ER 390 – Final Project

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UPLANDS PARK:

INVASIVE PLANT MANAGEMENT PLAN 2018-2025

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Cover Photographs

Front cover: Camas meadow in Uplands Park (Wylie Thomas)

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1 Introduction

Uplands Park is a 31-hectare municipal park located in the District of Oak Bay. It is surrounded on three sides by an urban residential neighbourhood and by the sea at its southeastern end (Cattle Point). The park is home to a well-preserved remnant of the endangered Garry Oak and associated ecosystems, which were once much more extensive in southeast Vancouver Island, and to an impressive array of very rare plant species. These plants and ecosystem are under threat from the invasion of a large number exotic plants.

In 2014, I developed a five-year woody invasive species management plan (2015 – 2019) to address the threats to rare plants and ecosystems from these species and in doing so to reduce the threat of wildfires to surrounding properties by removing highly flammable standing biomass produced by the invasive shrub species in the park. The 2015 – 2019 plan focused its attention on the southern and eastern sections of the park where the majority of the rare plant species are found. The stated goal of the plan was to reduce the threats from invasive non-native trees, shrubs and herbaceous plants to a level where their long-term control could be sustained by municipal staff on existing resources without recourse to outside sources of funding. The plan was subsequently used as the basis for a successful bid for three years of funding from the federal government's Habitat Stewardship Program (HSP)[1] which helped pay for some of the costs of its implementation.

In implementing the plan, it became apparent that it was overly ambitious and underestimated the resources required to treat and retreat many of the parks invasive species; further thought was needed to revise its treatment plans with a view to narrowing its focus and giving it a more realistic timetable if it were to meet its stated goals. On the other hand, municipal arborists had managed to meet the plan's original goal of ridding the targeted woodlands of mature invasive trees, and managers at the Oak Bay Parks Department expressed a desire to expand outside the target area and tackle the remaining woodlands in the park and in doing so rid the entire park of mature invasive trees. In short, a new plan would need to be developed.

This document therefore outlines an eight-year plan (2018 – 2025) to remove all remaining mature invasive trees from the park and identifies zones of high conservation value which provide the focus for complete control of all priority invasive plants and shrubs by 2025. To develop the plan, I resurveyed the entire park to estimate the resource requirements for controlling woody invasive shrubs and trees based on lessons learned and expanded the original list of targeted invasive to include Orchard Grass, Velvet Grass and other herbaceous species that threaten the park's rare plants.

This plan does not address some important invasives such as Crow Garlic (*Allium vineale*) that are found throughout the park, although it is recognizes that it poses a potentially big long-term threat to the ecological values of the park. However, studying the impact of this species and methods for its control in a conservation setting will be part of the activities undertaken as part

[1] The Habitat Stewardship Program is a federal funding program that supports work to protect and recover rare species that have been listed on Schedule 1 of the federal Species at Risk Act (SARA).

of this plan. A plan for introducing prescribed burns to Uplands Park has been proposed (John Dick 2014) and is currently under discussion.

Finally, the plan will establish a baseline ofdata on the health of the meadow systems and rare plant populations in the park so that the effects of implementing this plan can be monitored. As a start, I inventoried 6 of the parks SARA-listed species in 2017.

The current eight-year plan will form the basis of future requests for funding to control invasive species in the park and can be made a component of a broader management plan of the park that address balancing the park's conservation needs with other threats such recreational use.

Before finalizing this plan, consultations with other stakeholders will be held to determine other conservation values and how to accommodate them in this plan. This will help ensure that the plan receives broad community support and also balance the conservation imperative that it assumes with other values such as birding, recreation, esthetic.

2 Site Description and Rare Species

2.1 Geology and Climate

Uplands Park is located in the Coastal Douglas-fir (CDF) Biogeoclimatic Zone of British Columbia. Its climate is strongly influenced by its position in the rain shadow of the Olympic Mountains to the south and the mountains of Vancouver Island to the west, which give it a cool Mediterranean-type climate with winters that are wet and mild, and summers that are cool and dry. As much as 85% of the annual precipitation of 640 mm falls between October and April, leaving the summer months with little rain and subject to drought-like conditions. In the winter, soils are often waterlogged. July and August, the warmest months, have average daily high temperatures of approximately 23°C and average daily lows of 11°C.

The bedrock underlying Uplands Park consists of hard, resistant Wark Gneiss complex (Muller 1980), which is visible as outcroppings in several sections of the park. Two types of soil are found in the park: 1) Tolmie, found in the western 2/3 of the park; and, 2) Langford, found as thin deposits in the eastern end of the park (Collier *et al.*, 2004). Tolmie soils are characterized by an A horizon of very dark brown to black granular, fine sandy loam on top of a slowly permeable sandy clay (B_t) and very slowly permeable marine clay. The nutrient content of these soils makes them suited to agriculture provided proper drainage is installed. In the early part of the 20th Century, the south-western corner of the park was under hay production, and today the remains of the canals that once drained the land can still be seen. The soils in this section of the park now support a dense forest of One-seed Hawthorn and other woody exotic species.

2.2 Vegetation and Rare Ecological Communities

The Mediterranean-like climate of Uplands Park supports a complex of Garry Oak meadows and associated ecosystems, including the red-listed *Quecus garryana-Bromus carianatus* ecological community. Many species of spring-flowering plants grow in its oak-dominated landscapes, making Uplands one of the most floristically diverse areas in Canada. In wetter parts of the

park, small areas of the red-listed *Populus tremuloides-Malus festuca-Carex obpunta* ecological community can be found, although these have not been officially mapped by the BC Ministry of the Environment (http://a100.gov.bc.ca/pub/eswp/). Vernal pools occur throughout the park in areas where winter rains accumulate in shallow depressions that are underlain by impermeable clays. These pools remain wet into late spring but eventually dry out completely by early summer. The drastic fluctuation in water regime, combined with the rarity of these vernal pools, means that they are home to many of the rarest plants in British Columbia.

2.3 Plants Species at Risk

Uplands Park is a hotspot for plant species at risk in Garry Oak ecosystems. It is home to 25 rare species of plant, 13 of them registered with the federal Species at Risk Act ("SARA-listed"), giving the park one of the highest concentrations of rare plants in our region if not in Canada. Table 1 compares the number of rare plant species in Uplands Park with that of other rare plant hotspots in our region. Figure 1 on the next page shows how these rare species are distributed within the park.

Table 1. Comparison of Rare Plants in Uplands Park and Other Hot Spots around Victoria[2]

	Total Rare Plants	Provincial Status	National Status (SARA)	Global Status
Uplands Park	**24**	14 Red 10 Blue	9 Endangered 2 Threatened 3 Special Concern	1 Imperiled (G2) 4 Vulnerable (G3 or T3)
Rocky Pt./Bentinck Isl.	**23**	11 Red 12 Blue	6 Endangered 1 Threatened	1 Imperiled (G2) 1 Vulnerable (T3)
Trial Island	**19**	12 Red 7 Blue	7 Endangered 2 Threatened 2 Special Concern	2 Critically imperiled (G1) 1 Imperiled (G2) 4 Vulnerable (G3 or T3)
Mill Hill	**12**	5 Red 7 Blue	1 Endangered 1 Threatened 1 Special Concern	1 Vulnerable (G3)
Observatory Hill	**11**	5 Red 6 Blue	3 Endangered 3 Special Concern	1 Imperiled (G2G3) 2 Vulnerable (G3 or T3)

It is worth noting that Uplands Park contains a significant proportion of the Canadian populations for many of these species. For example, it is one of seven extant sites of Bearded Owl-clover (30% of the total number of plants), one of seven confirmed Coast Microseris sites (14-22% of the total number of plants), one of seven Foothill Sedge sites, one of 31 Macoun's Meadowfoam sites, one of three Muhlenberg's Centuary sites (98% of the total plants), one of 20

[2] This table was compiled by Wylie Thomas in April 2017 with information provided by Jenifer Penny (BC Conservation Data Centre), Matt Fairbarns (Trial Island), Andrea Schiller and James Miskelly (Natural Resources Canada) and supplemented by research at the Royal BC Museum Herbarium and the BC Species and Ecosystems Explorer (http://a100.gov.bc.ca/pub/eswp/). It will be updated in the coming year with Bigleaf Lupine (*Lupinus polyphyllus* var. *pallidipes*), bringing the total number of rare plants to 25.

Purple Sanicle sites (19% of the total plants), one of two Water-plantain Buttercup sites (60% of the total plants), one of four Tall Woolly-heads sites (33-67% of the total plants), one of 13 Yellow Montane Violet sites (<1% of the total plants), one of 22 White-top Aster sites, one of 18 Banded Cord-moss sites, one of 27 Twisted Oak Moss sites and the only known population of Kellogg's Rush. (Parks Canada 2006a, 2006b, 2006c, 2013a, 2013b, 2013c). For the list of these plants, please see Appendix 1.

Six SARA-listed species—Victoria's Owl-clover, Bear's-foot Sanicle, Geyer's Onion, Scouler's Catchfly and Howell's Triteleia—are known to have disappeared from the park since the 1990s. This number is likely higher since many of the rare plant collections from the area were done at a time when the park and some of the neighbourhoods had yet been established and would therefore not have been listed as originating from the park.

Figure 1—Number of Species of Rare Plant by Meadow in Uplands Park

Numbers shown are for the rare plant species that are currently know in different areas of the park. Four meadows stand out as having the highest number of species at risk: Central Meadow (17 species); Eastern Meadow (5 species); Memorial Meadow (4 species) and the four meadows at Cattle Point which, between them, count 10 species at risk.

2.4 Animal Species at Risk

Four rare invertebrates—all of them butterflies—are reported to have occurred in Uplands Park. Taylor's Checkerspot (*Euphydryas editha taylori*) and the Western Branded Skipper, *oregonia* subspecies (*Hesperia colorado oregonia*) were both collected from the park in the 1950s but have not been reported since (Collier *et al.*, 2004). The Island Ringlet (*Coenonympha californica*

insulana), once the most common butterfly in Victoria but red-listed today, and Propertius Duskywing (*Erynnis propertius*) were last reported from the area in 1995 (BC Ministry of the Environment 2014). Uplands Park contains several meadows that are suitable for Taylor's Checkerspot and the Island Ringlet, although these are slowly being converted to woodlands by the encroachment of woody species. The Western Branded Skipper may have been associated with the park's rocky outcrops where bunch grasses such as June Grass (*Koeleria macrantha*) may once have been more common (Collier 2004).

2.5 Invasive Alien Plants

Alien or exotic species are species that have been introduced outside of their natural range or habitat by humans. They are considered invasive when they establish themselves in their new environment and spread and increase in numbers.

Invasive alien species are considered a major driver of the worldwide decline in biodiversity, second only to habitat loss in their contribution to the phenomenon. They do this by displacing native species through competition for limited resources (IUCN 2017). Invasive plants have been identified as a serious threat to the survival of the 13 SARA-listed species in their respective recovery strategies (Parks Canada 2006a, 2006b, 2011a, 2011b, 2013a, 2013b, 2013c, 2013d).

More than 80 alien, invasive plants have been noted in Uplands Park, where they threaten not only its rare plants but also its endangered ecosystems. Many of these need to be controlled if the park's Garry Oak woodlands are to survive and its open meadows saved from conversion to a closed canopy system. However, not all are equally invasive and some pose a bigger and more immediate threat than others, and it is not practical to try to control all. A map of the distribution of invasive plant species is given in Appendix 7 and shows that the northwest of the park contains the highest share concentration of invasive plants in the park.

In addition, some native species have become much more common in the park than they were in the pre-European period due to human influences such as the suppression of fire. These include common snowberry (*Symphoracarpus albus*) and Nutka rose (*Rosa nutkana*), which dominate the understory of much of the park, and Douglas's Spirea (*Spirea douglasii*) which is encroaching slowly into the Central Meadow where most of the park's rare plants are found. Fire suppression has also contributed to the expansion of native and non-native trees which has converted much of what was once open meadow into woodlands.

It is worth stating here, that invasive species are not the only threat to the parks endangered plants and ecosystem. Other threats derive from the trampling and soil compaction brought on by the recreational use of the park. These must be dealt with as part of a larger management plan for the park, of which this invasive plant management plan is one component.

3 Developing the Current Eight-Year Plan: Background and Methods

In 2014, Wylie Thomas developed a draft five-year woody invasive species management plan (2015 – 2019) to address the threats from invasive plants to the park's rare plants and the ecosystems. Although this plan provided the basis for a successful HSP funding request, it

became apparent in its implementation that it needed to be refocused based on lessons learned. The new eight-year plan invasive plant management plan proposed here builds on the 2015 – 2019 plan by drawing on lessons learned and data collected in it implementation. The new plan makes a number of changes, namely:

- it redraws the boundaries of the treatment units of the original plan to better align them with features on the landscape;
- it provides better estimates of the resources required for controlling the target invasive plants, and incorporates in the threatment plan a focused monitoring and retreatment schedule that aims to reduce infestations to a level where, by 2025, long-term control can be sustained by municipal parks staff and volunteers, without additional outside support;
- it reduces in size the target area for intense removal of invasive woody shrubs to focus on meadows with the highest number of species at risk and their surrounding woods;
- it expands the area of the park targeted for the removal of mature invasive trees to include the previously excluded northwestern section, so that, by 2025, the park will have been cleared of all mature invasive trees;
- it includes provisions for the development of a baseline inventory of species at risk so that its effects can be assessed over time;
- it incorporates a monitoring and retreatment plan;
- it continues the push to eradicate broom from the park by preventing new seed-set in the park and thereby depleting the broom seed bank.

3.1 Building on Earlier Invasive Plan Management Plans

Uplands Park has been the subject of considerable activity to remove invasive species since the 1990s when volunteer groups first organized to remove Scotch Broom from its meadows. In 2004, the park's 3 large Gorse infestations were removed with the help of heavy equipment, and Gorse has now been brought largely under control. Scotch Broom, however, continues to be a significant pest despite the considerable resources that have been expended in its control. This can be attributed to the plant's long-lived seed bank but also to gaps in the availability of funding which have meant that occasionally a season was missed which allowed broom to set seed and replenish its seed bank. In 2005, the park's mature European Ash trees were felled with chainsaws and removed from site, but because their stumps were not treated with herbicide, they continued to send out new shoots from the base of their trunks and from their roots, creating dense new stands of Ash that crowd out the native Garry Oaks and other trees in the park's woodlands.

Since 2005, the park has received regular funding through Environment and Climate Change Canada's Habitat Stewardship Program (HSP) which has allowed the District of Oak Bay to hire small crews each summer to focus on removing woody invasive shrubs around critical habitat of the park's SARA-listed species. This work has focused primarily on removing Scotch Broom and Spanish White Broom in the park's meadows, but more recently on managing Himalayan Blackberry, English Ivy and Daphne. Starting in 2014, as part of its contribution to the HSP project, Oak Bay Parks provided arborist time to start removing mature invasive trees from the park. These federal funds, combined with extraordinary community input through volunteer invasives removal labour organized by Margaret Lidkea and Friends of Uplands Park, have

created momentum in Oak Bay to tackle the park's invasive species. In 2016 volunteers, contributed a total of 1600 hours removing English Ivy, Scotch Broom, Daphne and Carpet Burweed from the Cattle Point section of the park.

3.1.1 *2005 Uplands Park Invasive Species Management Plan*

An invasive species management plan for the site was prepared in 2005 by Richard Collier. The plan identified 10 species for control, which it ranked according to priorities for management. The ranking scheme, which considered both significance of impact and ease of control, arrived at the following priority:

1. Scotch Broom
2. One-seed Hawthorn
3. English Ivy
4. Daphne
5. European Ash
6. Norway Maple
7. Himalayan Blackberry
8. Crow Garlic
9. Gorse
10. English Holly

The plan produced detailed maps of the levels of infestation for each of the species, which has proved to be a very useful reference especially when assessing how these invasive plants have spread in the park over the last 12 years. However, the 2005 plan did not lay out any annual treatment plans and was never implemented, although subsequent plans have built on its list of priority invasive plants.

3.1.2 *Five-Year Woody Invasive Species Management Plan (2015 – 2019)*

In the fall of 2014, Wylie Thomas developed a comprehensive five-year plan (2015 – 2019) for controlling invasive woody species in the park. To develop the plan, he divided the park into 95 treatment units (TUs) based on features easily identifiable in the field such as paths, streams and changes in habitat (e.g., from woods to meadows), and surveyed each of these to determine the levels of infestation of invasive shrubs and trees and to estimate the resources required for their removal.

He found the concentration of invasive plants in the western third of the park to be disproportionally higher than in other areas of the park. Because these areas are also of lesser ecological value (fewer SARs), and because of the enormous resource levels required in their control, a decision was taken to exclude this section of the park from the 2015 – 2019 plan. The park was thus divided into a "project area" to focus resources and a "no-go zone" that would be excluded from invasives removal activities (See Figure 1).

Figure 2 - Uplands Park showing 2015 – 2019 Project Area and Location of Rare Plants

The project area of the original 2015 – 2019 woody invasives management plan is shown in green. The area shaded in red is a zone of extremely high concentrations of invasive woody plants and was excluded from the 2015 – 2019 plan. The locations of the park's rare plants are shown in orange. Those appearing outside the project area are subpopulations of *Carex tumulicola* and *Psilocarphus elatior*, which are relatively abundant in the rest of the park.

3.2 Building on Experience in Implementing the 2015 – 2019 Plan

The 2015 – 2019 plan was subsequently used to develop a successful application for three years of funding from HSP. Since that time, 400 person-days of hired crew time have been invested in removing woody shrubs from the areas identified in the 2015 – 2019 plan, and municipal arborists have spent more than 80 person-days removing 850 mature invasive trees from 13.7 hectares of woodlands.

In implementing and monitoring the 2015 – 2019 plan, it became apparent that the plan was overly ambitious and the resources needed for its implementation had been underestimated. A new plan was needed, one that would more tightly focus resources to control weeds in areas where they would have the biggest impact. (See Figure 3 for 2014 – 2017 work areas).

During his three year involvement, Wylie kept detailed records on the resources required to remove the individual woody shrubs and trees targeted in the plan. It allowed an assessment of different control techniques in terms of their efficacy and the length of time needed to bring the different invasive species under control (this information has been summarized in Table 3, and was used in developing the new eight-year plan described in detail Section 5, below). As well, it

became apparent that the list of target invasives should be expanded to included a few of the herbaceous species that may one day threaten the vernal pools of the park.

