

Invasive Species in the Historic Garden:
A Field Guide to Dumbarton Oaks

Dumbarton Oaks Internship Report

Joan Chen
Summer intern '18, Garden & Landscape Studies
Master of Landscape Architecture '19, Harvard GSD

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This report provides a brief overview of Beatrix Farrand’s use of plant species that are currently considered “invasive” and outlines management strategies. Farrand’s *Plant Book for Dumbarton Oaks*, written in 1941 and published by Dumbarton Oaks in 1980, is the main text referenced by this report. The Garden Archives at Dumbarton Oaks, as well as conversations with gardeners, also shaped this study. Two case studies explore how invasive species management might be approached in a historic garden.

A spreadsheet with each mention of an invasive plant in Farrand’s *Plant Book* and its associated management strategies is included in the Appendix, providing a working document for Garden and Grounds staff. The Appendix also contains a brief reading list with titles on garden history, the native/non-native/invasive plant debate, and various plant lists and technical references, as well as a printable pamphlet with information on the six most used invasive plants at Dumbarton Oaks.

Overview

When Beatrix Farrand described plant growth as invasive, the term “invasive species” had not yet come into use. Her 1941 plant book includes two uses of the word “invasive” while describing maintenance of fast-spreading plants:

At the little porter’s lodge, Ivy and Wisteria are used on the building itself, but here again they must not be allowed to become so **invasive** that the lodge is turned into a green mound.
(The Inner Edge from the Entrance Gate to the Terrior Column¹)

The Forsythia should be kept pruned each year, so that the heavy wood is taken out of the plants and so that they are not allowed to become too massive or **invasive**. If all the modeling of the hill is obscured by the mass of Forsythia, it becomes only a tangled, even if lovely, group of planting.
(The Forsythia Dell²)

Throughout the twentieth century, such plants have been referred to as “exotic”, “weedy”, or even “Barbarians” or “aggressive interlopers”³. The current definition of invasive species in the United States was made official by President Clinton through Executive Order 13112 (1999)⁴; there, an “invasive species” is defined as a species that is non-native (or alien) to the ecosystem under consideration, and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.⁵ For this report, the primary reference for what constitutes an invasive species is the most recent edition of *Plant Invaders of Mid-Atlantic Natural Areas*, published by National Park Service and U.S. Fish and Wildlife Service⁶. The National Park Service defines an invasive species as exclusively non-native⁷, aligning with the definition in E.O. 13112. For this study, however, an invasive species refers to any species that restricts biodiversity through aggressive growth, which means it can be of either native or non-native origin. (In other words, invasive

¹ Beatrix Farrand, *Beatrix Farrand's Plant Book for Dumbarton Oaks*, ed. Diane K. McGuire (Washington, D.C.: Dumbarton Oaks, 1997), 19.

² Farrand, *Plant Book*, 91.

³ Joachim Wolschke-Bulman, Introduction to *Nature and Ideology: Natural Garden Design in the Twentieth Century*, (Washington, D.C.: Dumbarton Oaks, 1997), 4.

⁴ E.O. 13112 of Feb 3, 1999. <https://www.federalregister.gov/documents/1999/02/08/99-3184/invasive-species>

⁵ Under this definition, aggressive plants of “native” origin are not considered invasive, including vines such as *Parthenocissus quinquefolia* or *Campsis radicans*. An NPS biologist suggested referring to those as “native nuisance species”.

⁶ Swearingen et al, *Plant Invaders of Mid-Atlantic Natural Areas*, (Washington, DC: National Park Service and U.S. Fish and Wildlife Service, 2014). This is the fifth and most recent edition.

⁷ Here, “native” typically means existing in a specific region before the arrival of European settlers, or the arrival of Columbus (1492) specifically, or before settlers began to mass transport alien plants to North America (150-200 years ago).

species is not the same as, and need not be a subset of, non-native species.) With the changing climate and movement of species, the list of invasive species and corresponding management strategies will continue to evolve.

