for Prior Years:

FNSP estimated the initial or original invasive plant coverage for the selected plots. Initially in the Gulf View Park plots for example, there was about 30% invasive coverage in each plot. At the 2022 sampling, the plots had reduced Daphne seedling and the English ivy coverage to about 1-2 %. As mentioned before, in the Denham Till Park plot, there were very few initial invasive plants because of the dense salal coverage. Here there was no Daphne during 2022. However, in 2022, Daphne seedlings at Nymph Point still were very much a dominant presence in both plots. English ivy was a minor presence here averaging about 1 %.

In 2023, FNSP re-examined the 9 plots established in North Saanich parks during 2020 and first sampled in 2022. As in 2022, members counted each invasive plant removed and then calculated the total species number per plot according to plant age categories. The main age categories for 2023 were: Daphne seedlings < 1 year, Daphne 1+years, 2+years, 3+years and 4+plus years. Similar plant age categories were applied to English ivy and to any additional newly discovered invasive species. Almost

all North Saanich plots where the age classes of 2022 and 2023 invasive plants could be compared, the plots had a reduction in invasive species numbers.

Holly seedlings present the year before (2022) did not persist in the Lillian Hoffar Park plots in 2023 nor did Himalayan blackberry or privet return in the Nymph Point or Gulf View plots respectively. English ivy in both the Lillian Hoffar plots only totaled 27% of its previous year's numbers. However, English laurel was a new addition in one plot in this park. The 2023 Daphne seedlings in Gulf View Park Plot 1 were reduced by 97% compared to 2022 and there was an accompanying 67% reduction of Daphne seedlings in Plot 2.

In 2023, the overall reduction from 2022 in invasive species for all similar categories and species was 74%. Quarry Park however showed a modest increase in Daphne seedlings that indicates, perhaps, a residual seedbed or seeds that were carried or blown in. Human error during the removal process could also account for their presence. New invasive species in the form of English Laurel appeared in Gulf View Plot 2 (34 individuals).

Results for 2024:

Results for year 2024 appear in Table 1 and some highlights over several years appear in the Figures (Page 7) found after the Discussion section. In 2024, there were more age categories within species than in 2022 but less individuals per category. In fact, 20 of the listings had four individuals or less. This may have occurred because plants missed during prior harvesting sessions continued to mature and move into older age categories.

As in the 2023 results, large masses of Daphne seedlings found in some parks continued to decline considerably. Those parks where ivy was initially eliminated from plots showed only minor increases due to new seedlings in the plots or because ivy continued to have roots that had not been detected earlier in the removal process. Laurel noted as a new entry in 2023, had a modest presence in 2024 within the Gulf View plots and only a single Cyclamen (*Cyclamen persicum*) and a Canada Thistle (*Cirsium arvense*) were new 2024 entries into the same plots.

Table 1: Removal of Invasive Plants in 2024 by Park, Plot, Species, Age and Dry Weight.

Park	Plot	Species	Plant Age (Years)	Counted Individuals	Dry Weight (gms)
Lillian Hoffar	1	Laurel	<1	1	0.25
Lillian Hoffar	1	Daphne	<1	3	0.04
Lillian Hoffar	1	Ivy	1+	1	0.27
Lillian Hoffar	1	Ivy	2+	2	2.33
Lillian Hoffar	1	Ivy	3+	2	6.97

Lillian Hoffar	2	Daphne	<1	19	0.45
Lillian Hoffar	2	Daphne	1+	1	0.16
Lillian Hoffar	2	Holly	3+	1	6.73
Lillian Hoffar	2	Ivy	1+	1	2.33
Lillian Hoffar	2	Ivy	3+	3	28.96
Gulf View	1	Laurel	<1	1	0.08
Gulf View	1	Daphne	<1	5	0.14
Gulf View	1	Daphne	1+	3	0.24
Gulf View	1	Daphne	3+	5	1.58
Gulf View	1	Ivy	2+	2	1.75
Gulf View	1	Cyclamen**	2+	1	42.75
Gulf View	2	Canada Thistle**	<1	1	1.16
Gulf View	2	Laurel	1+	33	3.67
Gulf View	2	Daphne	<1	104	2.14
Gulf View	2	Daphne	1+	82	2.76
Gulf View	2	Daphne	2+	29	2.36
Gulf View	2	Daphne	3+	2	0.70
Nymph* Point	1	Broom	1+	1	1.56
Nymph* Point	1	Daphne	<1	32	0.88
Nymph* Point	1	Daphne	1+	17	0.87
Nymph* Point	1	Daphne	2+	1	0.33
Nymph Point	2	Daphne	<1	1015	24.30
Nymph Point	2	Daphne	1+	606	29.07
Nymph Point	2	Daphne	2+	78	6.19
Nymph Point	2	Daphne	3+	6	1.35
Denham Till	1	Holly	1+	1	0.01
Denham Till	1	Daphne	1+	1	0.08
Denham Till	1	Laurel	<1	1	0.00
Quarry	1	Laurel	1+	1	0.15