Figure 3—Focus of Summer Crew and Arborist Activities 2014 – 2017

Areas cleared of mature invasive trees by municipal arborists are shown in purple (13.7 hectares). Areas of white hatching are where summer crews focused on removing woody invasive species including Privet, European Ash seedlings/root suckers, Himalayan Blackberry, Daphne and English Ivy.

3.3 Resurvey the Park in 2017 and Develop Geodatabase

In the summer and fall of 2017, Wylie Thomas spent 5 days resurveying the park to redo the estimates for controlling woody invasive plans in the park based on three years of data collected in the field. This work also identified a number herbaceous exotic plants (not part of the original plan) that pose a threat to these plants and their habitat and estimated the resource requirements for controlling these priority herbaceous IPs.

These data were used to build a geodatabase of the park's invasive species which provided the basis for developing the annual treatment plans that are the backbone of this 2018 – 2025 plan described in Section 5. The attribute data are provided in Appendix 3 and 4, and include information on the resources required to control priority invasive shrubs and forbs as well as on the mature invasive trees in the remaining woodlands of the park that have still not been treated. As part of this exercise, Wylie redrew the boundaries TUs of the original plan to better coincide with features on the ground and remove any overlaps and splinters in the feature class.

Four TUs (TU8, TU9, TU47 and TU50) were split into smaller, more manageable units, brining the total number of TUs to 100 in the new plan.

3.4 Mapping and Inventory of SARA-listed Species

In the spring and summer of 2017, six SARA-listed species were inventoried to provide baseline data for monitoring changes in the population health of rare species in the park as the eight-year plan is implemented. These species and their counts are shown in Table 2. In undertaking the rare plant inventories, new patches of four species at risk were discovered (Muhlenberg's Centaury, Water-plantain Buttercup, Kellogg's Rush, Bearded Owl-clover). These have been reported to the BC Conservation Data Centre.

In addition to the counts, the extent of known patches of Bearded Owl-clover, Erect Pigmyweed, Macoun's Meadowfoam, Water-plantain Buttercup and Yellow Montane Violet were mapped. Maps of these are reproduced in Appendix 2.

The resulting geodatabases have been provided to the Park Department of Oak Bay along with this plan.

Table 2 - Results of Rare Plant Inventory (2017)[3]

Species at Risk	Presence in the Park	Date	Numbers
Bearded Owl-clover (*Triphysaria versicolor* ssp. *versicolor*)	**TU67, TU90, TU91, TU92, TU94**	**April 27 – May 8, 2017**	**8184**
Purple Sanicle (*Sanicula bipinnatifida*)	TU15, TU75, TU80, TU83, TU90, TU94	June 2 – 6, 2017	510
Victoria's Owl-clover (*Castilleja victoriae*)	TU92	June 2017	0
Water-plantain Buttercup (*Ranunculus alismifolius* var. *alismifolius*)	TU62, TU69, TU70	May 8, 2017	168
White-top Aster (*Sericocarpus rigidus*)	TU62	July 19, 2017	3180
Yellow Montane Violet (*Viola praemorsa* ssp. *praemorsa*)	TU76	April 24, 2017	48

3.5 Identify Threats from Herbaceous Invasive Plants

In June of 2017, a quick assessment of herbaceous species that pose an immediate threat to species at risk in the park's seven high-value meadows was conducted. This survey found that the most pressing threats arise from the following species:

- **Non-native Bunch Grasses**—Velvet Grass (*Holcus lanatus*) and Orchard Grass (*Dactylis glomerata*) have begun to move into the park's main vernal pool in the Central Meadow

[3] Counts are for flowering individuals, except for White-top Aster, where all stems were counted. For the locations of Treatment Units (TUs) refereed to in the table, please see Figure 4.

(TU62) where 16 species at risk reside. Thatch build-up brought on by encroachment from such grasses such as these is identified in the *Recovery Strategy for Multi-species at Risk in Vernal Pools* (Parks Canada 2006b) as posing a moderate to high risk to the persistence of vernal pools and the species that inhabit them. Tall Oat-grass (*Arrhenantherum elatius*), which in recent years has severely invaded other meadows of the park, was observed in areas immediately adjacent to the park's main vernal pool in the Central Meadow; it is not clear whether this species will move into the vernal pool areas.

- **Crow Garlic** (*Allium vineale*)—This species has heavily invaded most of the park's meadows. It has significantly increased its extent (advanced considerably) since it was mapped in 2004 by Collier et al (2005). It is also observed to be moving into the vernal seep of the Eastern Meadow where it could possibly threaten the survival of the 5 species at risk there, but it has stopped short of doing so in the large vernal pool of the Central Meadow. Although no studies have investigated the impact it is having on native flora diversity and abundance, it seems reasonable to assume that it is negative. A brief trial of removing Crow Garlic by pulling mature individuals in late June and early July of 2017 found that there are on average 135 mature plants/m2 and which take on aver average 5.67 minutes to pull. A quick calculation shows that it would take 60 person days to remove all the Crow Garlic in the Central Meadow by hand. Unfortunately, pulling the garlic by hand leaves many individual behind in the soil as bulb offsets (bulbils) . There are unfortunately no known treatments for *Allium vineale* infestations in a conservation setting.

3.6 Other Values: Need for Consulting Stakeholders

This invasive plant management plan focuses explicitly on the recovery of native plants particularly the species at risk in the park. However, the large-scale removal of invasive plants, particularly of trees, as proposed in this plan, will impact other park values.

For example, more than 220 species of bird have been identified in the park, making it one of the best places in our region for bird watching. It is reasonable to expect that removing invasive trees will have some effect on the park's bird population.

The removal of invasive species will affect aesthetic values. The park is a popular destination for hiking and some of the woodlands created by tall invasive trees add to the diversity of landscapes that are part of the park's appeal to recreational users.

Therefore an important step in finalizing of this plan will be to consult with other stakeholders to determine what these other values are and how they can be accommodated in this plan. The basic outline of this plan has been presented to members of Friends of Uplands Park, the Oak Bay Parks and Recreation Commission and group of interested community members organized by Friends of Uplands Park in October 2017. Further consultation will be started in the winter of 2018 and competed by the start of the work season (May 2018). The following groups have been identified:

- Neighbours of Uplands Park
- Dog Walkers
- Naturalist Groups (Birders, VNHS)
- Community Association of Oak Bay
- Friends of Uplands Park
- Parks and Recreation Commission

Table 3—Summary of Target Invasive Species, Key Aspects of their Biology and Recommended Treatments

Species	Seed Longevity	Seed-Bearing Age	Recommended Treatment[4]
Common Privet (*Ligustrum vulgare*)	< 1 year (Shelton & Cain 2002)	330 growing degree days (Wikipedia)	The recommended treatment found in the literature is to stem inject with Garlon (NSWDPI 2014). However, our experience controlling this plant at Uplands Park is that dabbing undiluted glyphosate on cut stems works well. We recommend removing most of the biomass by hand and then dabbing cut stems. We mave found that, for full control, patches must be retreated for four consecutive years following the initial treatment. The level of effort required to retreat follows an approximate half life (4 pd→2 pd→1pd, etc). Following this, we recommend monitoring for regrowth every three years. In terms of initial treatment, we have found we can clear 35 m^2 of large Privet per person-day (pd).
One-Seed Hawthorn (*Crataegus monogyna*)	Unknown (Bossard 2000) or 2 – 3 years (Dirr and Heuser 1987)	10 years (CIPC 2014)	Without treating with herbicides, cuts stumps will resprout. The recommended treatment found in the literature is to dab cut stems with Garlon (Bossard 2000), but we have found that undiluted glyphosate works very well on the stumps of trees cut in the late summer. Berries generally remain firmly attached to the trees into September, although care should be taken to pick up and dispose of the few that do drop.
European Ash (*Fraxinus excelsior*)	No information found, but other species in the genus usually less than 3 years (Klooster 2014)	15 years, but usually longer (Bonner 2008)	There is little information on the control of this tree as it is generally considered highly desirable in its native range. It is a root-suckering species that vigorously resprouts from root fragments, if the cut trunk is not immediately treated with an herbicide. In some parts of the park, where trees were felled without subsequent treatment, live root fragments have raised a dense forest of many thousands of ash trees where once there were only a few. We have tried both triclopyr and glyphosate on cut stems and have found better results with the latter. As of 2016, all trees of seed-bearing age have been cut down. However, we believe it is necessary to treat saplings of all ages in order to kill the root fragments and rid the park of this tree. We recommend retreating all regrowth regardless of size for four consecutive years following initial treatment. In some cases this will require spot spraying saplings with dilute glyphosate in the late summer when native plants are dormant. After four years, and if seedlings are under control, monitor ever 5 years. We have built retreatment into the annual treatment plans in Section 5 and will monitor for effectiveness and keep track of the resources required, as it is too early (in 2017) to know what the follow-up resource commitments will look like.
English Holly (*Ilex aquifolium*)	3 years (Arrieta & Suárez 2004)	5 – 12 years (CIPC 2014)	The literature recommends stem injection with triclopyr (Salisbury 2014) although we have found that dabbing freshly cut trunks with undiluted glyphosate in late summer works well (be sure to read label). Berries generally remain firmly attached to the trees into September, although care should be taken to pick up and dispose of the few that do drop.

[4] Always read the product label before using herbicides. Pesticide labels are legal documents, and it is against the law in Canada to use a pesticide in any other way than specified on the label.

Species	Seed Longevity	Seed-Bearing Age	Recommended Treatment[4]
English Ivy (*Hedera helix*)	1 year (Stavretovic, 2007)	10 years (Bossard 200)	The literature recommends dabbing cut stems with undiluted triclopyr (Soll 2005). We have used triclopyr in 1:19 mix with mineral oil as per label specification, but found it does not work very well on green stems, but does the trick on woody ones. We have found also that undiluted glypohsate works well on both woody and green stems. *Carpet/ground Ivy (Elc)*—is extremely slow to remove if it is well established. We have found that a patch can be cleared at a rate of 19 m^2/pd. We have tried spot spraying dilute Garlon XRT on the leaves in the winter (when all else is dormant) and initial results look promising. *Ivy "stockings" on trees (Els)*—Cut stems and trunks of climbing or fruiting/flowering ivy, ensuring a gap of several inches between the two severed ends. Severed lianas left on trees will die. Treat cut trunks and root masses that cannot be pulled easily from the ground with herbicide. Return to treated sites every 2 years to retreat as needed. In developing our treatment schedule for this plan we have assumed subsequent treatments require one-tenth that of the original.
Daphne (*Daphne laureola*)	2 – 3 years (Webb 2006)	4 years (Webb 2006)	The literature cites triclopyr as effective against Daphne, but we do not recommend the use of herbicides to control Daphne as they can be usefully controlled with mechanical methods. Smaller individuals can be pulled by hand, provided this does not cause disturbance of the soil. For larger plants, cut well beneath soil, below the point where there is a visible color change from brown stem to orange root (below a lateral root). See Appendix 4 for precautions about handling this plant. Our experience shows that an individual can clear 200 m^2 of dense Daphne in one 8-hour day. We recommend retreating every three years (it takes 3 years to reach flowering size) after initial removal. The second and third treatments are assumed to require the same resources as the first, however starting in the fourth treatment, resources follow a half-life pattern (8 pd→4 pd→2 pd)
Himalayan Blackberry (*Rubus armeniacus*)	"several years"	Not found	This species produces many underground rhizomes that resprout vigorously unless completely dug up or treated with an effective herbicide. We recommend the judicious use of herbicides to avoid damaging the soils in the park's sensitive ecosystems. We have tried both undiluted glyphosate and agree with the literature that triclopyr provides better control. We recommend cutting canes and removing biomass by hand, then treating crowns and canes with triclopyr. In some cases it is necessary to spot spray the leaves of regenerating plants with diluted triclopyr in late summer. In developing our treatment plans, we assume it takes about 1 pd to treat 30 m^2 of dense Blackberry, and that monitoring and retreatment should occur for four consecutive years following the initial treatment. The level of effort required to retreat follows an approximate half life. After the fourth year, treated sites should be monitored every 3 years.

Species	Seed Longevity	Seed-Bearing Age	Recommended Treatment[4]
Gorse (*Ulex europaeus)*	30 – 70 years (Zabkiewicz 1976)	2 – 3 years	The literature recommends treating with triclopyr (Prasad 2003) which we have found works well in practice. Remove biomass by hand, apply triclopyr in 1:19 ratio with mineral oil to freshly cut stumps, apply thick layer of mulch to prevent germination of seed bank and monitor yearly for resprouting and regeneration from seed bank. Mature plants are most effectively controlled when they are blooming and their root reserves depleted.
Scotch Broom (*Cytisus scoparius*)	5 - 30 years (Bossard *et al.*, 2000; Carson 1998)	2 – 3 years	Herbicide is not needed in the control of broom. Cut broom plants below soil surface to past the first lateral root to ensure kill (otherwise the rootcrown will resprout). This also minimizes soil disturbance. Large woody stems can be cut well above ground (2 – 3 ft) and generally will not sprout provided there are no green side branches remaining below the cut. Mature plants are most effectively controlled when they are blooming and their root reserves depleted. Broom must be treated every year as the goal is to deplete the long-lived seed bank by preventing seed production in the park for many years. Based on our experience controlling broom, we have allocated 15 person-days per year to treat all broom in the park (early May). This also includes time to seek and treat any Gorse. If it turns out one day that 15 pd is more time than is required, direct remaining resources to other tasks in the plan.
Cotoneaster (*Cotoneaster* spp.*)*	"Short-lived" (GOERT 2002) but otherwise not characterized	3 years (Bossard 2000)	The literature recommends dabbing cut stems with triclopyr (Brossard 2000), although we have found that glyphosate works well. Cut shrubs to ground and apply triclopyr to freshly cut stems and trunks that cannot be easily removed without disturbing the soil. Revisit the following spring for regrowth and retreat with herbicide as necessary.
Norway Maple (*Acer platanoides*)	N/A	7 years	The literature recommends the use of triclopyr or glyphosate (Love 2003). Our limited experience with the use of undiluted glyphosate on cut stumps is that it works well. Cut trees to ground, apply herbicide to cut stump, as it is reported to be able to resprout (City of Toronto 2013).
Horse Chestnut (*Aesculus hippocastanum*)	N/A	N/A	Our experience is that undiluted glyphosate on cut trunks works well (check label). The biggest group of these trees was removed in 2014 and as of 2017 they have not resprouted.
Bird Cherry (*Prunus avium*)	N/A	N/A	In our three years of experience, undiluted glyphosate on cut trunks appears to work well.
Orchard Grass (*Dactylus glomerata*)	N/A	N/A	There is little information on how to control Orchard Grass except for the use of grass-specific herbicides such as POAST. We have limited experience in removing Orchard Grass with carpet knives in areas away from species at risk and have no information on how many repeat treatments it takes to control, nor data on resources levels per m^2 cleared. We have, however, included Orchard Grass in this Invasive plant management plan and have used the following assumptions to calculate resources: • retreat every year once treatment has been initiated • first 3 years following initial treatment, resources are one-fifth initial treatment • starting in fifth year, the resources required are one-tenth that of the original treatment

Species	Seed Longevity	Seed-Bearing Age	Recommended Treatment[4]
			• **in some Treatment Units (TUs), the initial treatment is spread over several years (e.g., TU62) because of the size** • **these assumptions have not yet been tested in practice (as of 2017)** We are including Velvet Grass and some Tall Oat-grass in our treatment of Orchard Grass.
Honesty (*Lunaria annua*)	N/A	N/A	There is little information on controlling Honesty, however our limited experience suggests that the seed bank may be very short lived (i.e., 1 year). In our treatment plan, we have assumed that we need to monitor for three years after initial treatment.
Carpet Burweed (CG) & Bur Chervil (BC)	N/A	N/A	Carpet Burweed is an annual that continually germinates from October until May, peaking some time in March. Early germinants may go to seed before the last crop germinates so, from October to May it is important to check once a month and remove any new germinants found. Plants along with their shallow root systems can be removed by hand using a car key or other similarly shaped objects. Very large patches can be burned with tiger torches to kill the seed banks, provided they are not in sensitive meadows (***always*** check with a botanist familiar with the locations of rare plants before employing tiger torches). Bur Chervil germinates in the winter and reaches maturity toward the middle of May. Plants should be pulled at the end of April or early May before the seeds ripen, and disposed of in sealed plastic bags so that seeds don't spread. In our treatment plan we assume 10 person-days in the late summer and early spring to remove the two species. Any time left over can be used to go after Poison Hemlock and other species.
Leopard's Bane (LPB)	N/A	N/A	Leopard's Bane (LPB) is a rhizomatous species that is found in only one part of the park (TU27), and it is spreading. It was treated for the first time in 2017 with a spot spray of glyphosate. Efficacy will be monitored and treatment adapted if necessary. The treatment plan assumes that the treated site will be monitored for 4 years following initial treatment.

4 Uplands Park 2018 – 2025 Invasive Plant Management Plan

4.1 Goals

The goals of invasive plant management at Uplands Park are as follows:

1. To protect species and ecosystems at risk from competition and suppression imposed by invasive plant species;
2. To reduce the risk to property from wildfires fuelled by invasive woody species;

3. To prevent small, isolated subpopulations of invasive plant species, which can now be controlled with low-cost interventions, from expanding to become too large to control with available resourcing.

The 2018 – 2025 invasive plant management plan described in this document achieves these goals by:

- identifying invasive species that pose the greatest threats to these values (Section 4.2.1);
- identifying areas of focus so that resources are concentrated where they achieve these goals (biggest bang for the buck) (Section 4.2.2);
- developing annual treatment plans for each of the eight years covered by this plan so that, by the end of 2025, the threats posed by invasive non-native trees, shrubs and herbaceous plants will be reduced to levels sufficiently low that subsequent long-term control can be sustained by municipal parks staff and volunteers, without additional external support (Section 5).

Figure 4 – Uplands Park Treatment Units (2018 – 2025)

Treatment Unit numbers are shown. Treatment units (TUs) are delineated by trails (shown in red and blue), changes in habitat type (black lines) and other features such as streams (shown in light blue).