Why study invasive species? Specifically, why study invasive species in a historic garden, and why now? Dumbarton Oaks provides a unique opportunity to engage in the dialogue on invasive plants in a historic garden because it is extraordinarily well documented. Gardens are not static; Beatrix Farrand's detailed descriptions of plant form and management in the *Plant Book* demonstrates her understanding of the garden as an evolving work that responds to changing conditions. The cultural history of plant exchange is also worth noting: non-native species have been transported and experimented with throughout the history of designed landscapes—a small fraction of which have become recognized as invasive in their new environments. In recent decades, public discourse has increasingly turned to ecosystem services of designed landscapes and the use of native plants. Many invasive plants⁸ threaten the biodiversity of natural areas by outcompeting indigenous species and therefore decreasing habitat for native wildlife; native plants generally provide more ecosystem services for native fauna⁹. As Dumbarton Oaks lies adjacent to Rock Creek Park and is thus connected to a larger network of natural areas, it is prudent to be a good neighbor while demonstrating horticultural best practices as a public garden.

The main reference for this study is Farrand's 1941 *Plant Book*, which documents her design intent and lists the plants present in the gardens at the time. Although changes have been made in the decades following, including those authored by Ruth Havey and Alden Hopkins, the gardens mostly remain true to Farrand's design intent¹⁰ and her *Plant Book* remains the single most important reference in the preservation of the gardens. In general, designs original to Farrand have higher priority in preservation¹¹, and areas in the garden that have since been altered offer more flexibility for future change.

Overall, management strategies for invasive species in the Dumbarton Oaks gardens are a combination of removal, replacement, control, and monitoring. The specific strategy for each planting relates to its significance in the garden, invasiveness and means of spreading, as well as functional requirements. For instance, Chinese wisteria (*Wisteria sinensis*) is considered a very invasive plant that spreads both vegetatively and by seed, but the use of wisteria is central to the design in Arbor Terrace, as well as around the orangery, the pool, North Vista, and Pebble Garden. Seed pods of wisteria are heavy, limiting dispersal by birds and mammals¹², which means it is mostly a local management problem. Thus, the proposed management strategy is to leave, monitor, and remove seed pods prior to ripening to prevent spreading.

Approaches to invasive species management at Dumbarton Oaks is explored through the following case studies.

⁸ There are nuances to this broad argument. For instance, Peter Del Tredici argues that “invasive” is not a helpful descriptor due to the inevitability of ecological change and the creation of “novel” ecosystems through human intervention.

⁹ Doug Tallamy, *Bringing Nature Home: How You Can Sustain Wildlife with Native Plants* (Portland: Timber Press, 2009), 38-46.

¹⁰ Diane K. McGuire, foreword to *Plant Book*.

¹¹ Conversation with Jonathan Kavalier, director of Garden & Grounds at Dumbarton Oaks. The gardens of Dumbarton Oaks largely remains true to Farrand's original design (McGuire, *Plant Book*); Farrand herself described Dumbarton Oaks as the “best and most deeply felt” project of her career (Karson, *A Genius For Place*, 146).

¹² <https://www.fs.fed.us/database/feis/plants/vine/wisspp/all.html#Seed%20dispersal>

Case Studies

Two case studies are included in this report. The first is focused on an area of the garden with a number of invasive plants, and the second concentrates on a single plant species in its uses across the gardens. These case studies are not intended to be comprehensive, but to explore how invasive species management might be approached in a historic garden.

1. Lovers' Lane Pool

Lovers' Lane Pool is chosen as a case study site because the design contains many species that are now considered invasive. This case study highlights some of the nuances of balancing invasive species control and historic preservation.