Quarry	1	Daphne	<1	12	0.23
Quarry	1	Daphne	1+	32	1.24
Quarry	1	Daphne	2+	32	2.33
Quarry	1	Daphne	3+	13	2.95
Green	1	Daphne	<1	13	0.56
Green	1	Daphne	1+	28	1.78
Green	1	Daphne	2+	9	0.91
Green	1	Daphne	3+	4	2.75

*Possible missing data in Plot 1 ** New entry species in 2024

Discussion:

Some trends can be found after several years of research within the selected parks (Figures 1 and 2). Figure 1 depicts the decrease in English ivy in Lillian Hoffar Park. Most of the ivy in the Lillian Hoffar plots originated from buried roots not removed in earlier years. Ivy has decreased within most park plots from 2022-2024.

However, the most dramatic pattern has been the steady decline in young Daphne seedling distribution in Nymph Point and Gulf View Park plots respectively where they were abundant (Figure 2). Although Daphne seed may still be viable after eight years, the number of < 1 year seedlings germinating in the plots is less. It should be mentioned that there have been variable results for Daphne seedling presence for Green Park and a few other parks.

Multiple year studies of this type are rare and the trends found over time justify the continuation of this research. The work demonstrates the long term effect of invasive plant removal and tracks new entries into the park ecosystems.

Broom seedlings have been observed external to the plots in Nymph Point Park although for several years only one known seeding adult broom plant (unfortunately inaccessible) remains in this park. Nymph Point is subject to prevailing winds and it is possible that the remaining adult plant has sufficient seed numbers and seed viability to create a widespread seedbed.

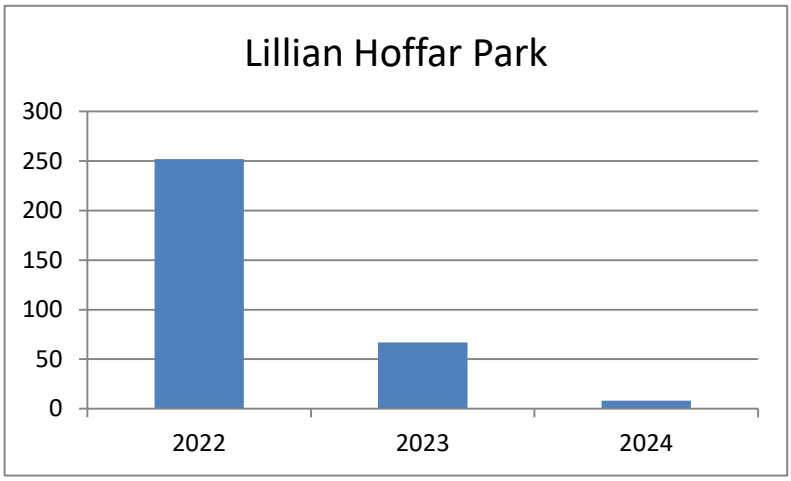

Figure 1: Total Ivy Plants Removed aged 2+ years in 200m^2.

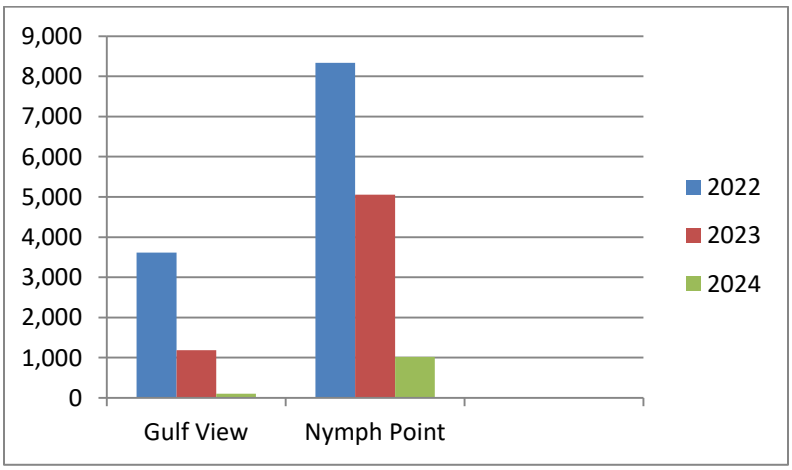

Figure 2: Declines in < 1 year old Daphne Seedlings in One Plot from 2022 to 2024.

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Cover: Daphne Seedlings in Nymph Point Park. Taken by: Sharon Hope