4.2 Target Areas and Priority Invasive Plants

The entire park has been divided into 100 treatment units (TUs), the boundaries of which are based on features easily identified in the field, such as paths, streams and changes in habitat type (e.g., woods to meadow) as shown in Figure 4. The TUs provide an easy way to organize work parties and to keep track of progress. Each of these TUs is associated with attribute data in shape files that include information on invasive species present, estimated resources needed for their removal, rare plants, etc. The attribute data used to develop this eight-year plan are shown in Appendices 4 and 5.

Uplands Park contains more than 80 species of invasive plant, a number that exceeds what can reasonably be managed given available resources. It is therefore necessary to identity those that pose the greatest threat to the park's species at risk and its endangered Garry Oak associated ecosystems and focus removal work accordingly. In identifying the areas of focus for this eight-year plan, the following tactical considerations, described by Fairbarns (2014), were used as guidance:

- Areas with plant species at risk take priority over areas with imperilled ecosystems, and they take priority over areas with neither species at risk nor imperilled ecosystems.
- Small spot-infestations take priority over well-established weed populations.
- Stopping the replenishment of invasive species seed banks in the soil is a more urgent priority than is removing juvenile invasive plants. This is accomplished by establishing the target treatment area for a multi-year project, removing all mature plants as soon as possible, and then returning to treated areas to remove juvenile plants.
- Once an area has been treated, regular inspections should be conducted to ensure that there are no flowering plants (removing flowering material if present). If this task is neglected, soil seed banks will be replenished and most of the work completed to date will have to be repeated. If flowering can be prevented, almost all of the seed banks of Daphne and English Ivy will be depleted within a few years.

4.2.1 *Priority Invasive Species*

In terms of invasive species to focus on, we have built on the list proposed by Collier (2005) and grouped them into the following categories, each with their own target areas:

1) ***Mature Invasive Trees***—These are found in large numbers in the park's woodlands where they grow faster than Garry Oaks and other native trees and have in many places come to dominate the tree canopy. Over time, they threaten to convert the open meadows and vernal pools to closed canopy systems by seeding into them. They also add to the fuel load of the park which could impact the park's natural and surrounding property values should a fire ever take hold. These species of tree include the following: European Ash (*Fraxinus excelsior*); One-seed Hawthorn (*Crataegus monogyna*); English Holly (*Ilex europaeus*); Bird cherry (*Prunus avium*); Portuguese laurel (*Prunus lusitanica*); Norway Maple (*Acer platanoides*); Horse-chestnut (*Aesculus hippocastanum*); European Mountain Ash (*Sorbus aucuparia*); Golden Chain (*Laburnun* spp.)

2) ***Broom and Gorse***—Scotch Broom is found throughout the park in the open meadows and at the edges of woodlands. White Broom is found in great numbers in the Eastern Meadow (TU67) where it has hopped the fence from a neighbouring property where it is grown as a

garden ornamental. Gorse used to be found in three patches but is now largely under control. All three species are nitrogen fixers that invade open areas where they present a serious threat to the park's meadows, vernal pools and rare plant species. The additional nitrogen that they bring to the meadow ecoystem encourages the invasion and competiveness of non-native grasses which further aggravate the threats.

3) ***Woody Invasive Species***—These species can be found in either shaded areas such as woodlands or in open areas. This plan targets the following species: Common Privet (*Ligustrum vulgare*); Himalayan Blackberry (*Rubus armeniacus*); English Ivy (*Hedera helix*); Cotoneaster (*Cotoneaster* spp.); Pyracantha (*Pyracantha coccinea*); Daphne (*Daphne laureola*) and European Ash root suckers. How these plants are addressed depends on where they occur in the park and will be dealt with in the next section. For example, Daphne and English Ivy, which are present in staggering quantities in the park, are only targeted in areas where they occur near high concentrations of rare plant species.

4) ***Herbaceous Invasive Species***—The vast majority of invasive plants fall into this category but this plan only addresses a small subset of them based on: 1) the threat they pose to the rare species in the park; 2) the stage of invasion they are found. The exotic bunch grasses *Dactylis glomerata* (Orchard Grass), *Holcus lanatus* (Velvet Grass) and *Arrhenantherum elatius* (Tall Oat-grass) along with Carpet Burweed (*Soliva sessilis*) fall under the first category for the threat they pose to the persistence of the vernal pools, while Poison Hemlock, Lesser Celandine and Bur Chervil are recent arrivals that are at an early stage of invasion where their further spread can be halted.

4.2.2 *Target Areas*

This plan identifies four levels of targeted activities:

1) *Entire Park*—**Every year in May, all areas of park are cleared of all Gorse and Broom of** blooming size. At the same time, Bur Chervil is removed from the 5 places it is currently found, and a half-day is spent looking for any new occurrences. Other plants that are treated annually early in the season are Carpet Burweed, Poison Hemlock and Leopard's Bane.

2) *Critical Habitat Zone*—This is defined here as the seven meadows with largest number of species at risk and the woodlands that immediately surround them, and is shown as white hatching in Figure 5. The Critical Habitat Zone (CHZ), which is more narrowly defined than the 2015 – 2019 plan, provides the focus for intense invasive removal work by hired summer crew with a goal to rid these areas of *all* woody invasive plants and some of the exotic bunch grasses that are invading their vernal pool systems by 2025. The exception is ivy, which requires huge investments in time and effort to clear small areas, and so, is being targeted only in those areas of the CHZ that are closest to occurrences of species at risk and where they are deemed to pose a long-term threat to these species. Target areas for ivy are identified in the annual treatment plans described in Section 5 of this document. Each year the intensity of focus shifts between these seven meadows as outline in the annual treatment plans. The Critical Habitat Zones are shown as white hatching in Figure 5 and include the meadows shown in orange shading.

3) *Former Project Area*—This approximates the former "project area" of the 2015 – 2019 plan. The focus here is on removing point infestations of Privet and Himalayan Blackberry from the central areas of the park before they become well established and spread further. The locations of the patches of Privet and Himalayan Blackberry that will be eliminated as part of this plan are indicated in red square (Privet) and purple triangle (Himalayan Blackberry) in Figure 5.

4) *Woodlands*—These are the woodlands that will be cleared of mature invasive trees by municipal arborists, which will complete the process to rid the entire park of invasive trees by the end of 2025. A map of this area is shown in Figure 6.

Figure 5—Focus Areas for Woody Shrub Removal (2018 – 2025)

Seven "high value" meadows in Uplands Park contain the majority of the rare plant species in the park. These meadows are indicated by orange shading with the number of species they contain indicated. The objective of this plan is to fully control all woody invasives except ivy in these meadows and the woodlands surrounding them (white hatching). Due its extreme difficulty to control, English Ivy is targeted only in areas that lie immediately adjacent to the high value meadows. Point infestations of other species that lie outside of the white hatched areas will also be **treated and are indicated as follows: ★ = Gorse; ★ = Poison Hemlock; ▲ = Himalayan Blackberry; ◆ = ground ivy; ⬟ = Lesser Celandine; ■ = Privet; ● = Leopard's Bane.**

4.2.3 *Eight-Year Objectives*

The following objectives guided the development of the new 2018 – 2025 invasive plant management plan for Uplands Park:

1. Ensure no new seed production by Scotch Broom, Spanish White Broom, Gorse, Carpet Burweed, Poison Hemlock, Lesser Celandine and Bur Chervil anywhere in the park (all 31 hectares);
2. Remove from the entire park all mature non-native invasive trees (European Ash, One-seed Hawthorn, English Holly, Norway Maple, etc) by the end of 2025;

3. Remove all Himalayan Blackberry, Privet and climbing English Ivy ("stockings") from the main part of the park by the end of 2025;
4. Remove all Daphne from Critical Habitat Zone by September 2019;
5. Remove ground ivy from certain identified areas where it is a pioneering patch or its proximity to high value meadows poses a long-term threat to the survival of its rare species, making it a priority for control.

Figure 6—Focus Area (Woodlands) for Mature Invasive tree Removal (2018 – 2025)

4.3 Resources Requirements

The treatment plans described in Section 5 below were developed on the assumption that the resources provided for the project will continue at the same levels as the four years from m2014 – 2017, namely: 100 person-days of hired labour to remove woody and invasive shrubs in the late summers; and, 20 person-days of arborists time to remove invasive trees. It assumes that the District of Oak Bay will continue to provide the support in terms of biomass disposal, chipper truck, chain saws and other tools. The Oak Bay Parks Department has expressed a strong desire to see the project through and a willingness to continue to provide the in-kind support and arborists time that it has in he past. However, it will need to seek an additional $25000 in funding to cover the costs of hiring a summer crew.

However, in the event that this level of funding is not continued, resources must be found to support, at a minimum, the removal of Carpet Burweed, Bur Chervil, Gorse, Scotch Broom and Spanish White Broom according to the schedule outlined in this plan (Section 5.1). Many years and resources have been invested in bringing Scotch Broom and Gorse under control, and many more, although at ever declining levels of effort, will be required before their long-lived seed banks are finally depleted. Missing a single season would allow these plants to reach maturity and produce seed, setting back efforts by many years. If, in addition, arborist time can be invested in this project, the recommendation is to continue removing invasive trees as per this plan.

5 Treatment Plan

5.1 Annual Treatment Plans

This section details the annual treatment plans that are the backbone of this eight-year invasive plant management plan. Each treatment plan consists of a table that summarizes the treatment, retreatment and monitoring activities to completed that year along with a map illustrating the locations of those activities. For some species, the locations of point infestations have been indicated on the map make finding them easier in the field. TU# listed in the tables refer to the treatment units in which the activities are to take place. A map of all TUs can be found in Figure 4.

Each annual treatment plan is structured as follows:

1) **Winter/Spring IP Treatments**, which are activities completed early in the year and target broom and gorse and a number of herbaceous plants. They are essentially invariable between years and most apply to the park in its entirety. We have allocated 20 person-days to complete these tasks.
2) **New IP Treatments**, which are first-pass treatments of woody and herbaceous IP infestations that have never been treated before. They are carried out by the hired summer crew.
3) **IP Retreatments**, which focus on previously treated areas with a goal of reducing the infestation to a level where it is for all intents an purposes under control. They too are carried out by the hired summer crew. Together with New IP Treatments we have allocated 80 person-days to complete these tasks.
4) **Mature Invasive Trees**. These are the areas from which arborists remove mature invasive trees. Each year focuses on a different wooded area with the goal of ridding the park of all invasive trees by 2025. It includes a monitoring plan for rechecking previously cleared woodlands for new trees. Twenty person-days of arborist time has been allocated for this task.

Guidelines for removing the woody invasive plants covered in this plan are provided Appendix 3.

2018 Treatment Plan (Year 1)

Winter/Spring IP Treatments			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Carpet Burweed	Cattle Point, TU65, TU75	Jan–Mar	Includes infestations in the large field to east of upper/first parking lot at Cattle Point.
Lesser Celandine	TU7	Mar	Spot spray Lesser Celandine with diluted glyphosate (see label). See 2019 treatment map for location.
Bur Chervil	TU14, TU75, TU80, TU94, TU7, TU4	Apr/May	Includes 0.5 pd for searching entire park for any new patches of Bur Chervil.
Poison Hemlock	TU4, TU80	Apr/May	Can be hand pulled with gloves. See 2018 treatment map for locations.
Broom and Gorse	TU4, TU80	May/Jun	Broom is found throughout the park. Location of gorse is shown in 2018 treatment map.
Leopard's Bane	TU27	Jun	Spot spray with diluted glyphosate (consult label). See 2018 treatment map for location.

Summer IP Crew—New IP Treatments			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Himalayan Blackberry	TU5, TU41, TU42	Jul/Aug	Remove Himalayan Blackberry by hand; dab cut stumps with undiluted triclopyr. See 2018 treatment map for loc.
English Ivy	TU40, TU42	Jul/Aug	Remove ground cover ivy from TU40. Cut ivy off trees in TU42
Orchard Grass	TU62-Subunit A, TU67	Jul/Aug	Remove Orchard Grass from TU67 and from area immediately around vernal pool in TU62 (see Figure 19).

Summer IP Crew—Retreat IPs from Earlier Years			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Daphne	TU3, TU9b, TU12, TU13, TU14, TU15, TU28	Jul/Aug	Retreat Daphne patches treated two years earlier.
European Ash	TU26, TU27, TU28	Jul/Aug	This will require spot spraying of saplings with diluted glyphosate (consult label).
Himalayan Blackberry	TU1, TU4, TU7, TU8a, TU8b, TU9a, TU12, TU15, TU19, TU18, TU23, TU24, TU26, TU27, TU54, TU55, TU62,	Jul/Aug	Retreat patches from earlier years (see 2018 treatment map). Dab cut stumps with triclopyr; for bigger infestations with vigorous regeneration spot spray with diluted triclopyr; consult label).
English Ivy (ground)	TU9b, TU18, TU24	Jul/Aug	Retreat ivy treated three years earlier.
English Ivy (on trees)	TU13	Jul/Aug	Remove any ivy growing up trees.
Privet	TU23, TU24, TU26, TU27, TU45, TU52, TU54, TU55	Jul/Aug	Retreat Privet patches treated in earlier years.

Summer / Fall—Invasive Trees (Arborists)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Mature Invasive Trees	TU29, TU30, TU51, TU52, TU53	Jul-Sep	Remove mature invasive trees with chainsaws and chipper. Note that arborists should consider staggering the tree removal in this area over several years to avoid a drastic change to the landscape.
Monitor	TU21, TU22, TU23, TU24, TU27, TU59, TU62, TU63	Jul-Sep	Check previously treated wooded areas for maturing invasive trees, and treat if found.

Figure 7—2018 Treatment Map/Target Areas for Invasives Removal

Hatched areas = mature invasive tree removal (arborists); **Solid areas** = woody shrub and forb removal (summer IP crew). Level of effort is indicated by shading; the darker the shading the greater number of person days required in that unit. Numbers are the treatment units (TUs) referred to in the action plan. Point infestations requiring treatment are indicated as follows: ★ = Gorse; ★ = Poison Hemlock; ▲ = Himalayan Blackberry; ◆ = ground ivy; ⬟ = Lesser Celandine; ■ = Privet; ● = Leopard's Bane.

2019 Treatment Plan (Year 2)

Winter/Spring IP Treatments			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Carpet Burweed	Cattle Point, TU65, TU75	Jan–Mar	Includes infestations in the large field to the east of upper/first parking lot at Cattle Point.
Lesser Celandine	TU7	Mar	Spot spray Lesser Celandine with diluted glyphosate (consult label). See 2019 treatment map for location.
Bur Chervil	TU14, TU75, TU80, TU94, TU7, TU4	Apr/May	Includes 0.5 pd for searching entire park for any new patches of Bur Chervil. .
Poison Hemlock	TU4, TU80	Apr/May	Can be hand pulled with gloves. See 2019 treatment map for locations.
Broom and Gorse	TU4, TU80	May/Jun	Broom is found throughout the park. Location of gorse is shown in 2019 treatment map.
Leopard's Bane	TU27	Jun	Spot spray with diluted glyphosate (consult label). See 2019 treatment map for location.

Summer—New IP Treatments (Hired Crew)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Daphne	TU55, TU52, TU53	Jul/Aug	Remove by hand, cutting into root zone.
European Ash	TU30	Jul/Aug	Cut and dab with undiluted glyphosate.
Himalayan Blackberry	TU30, TU52, TU52	Jul/Aug	Remove Himalayan Blackberry by hand; dab cut stumps with undiluted triclopyr. See 2019 treatment map for loc.
English Ivy (on trees)	TU52, TU53	Jul/Aug	Sever ivy growing up trees.
Privet	TU30, TU53	Jul/Aug	Remove by hand, dab stumps with undiluted glyphosate.

Summer—Retreat IPs from Earlier Years (Hired Crew)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Daphne	TU9a, TU54	Jul/Aug	Retreat Daphne patches treated two years earlier.
European Ash	TU24, TU26, TU27	Jul/Aug	This will require spot spraying of saplings with 1.4% glyphosate.
Himalayan Blackberry	TU5, TU7, TU8a, TU8b, TU9a, TU12, TU15, TU18, TU19, TU23, TU24, TU26, TU27, TU41, TU42, TU54, TU55	Jul/Aug	Retreat patches from earlier years (see 2019 treatment map). Dab cut stumps with triclopyr; for bigger infestations with vigorous regeneration spot spray with diluted triclopyr; consult label).
English Ivy (ground)	TU9b, TU18, TU24	Jul/Aug	Retreat ivy treated three years earlier.
Orchard Grass	TU62-Subunit A, TU67	Jul/Aug	Monitor and retreat as necessary areas treated in 2018 (For TU62, see Figure 19).
Privet	TU23, TU24, TU26, TU27, TU45, TY52, TU54, TU55	Jul/Aug	Retreat Privet patches treated in earlier years.

Summer / Fall—Invasive Trees (Arborists)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Mature Invasive Trees	TU32, TU33	Jul-Sep	Remove mature invasive trees with chainsaws and chipper. Consider staggering tree removal in this area over several years to avoid altering the landscape drastically.
Monitor	TU21, TU22, TU23, TU24, TU27, TU59, TU60, TU62	Sep-Jul	Check previously treated wooded areas for maturing invasive trees, and treat if found.

Figure 8—2019 Treatment Map/Target Areas for Invasive Removal

Hatched areas = mature invasive tree removal (arborists); **Solid areas** = woody shrub and forb removal (summer IP crew). Level of effort is indicated by shading; the darker the shading the greater number of person days required in that unit. Numbers are the treatment units (TUs) referred to in the action plan. Point infestations requiring treatment are indicated as follows: ★ = Gorse; ★ = Poison Hemlock; ▲ = Himalayan Blackberry; ◆ = ground ivy; ⬟ = Lesser Celandine; ■ = Privet; ● = Leopard's Bane.