Farrand arranged the design to work with the steep slope and to “keep as many of the native trees as possible unhurt and undisturbed”¹³. The area is also designed with “heavy-growing” plants to screen the property boundary with Montrose Park and provide a sense of enclosure:

These trellises are covered by both deciduous and evergreen creepers, such as Honeysuckle, Ivy, and Jasmine; on the east trellis, where protection is needed from the very close easterly boundary, the heavy-growing Kudzu has been amply used. The ground cover under the seats is of *Vinca minor* and this also surrounds the pool. ...Outside the trellis, it is protected by some few plants of Privet, both the Japanese and the *amurensis*, and a few plants of Bamboo...¹⁴

Of the plants mentioned, only the bamboo is currently in use. The trellis now supports a Chinese wisteria (*Wisteria sinensis*, Fig. 1.2), and the east side of the pool is screened only by bamboo (Fig. 1.1). Farrand planted the now infamous kudzu for the trellis, although ivy, honeysuckle (likely Japanese honeysuckle), periwinkle, privet, and bamboo are all considered invasive to different extents.

The slope to the west of the pool was recently (July 2018) treated to remove the Japanese honeysuckle (*Lonicera japonica*) and other unwanted plants, including porcelainberry (*Ampelopsis brevipedunculata*)¹⁵. As of summer 2018, this slope has been host to a weeping willow, some plants of aucuba, a leatherleaf mahonia¹⁶ (*Mahonia bealei*), and a sprawling mass of Japanese honeysuckle. Farrand describes the willow but not the other plants in her text¹⁷, and the origin of some of the plants, including honeysuckle, are unclear.

¹³ Farrand, *Plant Book*, 107.

¹⁴ Ibid.

¹⁵ Farrand has specified porcelainberry for other areas of the garden, but not Lover's Lane Pool. Although it has been removed from intentional planting, porcelainberry remains present in the gardens as an invasive species.

¹⁶ Also invasive; possibly a volunteer.

¹⁷ Farrand, *Plant Book*, 108.



Figure 1.1. Lover's Lane Pool, view towards north. June 2018.



Figure 1.2. Lover's Lane Pool trellis. June 2018

Farrand's description of Lovers' Lane Pool in the *Plant Book* provides a starting point for the question of preservation and invasive species management. A much loved space, Lovers' Lane Pool derives its charm from the amphitheater and the pool itself, where the silver maples and their reflections dominate the view. The design of the space draws inspiration from Italian gardens, especially the amphitheater of Janiculum Hill at the Accademia degli Arcadi Bosco Parrasio, and the planting is designed to "give seclusion to this little theater."¹⁸ Beyond the intention to provide screening and sense of seclusion on the east and south sides, and to provide a visual break for the steep slope on the west side, Farrand appears to be flexible with the planting palette. For instance, honeysuckle, ivy, and jasmine are only given as examples of creepers that cover the trellis, and Farrand does not recommend a specific plant over others. Farrand's 1941 plant list (Fig. 2.1), together with a 1960 planting plan drafted by Richard J. Meyers (Fig. 2.2), provide a detailed portrait of the plants present at Lovers' Lane Pool during its first few decades.

Figure 2.1 (below) Plant list for Lovers' Lane Pool, with invasive plants highlighted. / Figure 2.2 (right) Planting plan for Lovers' Lane Pool, 1960, with invasive plants highlighted. Dumbarton Oaks Garden Archives (GD Q-4-01)

Trees, shrubs, and vines surrounding the pool

Tsuga canadensis, Canadian hemlock
Acer saccharinum, Silver maple
Fagus sylvatica 'Purpurea' [*Fagus sylvatica* 'Atropunicea'], European purple-leaved beech
Juglans regia, Persian walnut
Liriodendron tulipifera, Tulip poplar
Prunus sp., Cherry
Salix babylonica, Weeping willow
Buxus sempervirens 'Suffruticosa', Edging box
Ligustrum amurense, Amur privet
Ligustrum japonicum, Wax-leaf privet
Lonicera japonica, Japanese honeysuckle
Bambusa sp., Bamboo

On the trellis

Hedera sp., Ivy
Jasminum sp., Jasmine
Lonicera sp., Honeysuckle
Pueraria lobata, Kudzu vine

