Best Management Practices for Control of English Ivy

Prepared for: City of Shoreline

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December 2012

I. Introduction

English ivy (*Hedera helix*) is a highly invasive plant species affecting the health of urban forests throughout the Northwest. This evergreen climbing vine is capable of forming dense mats in the forest understory and excluding all other understory species, including those native to the region. It can also climb up trees, preventing light from reaching the leaves and adding weight to the tree canopy, causing trees to weaken and fall during wind storms. Many regional land management agencies and organizations have adopted an integrated approach to control ivy, which includes a combination of manual, mechanical and chemical techniques. While these methods have warranted a significant amount of success over the last decade, it remains necessary to continue exploring scientifically-informed best management practices to ensure safe, effective, cost-efficient control of this aggressive plant.

II. Summary of Best Management Practices

Manual, mechanical and chemical control methods are all effective in removing and killing English ivy. Employing a combination of methods often yields the best results and may reduce potential impacts to native plants, animals and people. The method chosen will vary from site to site depending on the extent and type of infestation, the amount of native vegetation on the site, and the time, labor and other resources available. Careful consideration of these factors must be made before moving forward with one or more of the following ivy control methods:

<u>Manual/mechanical</u>

Removal by hand has many proven benefits and often is the most practical, cost-efficient means of invasive control. Effective manual removal of ground ivy involves pulling and/or digging all roots and vines from an area. Stem fragments are capable of re-rooting if left in the soil, so careful attention must be paid to eliminating as much of the stem and root material as possible. Ivy growing up a tree can be successfully stopped by cutting each vine at an easily-reached height, separating the plant from its roots in the soil and causing all ivy above the cut to die. Remaining vines below must be pulled away from the tree and removed to prohibit further growth. Whenever possible, all ivy roots and vines should be removed from the site to keep the infestation from re-establishing. Alternatively, grubbed plant material may be composted on site in piles, though this approach requires some maintenance to limit re-growth until the plant matter is fully decomposed. In general, sheet-mulching and native plantings soon after initial removal will suppress ivy re-establishment, limit soil erosion, and accelerate the ecosystem recovery process.

- *Benefits:* Ivy growing amongst native shrubs and ground covers is most thoroughly removed by hand and limits damage to the surrounding ecosystem. Manual removal requires very little training and much of the work,

especially for ground ivy, can be completed using simple hand tools such as pruning shears and small garden tillers. The ability to incorporate volunteer efforts into manual ivy removal projects proves both time and cost-efficient, while simultaneously promoting community involvement and awareness. Recent studies show that initial manual removal can successfully reduce an infestation of 80% cover to as little as 2-5% the following year after, with only 1-2% cover remaining after only one follow-up treatment.

- *Limitations:* In absence of volunteers, ivy removal by hand can be a slow and tedious process, particularly in large infestations where dense mats, or monocultures, have formed. Under these circumstances, manual removal puts a greater amount of physical strain on the practitioner, further reducing efficiency. According to research compiled by The Nature Conservancy and other partnering agencies, initial manual clearing of an acre of densely established ivy requires an average of 300-1,000 human hours. This number varies greatly due to conditions on-site, where topography, soil, and other factors influence the rate of productivity. Additional limitations of manual removal include a higher potential for soil disturbance and erosion.

Chemical

Systemic herbicides are absorbed into the plant's tissue and transported throughout the vascular system, eventually killing the entire plant. Two application methods, foliar and cut-stem, may be employed to treat ivy depending on the type of infestation. Foliar application is most appropriate for densely growing ground ivy covering a large area. Due to the thick, waxy nature of the leaves, a non-ionic surfactant must be added to the herbicide to maximize effectiveness of the chemical. The cut-stem method involves application directly to the ivy stem or stump immediately after being cut. This technique may be necessary if the stump is too large to be dug out from the ground, which typically occurs when the ivy has grown up a tree and fully established itself. In general, herbicide treatment may take several months before the plant dies, and follow-up treatments are often needed to spot-spray or manually remove ivy from areas that were missed or avoided. Native plant installation can typically take place at least six months after the initial treatment.

There is a wide variety of herbicides and surfactants on the market. In addition, different concentrations and application rates further increase the options of chemical control for ivy. Separate experiments conducted by the City of Portland, The Nature Conservancy, and Portland Metro Parks and Greenspaces show control rates of 95% or above after a single treatment of glyphosate (in either the Round-up Pro or Rodeo formulation) or triclopyr (Garlon 3a) mixed at 2-5% volume / volume (v/v) with the surfactant Li-700 (for glyphosate or near water) or Hasten (for triclopyr) at 0.5 - 1.0% v/v. In areas void of native vegetation, Pelargonic acid (sold under the brand name Scythe), can also be added to either mix at 0.5-1% to increase

effectiveness. The King County Noxious Weeds program recommends using a 2-5% solution of combined glyphosate and triclopyr (2:1 glyphosate to triclopyr), mixed with the surfactant Competitor, and sprayed directly onto foliage to control ground ivy. The Oregon State Extension recommends mowing ground ivy first using a nylon-string weed-eater, then immediately spraying with a 2% solution of 2,4-D.