2020 Treatment Plan (Year 3)

Winter/Spring IP Treatments			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Carpet Burweed	Cattle Point, TU65, TU75	Jan–Mar	Includes infestations in the large field to the east of upper/first parking lot at Cattle Point.
Lesser Celandine	TU7	Mar	Spot spray Lesser Celandine with diluted glyphosate (consult label). See 2020 treatment map for location.
Bur Chervil	TU14, TU75, TU80, TU94, TU7, TU4	Apr/May	Includes 0.5 pd for searching entire park for any new patches of Bur Chervil. .
Poison Hemlock	TU4, TU80	Apr/May	Can be hand pulled with gloves (see 2020 treatment map for locations).
Broom and Gorse	TU4, TU80	May/Jun	Broom is found throughout the park. Location of gorse is shown in 2020 treatment map.
Leopard's Bane	TU27	Jun	Spot spray with diluted glyphosate (consult label). See 2020 treatment map for location.

Summer—New IP Treatments (Hired Crew)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Daphne	TU56, TU58	Jul/Aug	Remove by hand, cutting into root zone.
European Ash	TU31	Jul/Aug	This will require spot spraying of saplings with diluted glyphosate (consult label).
Himalayan Blackberry	TU31, TU34, TU35, TU36, TU44, TU56, TU57, TU58, TU64	Jul/Aug	Remove Himalayan Blackberry by hand; dab cut stumps with undiluted triclopyr. See 2020 treatment map for loc.
One-seed Hawthorn	TU64	Jul/Aug	Cut with hands. Treat stumps with undiluted glyphosate.
Orchard Grass	TU62—Subunit B – G	Jul/Aug	See map for new target area within TU62 (Figure 19).
Privet	TU31, TU34, TU35, TU36, TU64	Jul/Aug	Remove by hand, dab stumps with undiluted glyphosate.

Summer—Retreat IPs from Earlier Years (Hired Crew)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Daphne	TU1, TU62	Jul/Aug	Retreat Daphne patches treated two years earlier.
European Ash	TU24, TU26, TU27, TU30, TU62, TU69, TU70, TU71	Jul/Aug	This will require spot spraying of saplings with diluted glyphosate (consult label). Search large fields of TU69 and TU70 for saplings.
Himalayan Blackberry	TU1, TU4, TU5, TU7, TU8a, TU8b, TU9a, TU24, TU26, TU27, TU30, TU41, TU42, TU52, TU52, TU54, TU55	Jul/Aug	Retreat patches from earlier years (see 2020 treatment map). Dab cut stumps with triclopyr; for bigger infestations with vigorous regeneration spot spray with diluted triclopyr; consult label).
English Ivy (ground)	TU4	Jul/Aug	Retreat ivy treated three years earlier.
Orchard Grass	TU62—Subunit A, TU67	Jul/Aug	Check previously treated areas and retreat if needed.(For TU62, see Figure 19)
Privet	TU24, TU26, TU27, TU30, TU52, TU53, TU54, TU55, TU69, TU70	Jul/Aug	Retreat Privet patches treated in earlier years.

Summer / Fall—Invasive Trees (Arborists)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Mature Invasive Trees	TU50a	Jul-Sep	Remove mature invasive trees with chainsaws and chipper.
Monitor	TU12, TU14, TU15, TU16, TU18, TU19, TU37, TU38, TU39, TU40, TU42, TU43, TU44, TU45, TU54, TU55, TU56, TU57, TU58	Jul-Sep	Check previously treated wooded areas for maturing invasive trees, and treat if found.

Figure 9—2020 Treatment Plan/Target Areas for Invasives Removal

Hatched areas = mature invasive tree removal (arborists); **Solid areas** = woody shrub and forb removal (summer IP crew). Level of effort is indicated by shading; the darker the shading the greater number of person days required in that unit. Numbers are the treatment units (TUs) referred to in the action plan. Point infestations requiring treatment are indicated as follows: ★ = Gorse; ★ = Poison Hemlock; ▲ = Himalayan Blackberry; ◆ = ground ivy; ⬟ = Lesser Celandine; ■ = Privet; ● = Leopard's Bane.

2021 Treatment Plan (Year 4)

Winter/Spring IP Treatments

Target Invasive Plant	Treatment Units	Month	Comments
Carpet Burweed	Cattle Point, TU65, TU75	Jan–Mar	Includes infestations in the large field to the east of upper/first parking lot at Cattle Point.
Lesser Celandine	TU7	Mar	Spot spray Lesser Celandine with diluted glyphosate (consult label). See 2021 treatment map for location.
Bur Chervil	TU14, TU75, TU80, TU94, TU7, TU4	Apr/May	Includes 0.5 pd for searching entire park for any new patches of Bur Chervil. .
Poison Hemlock	TU4, TU80	Apr/May	Can be hand pulled with gloves (see 2021 treatment map for locations)
Broom and Gorse	TU4, TU80	May/Jun	Broom is found throughout the park. Location of gorse is shown in 2021 treatment map.
Leopard's Bane	TU27	Jun	Spot spray with diluted glyphosate (consult label). See 2021 treatment map for location.

Summer—New IP Treatments (Hired Crew)

Target Invasive Plant	Treatment Units	Month	Comments
Orchard Grass	TU76	Jul/Aug	Remove Orchard Grass from meadow around Yellow Montane Violet carefully under supervision of botanist.
Privet	TU76	Jul/Aug	Remove by hand, dab stumps with undiluted glyphosate.

Summer—Retreat IPs from Earlier Years (Hired Crew)

Target Invasive Plant	Treatment Units	Month	Comments
Daphne	TU3, TU9b, TU12 TU13, TU14, TU15, TU23, TU24, TU28, TU40	Jul/Aug	Retreat Daphne patches treated two years earlier.
European Ash	TU24, TU26, TU27, TU28, TU30, TU31	Jul/Aug	This will require spot spraying of saplings with diluted glyphosate (consult label).
Himalayan Blackberry	TU1, TU5, TU12, TU24, TU26, TU27, TU30, TU31, TU34, TU35, TU36, TU41, TU42, TU44, TU52, TU53, TU54, TU55, TU56, TU57, TU58, TU64	Jul/Aug	Retreat patches from earlier years (see 2021 treatment map). Dab cut stumps with triclopyr; for bigger infestations with vigorous regeneration spot spray with diluted triclopyr; consult label).
English Ivy	TU3, TU9b, TU13, TU18, TU24, TU27, TU40	Jul/Aug	Retreat ivy treated three years earlier. In TU13, treat ivy on trees only (not ground ivy).
Orchard Grass	TU62—Subunits A – G, TU67, TU75	Jul/Aug	Check previously treated areas and retreat if needed. (For TU62, see Figure 19)
Privet	TU24, TU26, TU27, TU30, TU31, TU34, TU35, TU36, TU52, TU53, TU54, TU55, TU64	Jul/Aug	Retreat Privet patches treated in earlier years.

Summer / Fall—Invasive Trees (Arborists)

Target Invasive Plant	Treatment Units	Month	Comments
Mature Invasive Trees	TU50b	Jul-Sep	Remove mature invasive trees with chainsaws and chipper.
Monitor	TU1, TU2, TU3, TU4, TU5, TU7, TU8a, TU8b, TU9a, TU9b, TU10, TU11, YU17	Jul-Sep	Check previously treated wooded areas for maturing invasive trees, and treat if found.

Figure 10—2021 Treatment/Target Areas for Invasives Removal

Hatched areas = mature invasive tree removal (arborists); **Solid areas** = woody shrub and forb removal (summer IP crew). Level of effort is indicated by shading; the darker the shading the greater number of person days required in that unit. Numbers are the treatment units (TUs) referred to in the action plan. Point infestations requiring treatment are indicated as follows: ★ = Gorse; ★ = Poison Hemlock; ▲ = Himalayan Blackberry; ◆ = ground ivy; ⬟ = Lesser Celandine; ■ = Privet; ● = Leopard's Bane.

2022 Treatment Plan (Year 5)

Winter/Spring IP Treatments			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Carpet Burweed	Cattle Point, TU65, TU75	Jan–Mar	Includes infestations in the large field to the east of upper/first parking lot at Cattle Point.
Lesser Celandine	TU7	Mar	Spot spray Lesser Celandine with diluted glyphosate (consult label). See 2022 treatment map for location.
Bur Chervil	TU14, TU75, TU80, TU94, TU7, TU4	Apr/May	Includes 0.5 pd for searching entire park for any new patches of Bur Chervil. .
Poison Hemlock	TU4, TU80	Apr/May	Can be hand pulled with gloves (see 2022 treatment map for locations)
Broom and Gorse	TU4, TU80	May/Jun	Broom is found throughout the park. Location of gorse is shown in 2022 treatment map.
Leopard's Bane	TU27	Jun	Spot spray with diluted glyphosate (consult label). See 2022 treatment map for location.

Summer—New IP Treatments (Hired Crew)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Himalayan Blackberry	TU26, TU61	Jul/Aug	Remove Himalayan Blackberry by hand; dab cut stumps with undiluted triclopyr. See 2022 treatment map for loc.
Privet	TU17, TU20	Jul/Aug	Remove by hand, dab stumps with undiluted glyphosate.

Summer—Retreat IPs from Earlier Years (Hired Crew)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Daphne	TU27, TU52, TU53, TU54, TU55	Jul/Aug	Retreat Daphne patches treated two years earlier.
European Ash	TU30, TU31	Jul/Aug	This will require spot spraying of saplings with diluted glyphosate (consult label).
Himalayan Blackberry	TU5, TU15, TU18, TU19, TU23, TU30, TU31, TU34, TU35, TU36, TU41, TU42, TU44, TU52, TU53, TU56, TU57, TU58, TU64	Jul/Aug	Retreat patches from earlier years (see 2022 treatment map). Dab cut stumps with triclopyr; for bigger infestations with vigorous regeneration spot spray with diluted triclopyr; consult label).
Orchard Grass	TU62 —Subunits A – G, TU67, TU75, TU76	Jul/Aug	Check previously treated areas and treat if needed. (For TU62, see Figure 19)
Privet	TU18, TU23, TU30, TU31, TU34, TU35, TU36, TU45, TU52, TU53, TU64	Jul/Aug	Retreat Privet patches treated in earlier years.

Summer / Fall—Invasive Trees (Arborists)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Mature Invasive Trees	TU50c	Jul-Sep	Remove mature invasive trees with chainsaws and chipper.
Monitor	TU20, TU26, TU34, TU35, TU36		Check previously treated wooded areas for maturing invasive trees, and treat if found.

Figure 11—2022 Treatment Map/Target Areas for Invasives Removal

Hatched areas = mature invasive tree removal (arborists); **Solid areas** = woody shrub and forb removal (summer IP crew). Level of effort is indicated by shading; the darker the shading the greater number of person days required in that unit. Numbers are the treatment units (TUs) referred to in the action plan. Point infestations requiring treatment are indicated as follows: ★ = Gorse; ★ = Poison Hemlock; ▲ = Himalayan Blackberry; ◆ = ground ivy; ⬟ = Lesser Celandine; ■ = Privet; ● = Leopard's Bane.

2023 Treatment Plan (Year 6)

Winter/Spring IP Treatments

Target Invasive Plant	Treatment Units	Month	Comments
Carpet Burweed	Cattle Point, TU65, TU75	Jan–Mar	Includes infestations in the large field to the east of upper/first parking lot at Cattle Point.
Lesser Celandine	TU7	Mar	Spot spray Lesser Celandine with diluted glyphosate (consult label). See 2023 treatment map for location.
Bur Chervil	TU14, TU75, TU80, TU94, TU7, TU4	Apr/May	Includes 0.5 pd for searching entire park for any new patches of Bur Chervil. .
Poison Hemlock	TU4, TU80	Apr/May	Can be hand pulled with gloves (see 2023 treatment map for locations)
Broom and Gorse	TU4, TU80	May/Jun	Broom is found throughout the park. Location of gorse is shown in 2023 treatment map.
Leopard's Bane	TU27	Jun	Spot spray with diluted glyphosate (consult label). See 2023 treatment map for location.

Summer—New IP Treatments (Hired Crew)

Target Invasive Plant	Treatment Units	Month	Comments
English Ivy	TU52	Jul/Aug	Start removing ground cover ivy from TU52. Cut ivy off trees.

Summer—Retreat IPs from Earlier Years (Hired Crew)

Target Invasive Plant	Treatment Units	Month	Comments
Daphne	TU1, TU3, TU9a, TU56, TU58, TU62	Jul/Aug	Retreat Daphne patches treated two years earlier.
English Ivy	TU4, TU9a	Jul/Aug	Retreat ivy treated three years earlier.
European Ash	TU30, TU31, TU62, TU69, TU70, TU71	Jul/Aug	This will require spot spraying of saplings with diluted glyphosate (consult label). Search large fields of TU69 and TU70 for saplings.
Himalayan Blackberry	TU4, TU7, TU8a, TU8b, TU9a, TU26, TU30, TU31, TU34, TU35, TU36, TU44, TU52, TU53, TU56, TU57, TU58, TU61, TU64	Jul/Aug	Retreat patches from earlier years (see 2023 treatment map). Dab cut stumps with triclopyr; for bigger infestations with vigorous regeneration spot spray with diluted triclopyr; consult label).
Orchard Grass	TU62—Subunits A – G, TU67, TU75, TU76	Jul/Aug	Check previously treated areas and treat if needed. (For TU62, see Figure 19)
Privet	TU17, TU18, TU20, TU30, TU31, TU34, TU35, TU36, TU44, TU52, TU53, TU64, TU69, TU70	Jul/Aug	Retreat Privet patches treated in earlier years.

Summer / Fall—Invasive Trees (Arborists)

Target Invasive Plant	Treatment Units	Month	Comments
Mature Invasive Trees	TU47b	Jul-Sep	Remove mature invasive trees with chainsaws and chipper. Consider staggering tree removal in this area over several years to avoid altering the landscape drastically.
Monitor	TU29, TU30, TU51, TU52, TU53	Jul-Sep	Check previously treated wooded areas for maturing invasive trees, and treat if found.

Figure 12—2023 Treatment Map/Target Areas for Invasives Removal

Hatched areas = mature invasive tree removal (arborists); **Solid areas** = woody shrub and forb removal (summer IP crew). Level of effort is indicated by shading; the darker the shading the greater number of person days required in that unit. Numbers are the treatment units (TUs) referred to in the action plan. Point infestations requiring treatment are indicated as follows: ● = Gorse; ★ = Poison Hemlock; ▲ = Himalayan Blackberry; ◆ = ground ivy; ⬟ = Lesser Celandine; ■ = Privet; ● = Leopard's Bane.

2024 Treatment Plan (Year 7)

Winter/Spring IP Treatments			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Carpet Burweed	Cattle Point, TU65, TU75	Jan–Mar	Includes infestations in the large field to the east of upper/first parking lot at Cattle Point.
Lesser Celandine	TU7	Mar	Spot spray Lesser Celandine with diluted glyphosate (consult label). See 2024 treatment map for location.
Bur Chervil	TU14, TU75, TU80, TU94, TU7, TU4	Apr/May	Includes 0.5 pd for searching entire park for any new patches of Bur Chervil. .
Poison Hemlock	TU4, TU80	Apr/May	Can be hand pulled with gloves (see 2024 treatment map for locations)
Broom and Gorse	TU4, TU80	May/Jun	Broom is found throughout the park. Location of gorse is shown in 2024 treatment map.
Leopard's Bane	TU27	Jun	Spot spray with diluted glyphosate (consult label). See 2024 treatment map for location.

Summer—New IP Treatments (Hired Crew)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
English Ivy	TU52	Jul/Aug	Continue removing ground cover ivy from TU52.

Summer—Retreat IPs from Earlier Years (Hired Crew)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Daphne	TU3, TU9b, TU12, TU13, TU14, TU15, TU23, TU24, TU28, TU40	Jul/Aug	Retreat Daphne patches treated two years earlier.
English Ivy	TU3, TU9b, TU18, TU24, TU27, TU40, TU42	Jul/Aug	Retreat ivy treated three years earlier.
European Ash	TU24, TU26, TU27, TU28, TU31,	Jul/Aug	This will require spot spraying of saplings with diluted glyphosate (consult label).
Himalayan Blackberry	TU26, TU27, TU31, TU34, TU35, TU36, TU44, TU54, TU55, TU56, TU57, TU58, TU61, TU64	Jul/Aug	Retreat patches from earlier years (see 2024 treatment map). Dab cut stumps with triclopyr; for bigger infestations with vigorous regeneration spot spray with diluted triclopyr; consult label).
Orchard Grass	TU62—Subunits A – G, TU67, TU75, TU76	Jul/Aug	Check previously treated areas and treat if needed. (For TU62, see Figure 19)
Privet	TU17, TU18, TU20, TU24, TU26, TU27, TU31, TU34, TU35, TU36, TU54, TU55, TU64	Jul/Aug	Retreat Privet patches treated in earlier years.

Summer / Fall—Invasive Trees (Arborists)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Mature Invasive Trees	47a	Jul-Sep	Remove mature invasive trees with chainsaws and chipper.
Monitor	TU21, TU22, TU23, TU24, TU27, TU32, TU33, TU59, TU60, TU62	Jul-Sep	Check previously treated wooded areas for maturing invasive trees, and treat if found.

Figure 13—2024 Treatment Map/Target Areas for Invasives Removal

Hatched areas = mature invasive tree removal (arborists); **Solid areas** = woody shrub and forb removal (summer IP crew). Level of effort is indicated by shading; the darker the shading the greater number of person days required in that unit. Numbers are the treatment units (TUs) referred to in the action plan. Point infestations requiring treatment are indicated as follows: ★ = Gorse; ★ = Poison Hemlock; ▲ = Himalayan Blackberry; ◆ = ground ivy; ⬟ = Lesser Celandine; ■ = Privet; ● = Leopard's Bane.

2025 Treatment Plan (Year 8)

Winter/Spring IP Treatments			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Carpet Burweed	Cattle Point, TU65, TU75	Jan–Mar	Includes infestations in the large field to the east of upper/first parking lot at Cattle Point.
Lesser Celandine	TU7	Mar	Spot spray Lesser Celandine with diluted glyphosate (consult label). See 2025 treatment map for location.
Bur Chervil	TU14, TU75, TU80, TU94, TU7, TU4	Apr/May	Includes 0.5 pd for searching entire park for any new patches of Bur Chervil. .
Poison Hemlock	TU4, TU80	Apr/May	Can be hand pulled with gloves (see 2025 treatment map for locations)
Broom and Gorse	TU4, TU80	May/Jun	Broom is found throughout the park. Location of gorse is shown in 2025 treatment map.
Leopard's Bane	TU27	Jun	Spot spray with diluted glyphosate (consult label). See 2025 treatment map for location.

Summer—New IP Treatments (Hired Crew)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
English Ivy	TU52	Jul/Aug	Continue removing ground cover ivy from TU52.

Summer—Retreat IPs from Earlier Years (Hired Crew)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Daphne	TU27, TU52, TU53, TU54, TU55	Jul/Aug	Retreat Daphne patches treated two years earlier.
Himalayan Blackberry	TU5, TU15, TU18, TU19, TU26, TU41, TU42, TU61	Jul/Aug	Retreat patches from earlier years (see 2025 treatment map). Dab cut stumps with triclopyr; for bigger infestations with vigorous regeneration spot spray with diluted triclopyr; consult label).
Orchard Grass	TU62—Subunits A – G, TU67, TU75, TU76	Jul/Aug	Check previously treated areas and retreat if needed. (For TU62, see Figure 19)
Privet	TU17, TU18, TU20, TU45,	Jul/Aug	Retreat Privet patches treated in earlier years.

Summer / Fall—Invasive Trees (Arborists)			
Target Invasive Plant	***Treatment Units***	***Month***	***Comments***
Mature Invasive Trees	TU48, TU49, TU87	Jul-Sep	Remove mature invasive trees with chainsaws and chipper.
Monitor	TU12, TU14, TU15, TU16, TU18, TU19, TU37, TU38, TU39, TU40, TU42, TU43, TU44, TU45, TU50a ,TU54, TU55, TU56, TU57, TU58, TU64	Jul-Sep	Check previously treated wooded areas for maturing invasive trees, and treat if found.

Figure 14—2025 Treatment Map/Target Areas for Invasives Removal

Hatched areas = mature invasive tree removal (arborists); **Solid areas** = woody shrub and forb removal (summer IP crew). Level of effort is indicated by shading; the darker the shading the greater number of person days required in that unit. Numbers are the treatment units (TUs) referred to in the action plan. Point infestations requiring treatment are indicated as follows: ● = Gorse; ★ = Poison Hemlock; ▲ = Himalayan Blackberry; ◆ = ground ivy; ⬟ = Lesser Celandine; ■ = Privet; ● = Leopard's Bane.

5.2 Volunteer Contribution to Implementing This Plan

The park has enjoyed a strong volunteer program of invasive plant removal organized by Friends of Uplands Park (FOUP) which has played an important part in securing funding through the HSP. Under the previous five-year plan, coordination between the volunteer program and the summer HSP crew improved greatly. Volunteers focused primarily on English Ivy, Daphne, Bur Chervil and Carpet Burweed at Cattle Point in line with the goals of the HSP project.

This plan suggests the following activities for volunteers to contribute to the implementation of the renewed eight-year plan (refer to Figure 15):

1. Continue the work of removing ground Ivy and Daphne from the woods of TUs 2, 3, 4, 8a, 8b, 9a, 9b (all in Cattle Point), and ivy off trees ("ivy stockings") in TUs 5, 7, 8 and 11
2. Continue to remove Scotch Broom in the meadows of TUs 80, 81, 82 and 85 (Cattle Point) and in TUs 63, 64 and 68 .
3. Assist in the removal of Carpet Burweed and Bur Chervil in non-sensitive areas of Cattle Point under the guidance of someone familiar with the location of rare plants;
4. If time is available, work with the site botanist to identify TUs in the main section of Uplands Park where ground ivy is at an early stage of invasion and can still be removed easily. See the map in Figure 15 which shows TUs that contain the many small ivy infestations that have not been treated in the action plan described in Section 5.1 above. There are also opportunities to work on severing the many ivy "stockings" throughout the park.

The ambitious, long-term goal is to remove all English Ivy and Daphne from the ocean side of the Scenic Drive at Cattle Point (TUs 1, 2, 3, 4, 6, 9a & 9b).

All volunteer activities should be recorded and communicated to the project botanist or person responsible for implementing the plan as this information is important for monitoring, reporting to funders and improving future planning.

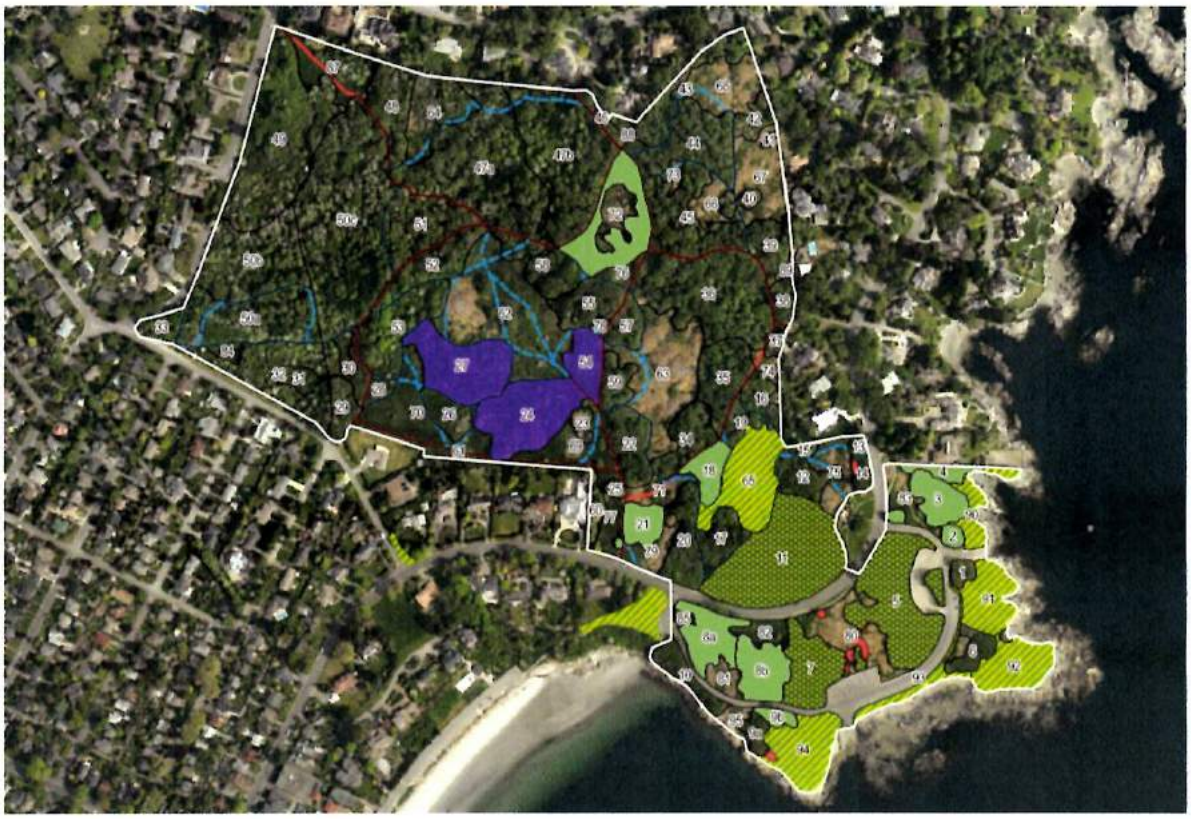

Figure 15—Location of Bur Cervil, Carpet Burweed and Volunteer Area Treatment Units

The above map shows the locations of Bur Chervil in the park (red) and Carpet Burweed (yellow-green striped) which must be aggressively treated in the spring by the paid crew with help from volunteers. (Note that the Carpet Burweed extends outside the park; these areas *should be treated as well*). Areas proposed for removal of ivy from trees are shown in green speckling (TU5, 7 & 11). Treatment units with ground ivy and Daphne that volunteers can tackle are shown in solid green. The purple areas are where large groups of volunteers have been removing Daphne several times a year. Please see Table 4 for details.

Table 4 Treatment Units suitable for removal work by volunteer crews[5]

TU	Level of Effort	Comment
TU19*	1 pd	Volunteers removed a pioneer patch here in 2015. It will need monitoring and possibly retreatment.
TU21	15 pd	This is a pioneering patch of ivy that has yet to be treated
TU56*	2 pd	This fairly extensive but pioneering patch of ivy was tackled in the winter of 2016. It will need monitoring in 2018 and possibly retreating
TU4*	50 pd	This is a high priority area due to its proximity to rare plants, and work should be done under the supervision of someone familiar with the location of the rare plants and their habitat. Volunteers began work here in 2017; it will be the focus of a paid crew work in 2020, however it is a worthwhile spot for volunteers to whittle away at.
TU7	5 pd	It is worth going after the ivy stockings on the trees in this TU.
TU5	2 pd	It is worth going after the ivy stockings on the trees in this TU.

[5] *These activities have higher priority than others in this table.

TU	Level of Effort	Comment
TU3*	10 pd	This unit was cleared almost entirely of ivy in 2016, however, some patches were missed and volunteers could work on removing what remains. It is fairly easy ivy to remove relative to some other patches. Vounteers could also tackled the Daphne regrowth in this unit.
TU9b*	10 pd	Volunteers have worked in this TU for many years and in 2016 cleared it of ground ivy. However, ivy is regrowing from large stumps and so it will need to be reteated.
TU8a	120 pd	Continue to remove Daphne and ivy from the TU which contains a large display of Fawn Lily that is being consumed by ivy.
TU8b	120 pd	Continue to remove Daphne and ivy from this TU.
TU54*	5 pd	Every two years (starting 2018) send volunteers in to remove Daphne and keep the unit free of ivy and blackberry.
TU24*	5 pd	Every year send volunteers to remove Daphne to continue the work they started in 2015, and check for regrowth from the two small patches of ivy which were removed in 2015.
TU27*	9 pd	Every year send volunteers to remove Daphne to continue the work they started in 2015.
TU11*	5 pd	Continue work started by volunteers in 2017 to remove the main ivy stockings growing on trees in this unit.

6 Monitoring and Adaptive Management

Two forms of monitoring will be followed: compliance monitoring and ecological response monitoring.

6.1.1 *Compliance Monitoring*

A record will be kept of all invasive species management activities as they are completed. These activities will be compared against the treatment plans provided in this document. If activities vary from those proposed in the treatment plan, then an explanation will be provided in an annual monitoring report and modification to subsequent years' plans made as needed. If scheduled activities cannot be conducted, whether due to funding issues or any other reason, the departure from plan will be identified in the annual report, the implications discussed, and "fixes" proposed.

The data that will be collected in monitoring this project include:

1. Number of person-days needed to remove and treat all Himalayan Blackberry, Privet and mature trees, and to sever all English Ivy stockings from their roots, in each of the TUs;
2. Number of person-days each spring to remove all flowering plants of Scotch Broom, Spanish White Broom and Gorse from the entire park each spring;
3. Number of person-days needed to remove all regrowth in each of the TUs treated;
4. Number of person-days needed to remove Daphne in each of the TUs.
5. Number of person-days to remove ground ivy.

These data were collected while implementing the 2015-2018 plan and have been used to improve estimations and develop the assumptions about weed response to various treatments and have been built into the new eight-year plan.

6.1.2 *Ecological Response Monitoring*

A baseline of counts for the park's SARA-listed species will be compiled, building on those conducted to date (See Section 3.4). These data will be used to monitor any impacts the removal of invasive plants has on the health of the park's rare plants. The schedule for conducting these counts is as follows: Coast Microseris (2018); Muhlenberg's Centaury (2019); Dense-spike Primrose (2020); Macoun's Meadowfoam (2021) and Kellogg's Rush (2022). In addition to the counts, the location and extent of patches of these plants will be mapped in a geodatabase. These counts will be conducted by Wylie Thomas as part of his volunteer contribution to the park's HSP project. As well, a plan will be developed for monitoring the response of the meadow ecosystems to the removal of invasive species.

7 Long-Term Management

Long-term management, as defined for the purposes of this plan, refers to management activities that will be conducted after 2025, but also at what can be done now to prepare for future challenges. The main questions relating to long-term management are:

1. Starting in 2026, ensure that the resources are available for maintaining treated areas free of woody invasive species;
2. Consider whether there is a will and the means for expanding the work into other areas of the park, post-2025;
3. Study the impact that *Allium vineale* is having and search for ways to control it in a conservation setting;
4. Monitor the spread of Hardhack (*Spirea douglasii*) in the Central Meadow and treat, if necessary;
5. Set up controlled burns to study this as a method for restoring the ecosystems of the park.

8 References

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Appendix 1: List of the Rare Plants of Uplands Park

English Name	Scientific Name	SARA Status	BC Status	Park Status
Banded Cord-moss	*Entosthodon fascicularis*	Special Concern	Blue	Present
Bearded Owl-clover	*Triphysaria versicolor* ssp. *versicolor*	Endangered	Red	Present
Bear's-foot Sanicle	*Sanicula arctopoides*	Endangered	Red	Extirpated
Bigleaf Lupine	*Lupinus polyphyllus* var. pallidipes	—	Red	Present
Carolina Meadow-Foxtail	*Alopecurus carolinianus*	—	Red	Present
Chaffweed	*Anagallis minima*	—	Blue	Present
Coast Microseris	*Microseris bigelovii*	Endangered	Red	Present
Dense Spike-primrose	*Epilobium densiflorum*	Endangered	Red	Present
Foothill Sedge	*Carex tumulicola*	Endangered	Red	Present
Geyer's Onion	*Allium geyeri* var. *tenerum*	—	Blue	Extirpated
Graceful Cinquefoil	*Potentilla gracilis* var. *gracilis*	—	Blue	Present
Heterocodon	*Heterocodon rariflorum*	—	Blue	Present
Howell's Triteleia	*Triteleia howellii*	Endangered	Red	Extirpated
Kellogg's Rush	*Juncus kelloggii*	Endangered	Red	Present
Macoun's Meadowfoam	*Limnanthes macounii*	Threatened	Red	Present
Mountain Sneezeweed	*Helenium aumnale* var *montanum*	—	Blue	Present
Muhlenberg's Centaury	*Zeltnera muehlenbergii*	Endangered	Red	Present
Nuttall's Quillwort	*Isoetes nuttallii*	—	Blue	Present
Poverty Clover	*Trifolium depauperatum* var. *depauperatum*	—	Blue	Present
Purple Sanicle	*Sanicula bipinnatifida*	Threatened	Red	Present
Spanish-clover	*Acmispon americanus* var. *americanus*	—	Blue	Present
Tall Wooly-heads	*Psilocarphus elatior*	Endangered	Red	Present
Twisted Oak Moss	*Syntrichia laevipila*	Special Concern	Blue	Present
Victoria's Owl-clover	*Castilleja victoriae*	Endangered	Red	Extirpated
Water-plantain Buttercup	*Ranunculus alismifolius* var. *alismifolius*	Endangered	Red	Present
White-top Aster	*Sericocarpus rigidus*	Special Concern	Red	Present
Winged Water-starwort	*Callitriche marginata*	—	Blue	Present
Yellow Montane Violet	*Viola praemorsa* ssp. *praemorsa*	Endangered	Red	Present

Appendix 2: Extent of Six Plant Species at Risk at Uplands Park

Figure 16—Cattle Point: Location of Three Plant Species at Risk

The extents of three of the nine plant species at risk found at Cattle Point are shown. These are Bearded Owl-clover (*Triphysaria versicolor* ssp. *versicolor*) shown in pink (TU90, TU91, TU92, TU94); Macoun's Meadowfoam (*Limnanthes macounii*) shown in white (TU90, TU91, TU92); and, Erect Pigmyweed (*Crassula connata*) shown in light orange in the northeastern most section of the park (TU90). Although some of the smaller patches are difficult to see in the above map, the associated shape files have been made available to the Oak Bay Parks Department and can be viewed easily in a GIS app such as QGIS or ArcGIS.

Figure 17—Uplands Park: Location of Four Plant Species at Risk

The extents of four of the more than 20 species at risk found in Uplands Park are shown. These are Bearded Owl-clover (*Triphysaria versicolor* ssp *versicolor*) shown in pink (TU67); Macoun's Meadowfoam (*Limnanthes macounii*) shown in white (TU62); Water-plantain Buttercup (*Ranunculus alismifolius* var. *alismifolius*) shown in green (TU62, TU69 and TU70) and, Yellow Montane Violet (*Viola praemorsa* ssp. *praemorsa*) shown in yellow (TU76). Although some of the smaller patches are difficult to see in the above map, the associated shape files have been made available to the Oak Bay Parks Department and can be viewed easily in a GIS app such as QGIS or ArcGIS. .