Regardless of the method chosen for chemical control, several critical factors must first be taken into consideration, including strict adherence to application directions and safety precautions described on every herbicide's label. In order to minimize harmful impact to native vegetation, a 3-5 foot herbicide-free buffer is recommended. Application in the Pacific Northwest should only take place when native vegetation is dormant (typically November – February), on sunny days with temperatures above 55°F. Rainy conditions within 24 hours of application will greatly reduce effectiveness of the treatment and create a higher likelihood of chemical run-off into the soil. Where little to no native vegetation is present, application may also take place in the Spring and Fall.

- *Benefits:* While initial cost of chemicals, equipment, and training may be high, a single practitioner can treat a typical acre of ivy in 2-4 hours, drastically reducing the cost of labor and increasing efficiency. Follow-up maintenance is typically minimal compared to manual removal.
- *Limitations:* Strict timing required for herbicide application can prove to be too impractical or inconvenient, particularly in the Northwest. In addition, there is always a health risk involved with exposure of humans and the environment to harmful chemicals. While chemical control may often be the most efficient means of ivy removal, this method requires specific training, certification, and specialized field skills in order to be implemented correctly.

INTEGRATED METHODS

A combination of manual and chemical control efforts has proven to be the most effective approach to controlling most ivy infestations. This enables the land management agency or organization to balance the costs and benefits of each method, maximizing efficiency and effectiveness. The type of ivy infestation proven to be most appropriate for an integrated manual/chemical approach are sites where clusters of, or sporadic native vegetation are distributed throughout patches of both ground and tree ivy. During chemical treatment, it is necessary to leave a buffer of 3-5 feet around any native plants on site, and potentially shield vegetation in windy conditions to avoid impact of herbicide drift. Ivy growing up and around native plants can be manually removed either before chemical treatment or afterwards, during the follow-up treatment. In the case of ivy monoculture with little to no native plant cover, it may be appropriate to implement 100% chemical control. In the same respect, where native vegetation dominates with a low percentage of ivy cover

intermixed, manual removal will be the best option. Due to the high variability of invasive plant infestations, a full site analysis and careful consideration of the benefits and limitations of each method must be made before designing a management plan that includes manual, chemical, or integrated practices.

III. Study Design

This study is designed to test the effectiveness of foliar herbicide applications for controlling English ivy. These methods are being presented as a potential example of a study design that may need to be further expanded upon or revised to meet the particular needs and budget of the agency. Testing different foliar application methods will ensure that the most cost-effective approach can be utilized. Existing data shows that both glyphosate and triclopyr can be successfully used to treat English ivy. This study will compare the effectiveness of each herbicide, as well as a combination of the two as suggested by the King County Noxious Weeds program. If either chemical alone is as effective as the combination, considerable resources could be saved.

The study location will be selected by the City of Shoreline, and will contain contiguous habitat dominated by dense ground ivy, with <5% native cover present. If necessary, more than one location may be selected as long as site conditions are consistent. The following treatments will each be applied to 3 10x10ft, randomly placed plots within the study site(s), for a total of 12 plots. Application will take place by one practitioner on a sunny day from November – February, with temperatures above 55°F and no rain in the forecast for 24 hours. The study may be replicated with additional plots in Spring or Fall, if desired. It would also be possible to include additional replicates using more than one type of surfactant.

Treatments

Control: No treatment

3% glyphosate w/surfactant

3% triclopyr w/surfactant

3% glyphosate & triclopyr (2:1) w/surfactant

Chemical application methods will be in accordance to the specific best management practices as outlined on each herbicide's label. At the time of application, the time and cost for each method will be collected. Each plot will be monitored in the fall following the initial treatment. Data observed will include % cover for live ivy, % cover for other (non-ivy) invasive species, % cover for native species, and % cover for bare ground. Follow-up treatment after fall monitoring may

include either manual removal of any remaining ivy or a second chemical treatment, depending on the agency's preference. After manual follow-up removal, the plots may be planted immediately with native trees, shrubs, and/or ground covers. For plots receiving additional chemical treatment, native planting may take place the following fall, after a second post-treatment monitoring for all plots. For initial treatments taking place in the spring or fall, a similar schedule may be followed where two years of post treatment monitoring will take place. Native plants may be installed only in the appropriate season, at least 6 months after any chemical treatment. Results of this study should provide the agency with a comprehensive comparison of the time, cost, and effectiveness of each ivy control method.

IV. References

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