Appendix 3: Treatment Units (TUs) & Annual Estimated Effort to Remove their Invasive Plant Species[6]

		2018 TOTAL IP CREW: 96.5					2019 TOTAL IP CREW: 100					2020 TOTAL IP CREW: 98.75					2021 TOTAL IP CREW: 100.625				
TU	W/M	2018-First	2018-F(pd)	2018-Rtrt	2018-R(pd)	2018-T(pd)	2019-First	2019-F(pd)	2019-Rtrt	2019-R(pd)	2019-T(pd)	2020-First	2020-F(pd)	2020-Rtrt	2020-R(pd)	2020-T(pd)	2021-First	2021-F(pd)	2021-Rtrt	2021-R(pd)	2021-T(pd)
1	W	-	0	HI	0.125	0.125	-	0	HI	0.125	0.125	-	0	HI, SL	0.25	0.25	-	0	HI	0.125	0.125
2	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
3	W	-	0	SL	4	4	-	0	-	0	0	-	0	-	0	0	-	0	Elc, SL	12	12
4	W	-	0	HI	0.25	0.25	-	0	HI	0.125	0.125	-	0	Elc, HI	12	12	-	0	-	0	0
5	W	HI	0.5	-	0	0.5	-	0	HI	0.25	0.25	-	0	HI	0.125	0.125	-	0	HI	0.125	0.125
6	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
7	W	-	0	HI	0.125	0.125	-	0	HI	0.125	0.125	-	0	HI	0.125	0.125	-	0	-	0	0
8a	W	-	0	HI	0.125	0.125	-	0	HI	0.125	0.125	-	0	HI	0.125	0.125	-	0	-	0	0
9a	W	-	0	HI	0.125	0.125	-	0	Elc, HI, SL	2	2	-	0	HI	0.125	0.125	-	0	-	0	0
10	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
11	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
12	W	-	0	HI, SL	7	7	-	0	HI	0.125	0.125	-	0	-	0	0	-	0	HI, SL	6	6
13	W	-	0	Els, SL	0.75	0.75	-	0	-	0	0	-	0	-	0	0	-	0	Els, SL	0.75	0.75
14	W	-	0	SL	0.5	0.5	-	0	-	0	0	-	0	-	0	0	-	0	SL	0.5	0.5
15	W	-	0	HI, SL	1.5	1.5	-	0	HI	0.125	0.125	-	0	-	0	0	-	0	SL	1	1
16	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
17	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
18	W	-	0	Elc, HI	0.75	0.75	-	0	HI	0.125	0.125	-	0	-	0	0	PRV	0.25	Elc	0.5	0.75
19	W	-	0	HI	0.125	0.125	-	0	HI	0.125	0.125	-	0	-	0	0	-	0	-	0	0
20	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
21	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
22	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
23	W	-	0	HI, PRV, SL	0.5	0.5	-	0	HI, PRV	0.25	0.25	-	0	-	0	0	-	0	SL	0.5	0.5
24	W	-	0	Elc, HI, LPB, PRV	2	2			ASH, HI, LPB, PRV	1	1	-	0	ASH, HI, LPB, PRV	1	1	-	0	ASH, Elc, HI, LPB, PRV, SL	20	20
25	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
26	W	-	0	ASH, HI, PRV	2	2	-	0	ASH, HI, PRV	1	1	-	0	ASH, HI, PRV	1	1	-	0	ASH, HI, PRV	1	1
27	W	-	0	ASH, Elc, HI, PRV	2	2	-	0	ASH, HI, PRV	1.5	1.5	-	0	ASH, HI, PRV	1	1	-	0	ASH, Elc, HI, PRV	1	1
28	W	-	0	ASH, SL	0.5	0.5	-	0	-	0	0	-	0	-	0	0	-	0	ASH, SL	0.5	0.5
29	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
30	W	-	0	-	0	0	ASH, HI, PRV	12	-	0	12	-	0	ASH, HI, PRV	1	1	-	0	ASH, HI, PRV	0.5	0.5
31	M	-	0	-	0	0	-	0	-	0	0	ASH, HI, PRV	16	-	0	16	-	0	ASH, HI, PRV	2	2
32	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
33	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
34	W	-	0	-	0	0	-	0	-	0	0	HI, PRV	6	-	0	6	-	0	HI, PRV	1	1
35	W	-	0	-	0	0	-	0	-	0	0	HI, PRV	2.5	-	0	2.5	-	0	HI, PRV	0.75	0.75
36	W	-	0	-	0	0	-	0	-	0	0	HI, PRV	2	-	0	2	-	0	HI, PRV	0.5	0.5
37	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
38	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
39	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
40	W	Elc, SL	20	-	0	20	-	0	-	0	0	-	0	-	0	0	-	0	Elc, SL	6	6
41	W	HI	7	-	0	7	-	0	HI	2.75	2.75	-	0	HI	1.5	1.5	-	0	HI	0.75	0.75
42	W	HI	10	-	0	10	-	0	HI	1	1	-	0	HI	2	2	-	0	HI	1	1
43	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
44	W	-	0	-	0	0	-	0	-	0	0	HI, PRV	2	-	0	2	-	0	HI, PRV	0.5	0.5
45	W	-	0	PRV	0.125	0.125	-	0	PRV	0.125	0.125	-	0	-	0	0	-	0	-	0	0
46	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
47a	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
48	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
49	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0

[6] Note that this data file does not include Bur Chervil; Broom; Poison Hemlock; Lesser Celandine or Carpet Burweed, which are assumed to take 20 person-days every year. Plant codes are as follows: SL = Spurge Laurel (Daphne); SB = Scotch Broom (but includes Spanish White); HI = Himalayan Blackberry; Elc = English Ivy (ground); Els = English Ivy (on trees); LPB = Leopard's Bane; ASH = European Ash; ORG = Orchard Grass (but also includes Velvet Grass); PRV = Common Privet.

		2018					2019					2020					2021				
		TOTAL IP CREW: 96.5					TOTAL IP CREW: 100					TOTAL IP CREW: 98.75					TOTAL IP CREW: 100.625				
TU	W/M	2018-First	2018-F(pd)	2018-Rtrt	2018-R(pd)	2018-T(pd)	2019-First	2019-F(pd)	2019-Rtrt	2019-R(pd)	2019-T(pd)	2020-First	2020-F(pd)	2020-Rtrt	2020-R(pd)	2020-T(pd)	2021-First	2021-F(pd)	2021-Rtrt	2021-R(pd)	2021-T(pd)
50a	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
51	W					0					0					0					0
52	W	-	0	PRV	0.25	0.25	Elc, HI, SL	14.25	PRV	0.125	14.375	-	0	HI, PRV	0.75	0.75	-	0	HI, PRV	0.25	0.25
53	W	-	0	-	0	0	Elc, HI, PRV, SL	24.125	-	0	24.125	-	0	HI, PRV	1	1	-	0	HI, PRV	0.5	0.5
54	W	-	0	HI, PRV	0.5	0.5	-	0	HI, PRV, SL	5.25	5.25	-	0	HI, PRV	0.125	0.125	-	0	HI, PRV	0.125	0.125
55	W	-	0	HI, PRV	2	2	SL	5	HI, PRV	2	7	-	0	HI, PRV	0.5	0.5	-	0	HI, PRV	0.5	0.5
56	W	-	0	-	0	0	-	0	-	0	0	HI, SL	5	-	0	5	-	0	HI	5	5
57	W	-	0	-	0	0	-	0	-	0	0	HI	0.5	-	0	0.5	-	0	HI	0.25	0.25
58	W	-	0	-	0	0					0	HI, SL	3.5	-	0	3.5	-	0	HI	0.25	0.25
59	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
60	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
61	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
62	M	ORG	2	HI	0.125	2.125	-	0	ORG	0.25	0.25	ORG	3	ASH, HAW, ORG, SL	1	4	-	0	ORG	0.5	0.5
63	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
64	M	-	0	-	0	0	-	0	-	0	0	HAW, HI, PRV	6.5	-	0	6.5	-	0	HI, PRV	0.5	0.5
65	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
66	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
67	M	ORG	5	-	0	5	-	0	ORG	1	1	-	0	ORG	1	1	-	0	ORG	1	1
68	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
69	M	-	0	-	0	0	-	0	-	0	0	-	0	ASH, HAW, PRV	1	1	-	0	-	0	0
70	M	-	0	-	0	0	-	0	-	0	0	-	0	ASH, HAW, PRV	1	1	-	0	-	0	0
71	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
72	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
73	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
74	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
75	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	ORG	3	3
76	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	ORG	5	-	0	5
77	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
78	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
79	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
80	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
81	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
82	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
83	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
84	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
85	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
86	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
87	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
88	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
89	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
90	B	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
91	B	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
92	B	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
93	B	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
94	B	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
95	B	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
8b	W	-	0	HI	0.125	0.125	-	0	HI	0.125	0.125	-	0	HI	0.125	0.125	-	0	-	0	0
9b	W	-	0	Elc, SL	1.5	1.5	-	0	-	0	0	-	0	-	0	0	-	0	Elc, SL	1.5	1.5
47b	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
50b	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0
50c	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0

		2022					2023					2024					2025				
		TOTAL IP CREW: 94.75					TOTAL IP CREW: 98.625					TOTAL IP CREW: 99.125					TOTAL IP CREW: 98.5				
TU	W/M	2022-First	2022-F(pd)	2022-Rtrt	2022-R(pd)	2022-T(pd)	2023-First	2023-F(pd)	2023-Rtrt	2023-R(pd)	2023-T(pd)	2024-First	2024-F(pd)	2024-Rtrt	2024-R(pd)	2024-T(pd)	2025-First	2025-F(pd)	2025-Rtrt	2025-R(pd)	2025-T(pd)
1	W	-	0	-	0	0	-	0	SL	0.125	0.125	-	0	-	0	0					
2	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
3	W	-	0	-	0	0	-	0	SL	6.125	6.125	-	0	Ex, SL	4.5	4.5					
4	W	-	0	-	0	0	-	0	Ex, HI	5.125	5.125	-	0	-	0	0					
5	W	-	0	HI	0.125	0.125	-	0	-	0	0	-	0	-	0	0					
6	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
7	W	-	0	-	0	0	-	0	HI	0.125	0.125	-	0	-	0	0					
8a	W	-	0	-	0	0	-	0	HI	0.125	0.125	-	0	-	0	0					
9a	W	-	0	-	0	0	-	0	Ex, HI, SL	2	2	-	0	-	0	0					
10	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
11	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
12	W	-	0	-	0	0	-	0	-	0	0	-	0	SL	2	2					
13	W	-	0	-	0	0	-	0	-	0	0	-	0	Ex, SL	0.5	0.5					
14	W	-	0	-	0	0	-	0	-	0	0	-	0	SL	0.25	0.25					
15	W	-	0	HI	0.125	0.125	-	0	-	0	0	-	0	SL	1	1	-	0	HI	0.125	0.125
16	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
17	W	PRV	1	-	0	1	-	0	PRV	0.5	0.5	-	0	PRV	0.25	0.25			PRV	0.125	0.125
18	W	-	0	HI, PRV	0.25	0.25	-	0	PRV	0.125	0.125	-	0	Ex, PRV	0.625	0.625			HI, PRV	0.125	0.125
19	W	-	0	HI	0.125	0.125	-	0	-	0	0	-	0	-	0	0			HI	0.125	0.125
20	W	PRV	2	-	0	2	-	0	PRV	1	1	-	0	PRV	0.5	0.5			PRV	0.25	0.25
21	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
22	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
23	W	-	0	HI, PRV	0.125	0.125	-	0	-	0	0	-	0	SL	0.25	0.25					
24	W	-	0	-	0	0	-	0	-	0	0	-	0	ASH, Ex, HI, PRV, SL	20	20					
25	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
26	W	HI	4	-	0	4	-	0	HI	2	2	-	0	ASH, HI, PRV	1.5	1.5	-	0	HI	0.5	0.5
27	W	-	0	SL	12	12	-	0	-	0	0	-	0	ASH, Ex, HI, PRV	0.25	0.25	-	0	SL	12	12
28	W	-	0	-	0	0	-	0	-	0	0	-	0	ASH, SL	0.5	0.5					
29	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
30	W	-	0	ASH, HI, PRV	0.5	0.5	-	0	ASH, HI, PRV	0.25	0.25	-	0	-	0	0	-	0	-	0	0
31	M	-	0	ASH, HI, PRV	1	1	-	0	ASH, HI, PRV	0.5	0.5	-	0	ASH, HI, PRV	0.25	0.25	-	0	-	0	0
32	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
33	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
34	W	-	0	HI, PRV	0.5	0.5	-	0	HI, PRV	0.25	0.25	-	0	HI, PRV	0.125	0.125	-	0	-	0	0
35	W	-	0	HI, PRV	0.25	0.25	-	0	HI, PRV	0.125	0.125	-	0	HI, PRV	0.125	0.125	-	0	-	0	0
36	W	-	0	HI, PRV	0.125	0.125	-	0	HI, PRV	0.125	0.125	-	0	HI, PRV	0.125	0.125	-	0	-	0	0
37	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
38	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
39	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
40	W	-	0	-	0	0	-	0	-	0	0	-	0	Ex, SL	6	6					
41	W	-	0	HI	0.25	0.25	-	0	-	0	0	-	0	-	0	0			HI	0.125	0.125
42	W	-	0	HI	0.5	0.5	-	0	-	0	0	-	0	Ex	2	2			HI	0.125	0.125
43	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
44	W	-	0	HI, PRV	0.125	0.125	-	0	HI, PRV	0.125	0.125	-	0	HI, PRV	0.125	0.125					
45	W	-	0	PRV	0.125	0.125	-	0	-	0	0	-	0	-	0	0			PRV	0.125	0.125
46	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
47a	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
48	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					
49	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0					

		2022 TOTAL IP CREW: 94.75					2023 TOTAL IP CREW: 98.625					2024 TOTAL IP CREW: 99.125					2025 TOTAL IP CREW: 98.5				
TU	W/M	2022-First	2022-F(pd)	2022-Rtrt	2022-R(pd)	2022-T(pd)	2023-First	2023-F(pd)	2023-Rtrt	2023-R(pd)	2023-T(pd)	2024-First	2024-F(pd)	2024-Rtrt	2024-R(pd)	2024-T(pd)	2025-First	2025-F(pd)	2025-Rtrt	2025-R(pd)	2025-T(pd)
50a	W	-	0	-	0	0	-	0	-	0	0		0	-	0	0					
51	W					0					0					0					
52	W	-	0	HI, PRV, SL	12.125	12.125	Etc	43.5	HI, PRV	0.125	43.625	Etc	27.625	-	0	27.625	Etc	17.75	54	12	29.75
53	W	-	0	HI, PRV, SL	18.25	18.25	-	0	HI, PRV	0.125	0.125	-	0	-	0	0		0	54	18	18
54	W	-	0	SL	5	5	-	0	-	0	0	-	0	HI, PRV	0.125	0.125	-	0	54	5	5
55	W	-	0	SL	5	5	-	0	-	0	0	-	0	HI, PRV	1	1		0	54	5	5
56	W	-	0	HI	0.25	0.25	-	0	HI, SL	2.125	2.125	-	0	HI	0.125	0.125		0		0	0
57	W	-	0	HI	0.125	0.125	-	0	HI	0.125	0.125	-	0	HI	0.125	0.125		0		0	0
58	W	-	0	HI	0.125	0.125	-	0	HI, SL	2.125	2.125	-	0	HI	0.125	0.125		0		0	0
59	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
60	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
61	W	HI	3	-	0	3	-	0	HI	1.5	1.5	-	0	HI	0.75	0.75		0		0.5	0.5
62	M	-	0	ORG	0.5	0.5	-	0	ASH, HAW, ORG, SL	1	1	-	0	ORG	0.5	0.5	-	0	ORG	0.5	0.5
63	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
64	M	-	0	HI, PRV	0.25	0.25	-	0	HI, PRV	0.25	0.25	-	0	HI, PRV	0.125	0.125	-	0		0	0
65	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
66	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
67	M	-	0	ORG	0.5	0.5	-	0	ORG	0.5	0.5	1	0	ORG	0.5	0.5		0	ORG	0.5	0.5
68	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
69	M	-	0	-	0	0	-	0	ASH, HAW, PRV	1	1	-	0	-	0	0		0		0	0
70	M	-	0	-	0	0	-	0	ASH, HAW, PRV	1	1	-	0	-	0	0		0		0	0
71	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
72	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
73	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
74	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
75	M	-	0	ORG	0.5	0.5	-	0	ORG	0.5	0.5	-	0	ORG	0.5	0.5		0	ORG	0.5	0.5
76	M	-	0	ORG	1	1	-	0	ORG	1	1	-	0	ORG	1	1		0	ORG	1	1
77	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
78	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
79	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
80	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
81	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
82	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
83	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
84	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
85	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
86	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
87	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
88	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
89	M	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
90	B	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
91	B	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
92	B	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
93	B	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
94	B	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
95	B	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
8b	W	-	0	-	0	0	-	0	HI	0.125	0.125	-	0	-	0	0		0		0	0
9b	W	-	0	-	0	0	-	0	-	0	0	-	0	Etc, SL	0.75	0.75		0		0	0
47b	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
50b	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0
50c	W	-	0	-	0	0	-	0	-	0	0	-	0	-	0	0		0		0	0

Appendix 4—Treatment and Monitoring Schedule for Mature Invasive Trees[7]

TU	W/M	Area (m2)	First Year	Monitor1	Monitor2	Monitor2	MITs
1	W	637	0	2021	2026	2031	N/A
2	W	737	0	2021	2026	2031	N/A
3	W	2407	2016	2021	2026	2031	N/A
4	W	905	0	2021	2026	2031	N/A
5	W	8524	2016	2021	2026	2031	CHS,ELM,HAW,HO
6	W	1506	0	2021	2026	2031	N/A
7	W	4256	2016	2021	2026	2031	HAW,HO
8a	W	3223	2016	2021	2026	2031	HO
9a	W	935	2016	2021	2026	2031	ELM,HO,LC,LP,VS
10	W	1886	2016	2021	2026	2031	HO,VS
11	W	11278	2016	2021	2026	2031	ELM,HAW,HO,PYR
12	W	2183	2015	2020	2025	2030	HAW,VS
13	W	376	2015	2020	2025	2030	HAW
14	W	731	2015	2020	2025	2030	HO,VS
15	W	356	2015	2020	2025	2030	HAW,HO
16	W	1516	2015	2020	2025	2030	N/A
17	W	2293	2016	2021	2026	2031	HAW,PRV,VS
18	W	1872	2015	2020	2025	2030	COT,HAW,HO
19	W	1255	2015	2020	2025	2030	ASH,COT,YEW
20	W	3376	2017	2022	2027	2032	COT,HAW,HO,PRV,VS
21	W	1854	2014	2019	2024	2029	HAW
22	W	3175	2014	2019	2024	2029	N/A
23	W	639	2014	2019	2024	2029	ASH,PRV
24	W	6512	2014	2019	2024	2029	ASH,CHS,CON,HAW,HO,PRV,
25	W	360	2014	2019	2024	2029	HAW
26	W	1839	2017	2022	2027	2032	ASH,HAW,PRV
27	W	6020	2014	2019	2024	2029	ASH,COT,HAW,HO,MN,MS,PRV
28	W	653	2015	2020	2025	2030	ASH,HAW,PRV
29	W	1609	2018	2023	2028	2033	ASH,HAW,HO,MN
30	W	1468	2018	2023	2028	2033	ASH,HAW,PRV,MN
31	M	959	0	2024	2029	2034	ASH,HAW,PRY
32	W	5941	2019	2024	2029	2034	ASH,CON,COT,HAW,HO,MN,MS,PRV,VS
33	W	1210	2019	2024	2029	2034	CHS,HAW,PRV
34	W	2828	2017	2022	2027	2032	ASH,HAW,HO,PRV
35	W	3762	2017	2022	2027	2032	CON,COT,HAW,HO,PRV,VS,YEW
36	W	11058	2017	2022	2027	2032	CHS,HAW,HO,MN,PRV,VS,YEW
37	W	556	2015	2020	2025	2030	CHS
38	W	1073	2015	2020	2025	2030	HO
39	W	2271	2015	2020	2025	2030	COT,HAW,HO
40	W	409	2015	2020	2025	2030	N/A
41	W	176	0	2023	2028	2033	N/A
42	W	1291	2015	2020	2025	2030	HAW,MN
43	W	3239	2015	2020	2025	2030	COT,HO,MN
44	W	5308	2015	2020	2025	2030	ASH,HAW,PRV
45	W	6361	2015	2020	2025	2030	HAW,HO,PRV,VS,YEW
46	W	813	2023	2028	2033	2038	HO,VS,YEW
47a	W	14180	2024	2029	2034	2039	HAW,HO,MN,PRV,VS,YEW
48	W	3560	2025	2030	2035	2040	HAW,HO,PRV,VS
49	W	13352	2025	2030	2035	2040	HAW,HO,PRV

[7] Tree codes are as follows: ASH – European Ash; HAW = One-Seed Hawthorn; HO = English Holly; PRV = Common Privet; Vs = Bird Cherry; NOR = Norway Maple; CHS = Horse Chestnut; COT = Cotoneaster; YEW = European Yew; CON = unidentified conifer; LP = Portuguese Laurel; PYR = Pyracantha.

TU	W/M	Area (m2)	First Year	Monitor1	Monitor2	Monitor2	MITs
50a	W	7375	2020	2025	2030	2035	HAW,HO,PRV,VS
51	W	5009	2018	2023	2028	2033	CHS,HAW,HO,MN,PRV,VS
52	W	3468	2018	2023	2028	2033	HAW,HO,MN,PRV,VS,YEW
53	W	5053	2018	2023	2028	2033	ASH,HAW,HO,MN,PRV,VS
54	W	2262	2015	2020	2025	2030	ASH,COT,HAW,HO,PRV,VS
55	W	2884	2015	2020	2025	2030	COT,HAW,HO,PRV
56	W	4922	2015	2020	2025	2030	LAB
57	W	1610	2015	2020	2025	2030	HAW
58	W	3378	2015	2020	2025	2030	HAW
59	W	1664	2014	2019	2024	2029	ASH
60	W	944	2014	2019	2024	2029	ASH
61	W	1484	0	2026	2031	2036	N/A
62	M	12060	2015	2019	2024	2029	ASH,HAW,PRV,VS
63	M	8227	0	2019	2024	2029	N/A
64	M	4066	0	2025	2030	2035	HAW
65	M	5684	0	2021	2026	2031	N/A
66	M	1488	0	2020	2025	2030	N/A
67	M	4050	0	2020	2025	2030	N/A
68	M	4027	0	2020	2025	2030	N/A
69	M	3132	0	2019	2024	2029	N/A
70	M	5102	0	2019	2024	2029	N/A
71	M	1533	0	2019	2024	2029	N/A
72	M	1717	0	2019	2024	2029	N/A
73	M	489	0	2020	2025	2030	N/A
74	M	871	0	2022	2027	2032	N/A
75	M	2318	0	2021	2026	2031	N/A
76	M	748	0	2020	2025	2030	N/A
77	M	1840	0	2019	2024	2029	N/A
78	M	284	0	2019	2024	2029	N/A
79	M	1550	0	2019	2024	2029	N/A
80	M	4424	0	2021	2026	2031	N/A
81	M	1064	0	2021	2026	2031	N/A
82	M	1195	0	2021	2026	2031	N/A
83	M	1807	0	2021	2026	2031	N/A
84	M	562	0	2023	2028	2033	N/A
85	M	252	0	2021	2026	2031	N/A
86	M	652	0	2023	2028	2033	N/A
87	W	3793	2025	2030	2035	2040	COT,HAW,HO,PRV
88	M	666	0	2020	2025	2030	N/A
89	M	256	0	2020	2025	2030	N/A
90	B	1801	0	2021	2026	2031	N/A
91	B	3462	0	2021	2026	2031	N/A
92	B	3577	0	2021	2026	2031	N/A
93	B	1433	0	2021	2026	2031	N/A
94	B	4630	0	2021	2026	2031	N/A
95	B	765	0	2021	2026	2031	N/A
8b	W	3143	2016	2021	2026	2031	HO,VS
9b	W	656	2016	2021	2026	2031	HO
47b	W	11356	2023	2028	2033	2038	HAW,HO,MN,PRV,VS,YEW
50b	W	7824	2021	2026	2031	2036	CHS,HAW,HO,MN,PRV,VS
50c	W	18328	2022	2027	2032	2037	CHS,HAW,HO,MN,PRV,VS

Appendix 5: Species Control Methods

English Ivy[8]

(*Hedera helix*, IAPP code: EI)

English Ivy is a woody, evergreen liana that may grow as a ground cover and/or climb on vertical surfaces such as trees, shrubs, fences and walls. Portions of the liana that climb on more or less vertical surfaces (even low shrubs) tend to have unlobed or weakly-lobed leaves and may flower prolifically, especially where they are not heavily shaded. Portions of the liana sprawling on flat ground tend to have more deeply lobed leaves and are unlikely to flower. In Victoria, English Ivy usually flowers in the autumn and develops seeds over the winter. Most of the seeds are short-lived (1 year), so the soil seed bank can be quickly depleted if flowering stems are removed before they set seed. English Ivy may spread rapidly along the ground, expanding from central root masses by establishing adventitious roots along its spreading stems. Fragments of stems readily root if they come in contact with soil.

English Ivy may form a dense ground cover that smothers native vegetation. It can weaken or kill host trees by blocking sunlight to the tree's foliage, by adding enough weight to cause branches to break off or trees to fall during winter storms, and perhaps by competing with host trees for water and nutrients.

English Ivy is one of the most abundant invasive species on the Saanich Peninsula. It is well established in the wooded areas in the northwest and southeast of Uplands Park. The south central section of the park is relatively free of ivy, although small pioneering infestations can be found in some of the neighbouring woods (see Figure 15). For the heavily infested areas, it makes sense to remove the climbing vines as these are most damaging and can be removed at relatively little cost. Because of the extreme cost involved in removing ground ivy, managing this invasive should focus on keeping the trees free of climbing vines and removing small, pioneering patches before they become established, giving priority to areas nearest rare plants and on the few patches in the park where they are found immediately adjacent to critical habitat.

Key steps in the eradication of English Ivy include:

- Choking off the supply of seeds into the soil for 2-3 years by preventing plants from flowering;
  - Killing masses of climbing ivy by severing their connection to root systems; the severed aerial systems will quickly die although their skeleton of dead branches may persist on for several years unless stripped by hand, although this is generally not necessary.
  - Treating freshly cut stumps and root masses with triclopyr (Garlon 3A). Treated stumps should be marked with flagging tape and checked for growth the following year, and retreated if necessary. Treatment with Garlon is effective at all times of year, although

[8] Modified from Fairbarns 2014

the City of Portland has found best results with treatments administered in January during sunny days. We have had success dabbin cut stumps with undiluted glyphosate.
  - Leaving treated stumps to rot in place in order not to disturb the soil
- Removing, by hand, portions of the lianas spreading along the ground:
  - Secondary root systems that develop adventitiously along the spreading stems take several years to develop into large root masses so most can be easily removed as the lianas are stripped from the ground;
  - All biomass should be disposed of off site as even the smallest stem fragments can take root and create new patches of ivy;
  - Hand-removal of a ground cover of English Ivy may create areas where other invasive species can become established, particularly where mineral soil is exposed. Such "secondary weed invasions" may be controlled by hand weeding where there is a significant residual component of native species or by establishing a layer of mulch if there are few native plants.

Daphne[9]

(*Daphne laureola*, IAPP code: SL)

Daphne (also known as Evergreen Daphne or Spurge-laurel) is a woody, evergreen shrub that may form dense patches typically 30-80 cm tall in lightly to deeply shaded woodlands that can smother native vegetation. It can occasionally be found in sunny, open areas, although this has not been observed in Uplands Park. In the Victoria area, Daphne usually flowers in the late autumn and early winter, developing seeds that ripen in the early summer. Seeds are reportedly short-lived so that the number of plants germinating from the soil seed bank drops off drastically after the second year (Webb 2006). Daphne cannot spread vegetatively and stems fragments have not been reported to take root. Cut stumps, if improperly done, however, usually re-sprout vigorously. To avoid this, plants should be cut beneath the soil, below the point where there is a visible change in color from brown stem to orange root (ideally including a lateral root).

Daphne presents a health risk if workers fail to follow appropriate safety precautions. In some people, it may cause the skin to blister. Ingestion of even small amounts of Daphne can cause a wide range of reactions and even death. When cutting large amounts of Daphne in a small area, or when transporting it in an enclosed space, fumes from Daphne may cause respiratory problems. WorkSafe BC recommends that workers use gloves and clothing that prevent skin contact with Daphne as well as goggles to protect workers' eyes from airborne sap droplets (http://www.worksafebc.com/publications/health_and_safety/bulletins/toxic_plants/assets/pdf/tp0601.pdf).

Daphne is found in all wooded sections of Uplands Park, and has spread considerably since 2004 when it was found to occur in only about half the park (Morbins and Jenning 2004).

Key steps in the eradication of Daphne include:

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[9] Modified from Fairbarns 2014

- Choking off the seed production for 2-3 years by preventing plants from flowering;
- Manually removing larger plants by cutting them below the root crown (at least a few root hairs must be visible above the cut to ensure that no stem material is left behind);
- Manually removing small plants (generally under 30 cm tall) by pulling them with care to avoid creating areas of exposed mineral soil;
- Manually removing seedlings by hand pulling, or if they form a dense carpet of seedlings then by using a weed-eater to remove their tops;
- Herbicides are rarely needed to kill Daphne although cut-stem treatment with triclopyr may occasionally be needed to eradicate plants rooting in rock fissures if it is not possible to cut them below the root crown;
- Cut plants should be disposed of off-site;
- Ideally, flowering heads should be cut early in the winter to prevent seed production so that when plants are removed in the summer, fewer seeds are scattered as biomass is taken off site. Flower heads can be left to decay on site.

Himalayan Blackberry[10]

(*Rubus armeniacus*, IAPP code: HI)

Himalayan Blackberry is a tall, woody, evergreen shrub that grows well in full sun on a variety of soil types, often forming dense patches and even monocultures. It can quickly outcompete low-growing native vegetation through shading and build up of leaf litter and dead stems. In the Victoria area, Himalayan Blackberry usually flowers in the late spring and develops seeds that ripen from mid-summer to fall. The seeds of most blackberries remain viable in the soil for several years, although the specific length of viability has not been documented.

Himalayan Blackberry reproduces vegetatively once established by rooting at the tips where growing canes touch the ground. Patches have been reported to expand up to 3 metre a year in this way (Hoshovsky, n.d.). Lateral roots arising from the root crown may spread over a metre and produce suckers (adventitious shoots). Cut stumps re-sprout vigorously and even small fragments of root or cane may produce new clumps.

Himalayan Blackberry canes are covered in hooked thorns and so protective gear should be worn when cutting canes.

Himalayan Blackberry is well established in the western third of Uplands Parks, particularly near the borders with Midland and Dorset Roads. There are at least three large well-established patches in the in the middle of the park that received initial treatment in 2015 but will need treating until 2018 before they are fully controlled. Many small pioneering patches should receive priority attention, and these have been identified for eradication as part of this 8-year plan. Key steps in the eradication of Himalayan Blackberry include:

- Manually removing existing canes to make it easier to work around without tearing skin;
- Where practical, excavating and removing old root crowns;
- Where excavation is not practical, treating freshly cut cane stumps with 50% Garlon © 3a;

[10] Modified from Fairbarns 2014

- Removing all cut materials for disposal off site, taking care that no stem fragments are left in contact with soil where they can root and begin to establish new patches;
- Demarcating treated areas with flagging tape for subsequent monitoring and follow-up with herbicide applications;
- Mulching treated areas to prevent emergence of seedlings.

Scotch Broom and White Spanish Broom[11]

(*Cytisus scoparius*, IAPP code: SB; *Cytisus multiflorus*, no IAPP code)

Scotch Broom is a medium-sized to tall, woody, evergreen shrub. In Victoria, Scotch Broom flowers in late spring (May/June) but very occasionally can be found flowering at other times of the year including the fall and winter. The seeds of Scotch Broom are reported to persist in the soil seed bank for at least 5 years (Bossard *et al.*, 2000) and as long as 30 (Carson 1998). Seed bank densities can be very high in long-established stands making it difficult to eradicate the species from an area without a long-term commitment to returning annually without fail to remove new plants that have germinated from the seed bank. Scotch Broom does not spread vegetatively, and stems fragments rarely, if ever, take root. Improperly cut stumps, however, often re-sprout vigorously.

Scotch Broom is a major threat to Garry Oak ecosystems as it can rapidly create a shrub layer typically 50-200 cm tall that shades out native vegetation, particularly in meadow systems where the majority of rare plants are found. It alters ecosystem function by 'fixing' atmospheric nitrogen into the soil, which in turn favours other non-native plants such as Orchard Grass.

Scotch Broom has been the focus of many years of removal in Uplands Park, and today most plants are probably less than 2 years old. It is found most densely in the eastern and southern sections of the park in open areas where it is regenerating from the soil seed bank. Spanish White Broom is found in the Eastern Meadow where it has escaped from gardens along Rutland Road. Its life cycle appears similar to Scotch Broom, although very little specific information on its control could be found for this report. For the time being, it will be managed with the same approach as for Scotch Broom.

Key steps in the eradication of Scotch Broom include:

- Choking off the supply of seeds into the soil for at least six years by preventing plants from flowering;
- Every May, removing all flowering plants from the park, by cutting them below the root crown (at least a few root hairs must be visible above the cut to ensure that no stem material is left behind);
- If resources permit, removing smaller plants, by hand pulling;
- Removing all cut materials for disposal off-site.

[11] Modified from Fairbarns 2014

One-seed Hawthorn[12]

(*Crataegus monogyna*, no IAPP code)

One-seed Hawthorn is a woody, deciduous shrub or small tree that commonly grows up to about 8 m tall. One-seed Hawthorn is also known as Common Hawthorn and frequently, though incorrectly, referred to as English Hawthorn (the true English Hawthorn is *Crataegus laevigata*). It grows well in most soil types, prefers full sun, although it can tolerate semi-shade (King County 2014). In Victoria, One-seed Hawthorn flowers in April and May and develops fruit that ripen over the summer and often persist on the parent plant over winter. Fruit do not detach easily until about mid-October. Most seeds are reputedly dormant in the year following production but the soil seed bank is generally depleted after 3-5 years if plants are not allowed to produce fruit. The seedlings perform poorly if covered by deep mulch. One-seed Hawthorn does not spread vegetatively although it readily resprouts from cuts stumps and is reported to coppice from roots.

Mature One-seed Hawthorn occurs in almost all wooded areas of Uplands Park, but is densest in the western third (the "no-go" zone) and in the south, where in places it is the dominant member of the canopy. Seedlings and young trees can be found in open areas where they threaten to eventually convert meadows to woodlands.

Key steps in the eradication of One-seed Hawthorn include:

- Choking off the supply of seeds to the soil for 2-5 years by preventing trees from reaching flowering size;
- Hand-pulling small individuals which can be removed without causing excessive soil disturbance;
- Cutting larger trees with chainsaw:
  - Taking care not to spread fruits as biomass is taken off site (generally few fruit will detach from branches if this work is done before mid-September);
  - Collecting and disposing of the fruit that do fall from the branches;
  - Treating freshly cut stumps immediately with undiluted glyphosate (check label);
  - Making note of treated areas for subsequent monitoring and retreatment if necessary.

English Holly[13]

(*Ilex aquifolium*, IAPP code: HO)

English Holly is a woody, evergreen shrub that commonly grows up to about 5 m tall. It is extremely shade tolerant and is able to establish in wooded areas with closed canopies, reaching seed-producing age within 5 to 12 years (CIPC 2014). In Victoria, English Holly flowers in April and May and fruit ripen from August to September often persisting on the tree over winter. Most seeds remain dormant for a year after they disperse, and 80% lose viability within three years (Arrieta and Suárez 2004). The seedlings perform poorly if covered by deep mulch.

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[12] Modified from Fairbarns 2014

[13] Modified from Fairbarns 2014

English Holly can spread vegetatively through suckering and layering, especially when damaged or cut down (King County 2008).

In Uplands Park, mature trees are found scattered throughout the park with highest concentrations occurring in the north and west, and in the southern woods that border Beach Drive.

Key steps in the eradication of English Holly include:

- Choking off the supply of seeds into the soil for 2-5 years by preventing plants from flowering;
- Hand-pulling small individuals which can be removed without causing excessive soil disturbance;
- Cutting trees and large shrubs with chainsaws and:
  - Taking care not to spread fruits as biomass is taken off site (generally few fruit will detach from branches if this work is done before mid-September);
  - Collecting and disposing of the fruit that do fall from the branches;
  - Treating freshly cut stumps immediately with undiluted glyphosate (check label);
  - Demarcating treated areas with flagging tape for subsequent monitoring and retreatment if necessary.

European Ash

(*Fraxinus excelsior*, no IAPP code)

European Ash is a medium-sized tree, with a broad, rounded crown reaching up to 25 metres in height. Its leaves are pinnately compound with an opposite arrangement on the branch. Dormant buds are black which help distinguish it from other species of *Fraxinus*. It prefers moist, fertile soil conditions and performs less well in drought-prone areas. The minimum seed-bearing age is reported to be 15 years, and mature trees set seed irregularly. Trees are usually monoecious but often alternate between producing female flowers one year and male the next. Fruits are samaras and remain on the tree until spring. No information was found on European Ash seed longevity in the soil, although studies of native North American species of *Fraxinus* have found that viability of seeds in the soil declined to zero within three years (Klooster *et al.*, 2014).

European Ash was planted in the 1930s in the southwestern section of the park in anticipation of a subdivision that was never built. Those trees grew to maturity and scattered their seed over wide areas of the park, although most are still found in the western half of the park where the trees were planted. In 2005, the mature trees were cut down, but because their stumps were not treated with herbicide, they resprouted from the base and generated many thousands of saplings through root suckering. Saplings are reportedly browsed by rabbits and deer, and so benefit from the protected cover afforded by rose thickets and other spiny shrubs (Collier 2005). Some of the smaller trees, which were not cut down in 2004, have since reached seed-bearing age. These were removed in the summer of 2014.

Key steps in the eradication of European Ash include:

- Choking off the supply of seeds into the soil for 5 years by preventing trees from reaching seed-bearing age;
- Removing all trees and saplings taller than 5 ft:
  - Cutting larger trees with chainsaw;
  - Cutting smaller trees with loppers or handsaw;
  - Treating freshly cut stumps immediately with glyphosate (check label).
- Because of the importance of depleting the "root bank" for this root-suckering species, this plan includes spot spraying of young saplings to kill the root fragment in the soil, which would otherwise regenerate a dense ash forest.
- Repeating this treatment every 5 years.

Common Privet

(*Ligustrum vulgare*, no IAPP code)

Common Privet is a deciduous shrub that can reach 5 metres in height and can tolerate a wide range of growing conditions including shade. It spreads by sending up new shoots from lateral roots that grow just under the soil surface, and its many sprawling branches root where they come into contact with soil. Its flowers, which appear in the summer, produce black fruit that ripen in the fall. Privet will readily reproduce from root or stem cuttings, and is able to regenerate easily from root fragments left in the ground. However, it is reported not to form seed banks as almost all germination occurs in the first growing season following dispersal (Shelton and Cain, 2002).

Common Privet occurs throughout Uplands Park, but is densest in the western "no-go" end of the park towards Midland Road. In the rest of park it occurs as isolated patches many of which are large with substantial trunks.

Key steps in the eradication of Common Privet include:

- Choking off the supply of seeds to the soil for 2 years by removing all patches of Common Privet in the Project Area of the park;
- Cutting large individuals with thick trunks to the ground with chainsaw;
- Cutting smaller, bushier shrubs to the ground with loppers and secateurs, removing roots as best as possible;
- Painting all cut stumps and any remaining stem fragments with glyphosate or triclopyr (Batcher 2000) and marking these with flagging tape for follow-up the following season;
- Hauling all materials off site, being careful not to drop loose fragments as these will readily root and establish new colonies;
- Revisiting all sites for four seasons following season the initial treatment to check for regrowth and retreat as necessary.

❖

Gorse

(*Ulex europaeus*, IAPP code: GO)

Gorse is a medium to tall shrub up to 3 metres high, with erect, densely branched stems covered in spines. Its waxy, spine-like leaves allow it to thrive in very dry conditions. It prefers sunny positions on well-drained soils. Like broom, it is a member of the pea family and is able to fix atmospheric nitrogen into the soil, which favours other non-native plants such as orchard grass. Its yellow flowers appear in March, and seeds mature and disperse by late summer. It can also flower in the late fall and winter. The seeds of Gorse are reported to remain viable in the soil for up to 30 years (Zabkiewicz 1976), and at the base of mature stands and can reach levels reaching 20,000 seeds/m^2. Seed germination is stimulated by exposure to heat. Gorse is reportedly able to establish from root cuttings (Clements *et al.*, 2001) and resprouts readily from cut stems.

Gorse was formerly found in three large patches in the south central section of the park, but has been brought largely under control by work undertaken in 2004 and subsequent maintenance. In 2014, only a few small plants were found and removed.

Key steps in the eradication of Gorse include:

- ❖ Choking off the supply of seeds into the soil by preventing plants from flowering;
- ❖ Every May, checking the three former sites for regrowth; cutting any found and treating cut stems immediately with triclopyr.
  Removing all cut materials for disposal off-site.

Norway Maple and Sycamore Maple

(*Acer platanoides* and *Acer pseudoplatanus*, no IAPP codes)

Norway Maple and Sycamore Maples are a large, deciduous canopy tree that can grow up to 30 metres tall. They have broad, rounded crowns that are densely limbed. Leaves are opposite, lobed and often very large (up to 7") Flowers appear in the early spring before leaf-out, and fruits (samaras) mature by the end of summer and are dispersed by the wind. It is shade tolerant, which has allowed its seedlings to outcompete native trees to become the dominant species in large tracts of forests in eastern North America (Love 2003). Cut trunks reportedly resprout (Love 2003), although no information could be found on root suckering. Information on seed soil bank longevity could not be found. One source suggests that Norway Maple reaches seed-producing age at 7 years (https://sites.google.com/a/wiltonhs.com/norway-maple/welcome).

Norway Maple and Sycamore Maple were planted in the northwest section of the park and along the perimeter of the park that follows Dorset Rd, and about a hundred trees of all sizes can now be found in the park. As well, carpets of seedlings can be found in the vicinity of these trees.

Key steps in the eradication of Norway and Sycamore Maple include:

- Choking off the supply of seeds into the soil for 5 years by preventing trees from reaching seed-bearing age;
- Removing all trees and saplings taller than 5 ft:
  - Cutting larger trees with chainsaw;
  - Cutting smaller trees with loppers or handsaw;
  - Treating freshly cut stumps immediately with glyphosate to kill the root crown (Love 2003).
- Repeating this treatment every 5 years.

Cotoneaster and Pyracantha

(*Cotoneaster* spp., no IAPP code)

Cotoneasters and Pracanthas are a group of popular ornamental shrubs grown for their showy red berries and attractive growth habit. Some are low-growing and prostate, preferring open spaces over rocks, while others can become almost tree-like in their height and girth. Cotoneasters flower from June through September, depending on the species, and produce red to orange berries from September to February. Flowers are apomictic. Pyracantha is covered in long, sharp spines and follow a similar life cycle. Seeds of both plants are dispersed by birds who eat them. Cotoneasters take three years to reach maturity after germination. They can also spread vegetatively by root suckering or by branches that root at the nodes where they come in contact with soil (Hollaran *et al.*, 2004). Cotoneasters will resprout from cut stems and roots. Seed longevity in the soil bank is not known (Bossard *et al.*, 2000). Little information was found for Pyracantha.

Cotoneaster is at an early stage of invasion in Uplands Park. It occurs as small individuals plants throughout the park, but not in great numbers (less than 20 were counted in 2014). Only 2 Pyracanthas were found.

Key steps in the eradication of Cotoneaster and Pyracantha include:

- Choking off the supply of seeds into the soil by removing all specimens found in the Project Area of the park;
- Cutting all shrubs with a handsaw or loppers;
- Treating freshly cut stumps immediately with triclopyr (Bossard *et al.*, 2004).
- Revisiting treated sites every two years for regrowth and retreating and pulling by hand any newly germinated plants.

Appenidx 6: Partial List of Alien Invasive Plants Found in Uplands Park

Forbs (non-grassy herbaceous species), including

- Sticky Chickweed (*Cerastium glomeratum*)
- Canada Thistle (*Cirsium arvense*)
- Bull Thistle (*Cirsium vulgare*)
- Common Draba (*Draba verna*)
- Common Stork's-bill (*Erodium cicutarium*)
- Cut-leaved Geranium (*Geranium dissectum*)
- Dovefoot Geranium (*Geranium molle*)
- Purple Cudweed (*Gnaphalium purpureum*)
- Hairy Cat's-ear (*Hypochaeris radicata*)
- Purple Dead-nettle (*Lamium purpureum*)
- Black Medic (*Medicago lupulina*)
- Ribwort Plantain (*Plantago lanceolata*)
- Sheep Sorrel (*Rumex acetosella*)
- Common Groundsel (*Senecio vulgaris*)
- Small-flowered Catchfly (*Silene gallica*)
- Prickly Sow-thistle (*Sonchus asper*)
- Common Chickweed (*Stellaria media*)
- Common Dandelion (*Taraxacum officinale*)
- Shepherd's Cress (*Teesdalia nudicaulis*)
- Small hop-clover (*Trifolium dubium*)
- Subterranean clover (*Trifolium subterraneum*)
- Wall Speedwell (*Veronica arvensis*)
- Common Vetch (*Vicia sativa*)
- Garden Loosestrife (*Lysimachia vulgaris*)
- St.John's Wort (*Hypericum perforatum*)
- Carpet Burweed (*Soliva sessilis*)
- Periwinkle (*Vinca* spp.)
- Crocosmia (*Crocosmia* spp.)
- Poison Hemlock (*Conium maculatum*)
- Crow Garlic (*Allium vineale*)
- Giant Hogweed (*Heracleum mantegazzianum*)
- Hardy Cyclamen (*Cyclamen hederifolium*)
- Creeping Buttercup (*Ranunculus repens*)
- Meadow Buttercup (*Ranunculus acris*)
- Chickweed (*Stellaria media*)
- Blue Field-Madder (*Sherardia arvensis*)
- Common Salsify (*Tragopogon porrifolius*)
- Goldmoss Stonecrop (*Sedum acre*)
- Field Pennycress (*Thlaspi arvense*)
- Small-fruited Parsley-piert (*Aphanes arvensis*)
- Mouse-ear Cress (*Arabidopsis thaliana*)
- Bittercress (*Barbarea vulgaris*)
- English daisy (*Bellis perennis*)
- Broad-leafed Peavine (*Lathyrus latifolius*)
- Pineappleweed (*Matricaria discoidea*)
- Silver Dollar Plant (*Lunaria annua*)
- Lesser Celandine (*Ranunculus ficaria*)
- Bur Chervil (*Anthriscus caucalis*)

Grasses, including

- Colonial Bentgrass (*Agrostis capillaris*)
- Silver Hairgrass (*Aira caryophyllea*)
- Early Hairgrass (*Aira praecox*)
- Sweet Vernalgrass (*Anthoxanthum odoratum*)
- Soft Brome (*Bromus hordeaceus*)
- Rip-gut Brome (*Bromus rigidus*)
- Barren Brome (*Bromus sterilis*)
- Cheatgrass (*Bromus tectorum*)
- Hedgehog Dogtail (*Cynosurus echinatus*)
- Crested Dogtail (*Cynosurus echinatus*)
- Orchardgrass (*Dactylis glomerata*)
- Quackgrass (*Elymus repens*)
- Common Velvet-grass (*Holcus lanatus*)
- Perennial Ryegrass (*Lolium perenne*)
- Annual Bluegrass (*Poa annua*)
- Bulbous Bluegrass (*Poa bulbosa*)
- Kentucky Bluegrass (*Poa pratensis*)
- Barren Fescue (*Vulpia bromoides*)
- Tall Oatgrass (*Arrhenatherum elatius*)
- Common Timothy (*Phleum prataense*)

Appendix 7—Distribution of Invasive Plant Species in Uplands Park

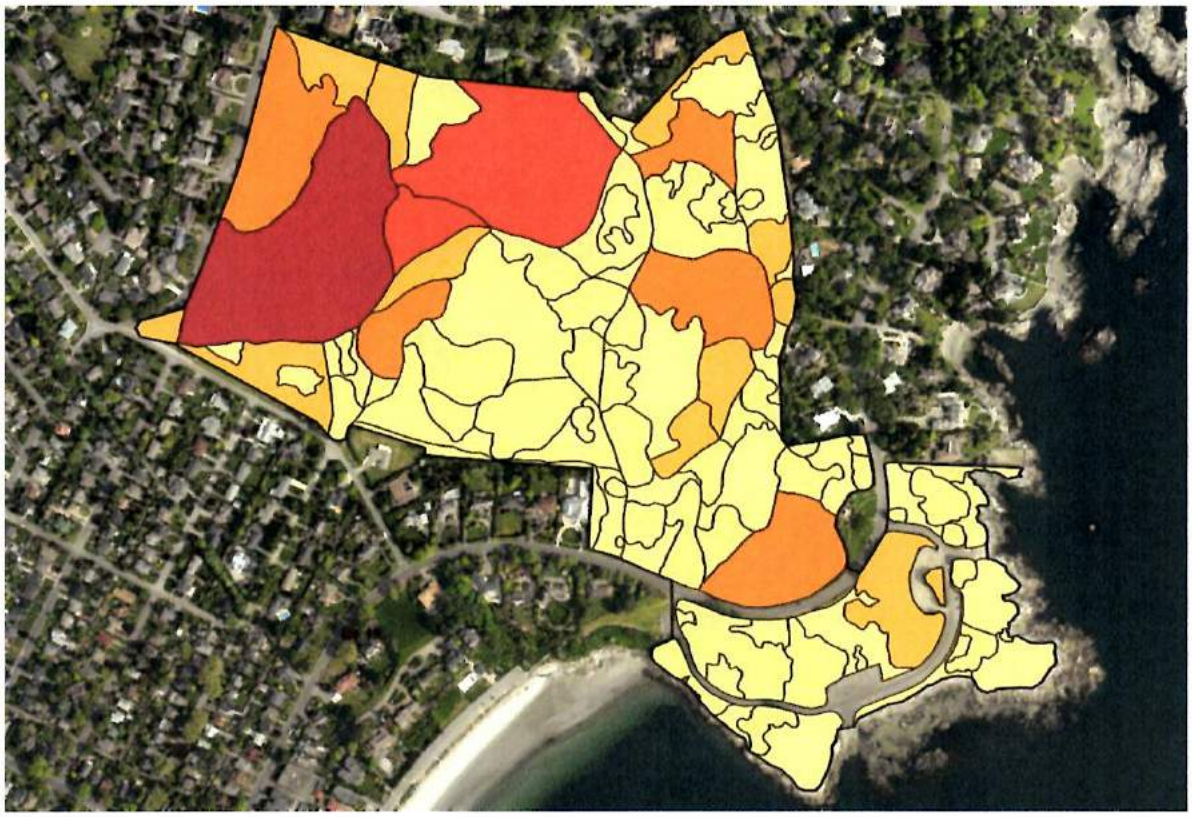

Figure 18—Distribution of Invasive Plant Species in Uplands Park

The darker red the area, the higher the concentration of invasive plant species as measured by estimated person-days of work required for their removal. Plants represented in the map are only a subset of those found in the park and include: Daphne; Ivy; Holly; One-seed Hawthorn; European Ash; Himalayan BlackBerry; Common Privet and are based on data collected in 2014 by Wylie Thomas.

Appendix 8—Subunits of TU62 Referenced in Treatment Plans for Removing Invasive Grasses

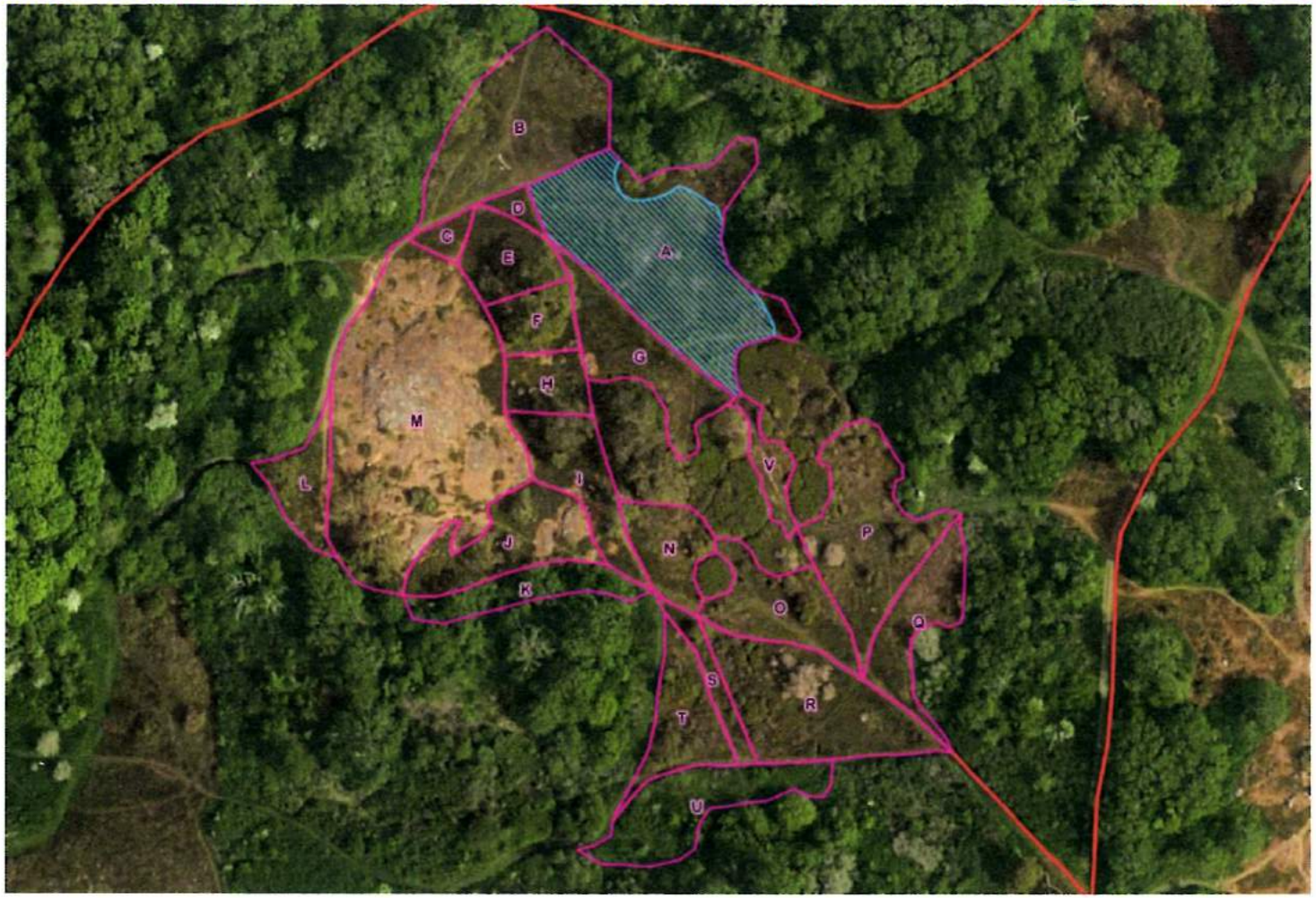

Figure 19—Close-up of Central Meadow (TU62) with Subunits for Tackling Invasive Grasses
Light-blue hatching is the main vernal pool home to a very large number of endangered species of plant. The pink lines delineate the borders of the meadow's subunits A to V, which are targets for invasives grass removal according to this eight-year invasive plant management plan. They are referenced in the annual treatment plans provided in Section 5 of this document.