On the brick wall

Vinca minor, Periwinkle

Ground cover, perennials, and spring bulbs around the pool

Crocus sp., Crocus

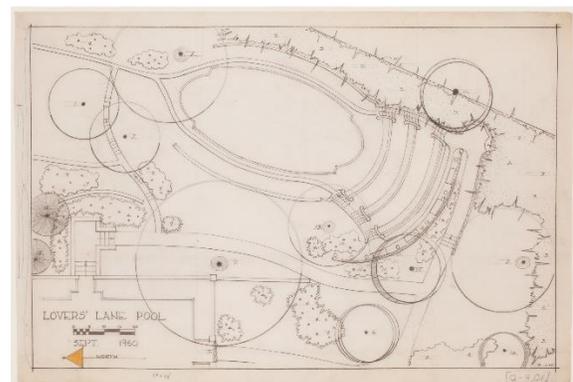
Vinca minor, Periwinkle
Viola sp., Violet

Spring bulbs and perennials underneath the beech tree

Crocus sp., Crocus
Eranthis hyemalis, Winter aconite
Erythronium sp., Dog-tooth violet
Fritillaria sp., Guinea-hen flower
Galanthus nivalis, Common snowdrop
Hepatica sp., Liverleaf
Narcissus sp., Daffodil
Osmorhiza sp., Sweet cicely
Podophyllum peltatum, Mayapple
Trillium sp., Trillium
Triteleia sp., Tritelia
Viola sp., Violet

Trees and shrubs on the bank outside the east wall of the Fountain Terrace

Acer saccharinum, Silver maple
Crataegus cordata [*Crataegus phaenopyrum*], Washington thorn
Platanus occidentalis, Buttonwood
Pyrus lecontei 'Kieffer', Kieffer pear
Buxus sempervirens, Common box
Cydonia sinensis, Chinese quince
Jasminum nudiflorum, Winter jasmine
Ligustrum amurense, Amur privet



LOVERS LANE POOL

1. <i>Acer platanoides</i>	Norway Maple
2. <i>Acer saccharinum</i>	Silver maple
3. <i>Bambusa</i> sp.	Bamboo
4. <i>Clematis</i>	Clematis
5. <i>Clematis</i>	Chinese quince
6. <i>Fagus sylvatica</i>	Common beech
7. <i>Fagus sylvatica</i>	Bayleaf
8. <i>Ligustrum amurense</i>	Amur privet
9. <i>Ligustrum sinensis</i>	Chinese privet
10. <i>Ligustrum sinensis</i>	Chinese privet
11. <i>Ligustrum sinensis</i>	Chinese privet
12. <i>Pyrus lecontei</i>	Common Pear
13. <i>Salix viticulata</i> var. <i>undulata</i>	Golden Willow
14. <i>Ulmus parvifolia</i>	Chinese Elm
15. <i>Ulmus parvifolia</i>	Chinese Elm
16. <i>Wisteria sinensis</i>	Chinese wisteria

¹⁸ Ibid, 107.

Historic photographs of Lovers' Lane Pool in the Dumbarton Oaks Garden Archives also give clues to how the area has changed in the past nine decades and provide evidence for future modifications to the planting. Early photographs of the area depict an east trellis with vines and lesser mass of bamboo, with the lattice still visible (Figures 3 and 4). The bamboo screening had since grown thicker and has been sheared to a dense, defined mass. The wisteria on the trellis, although not included in the 1941 plant list, have existed on site for some decades: it is clearly visible in a 1967 photograph (Fig. 5). The west slope has always appeared somewhat overgrown, although the perforations in the stone wall had been visible, with plants growing from it (possibly honeysuckle, Fig. 5). The wild appearance of the west slope is evident in photographs dating from the 1930s (Fig. 6).



Figure 3. Lover's Lane Pool, likely late 1920s or early 1930s. Dumbarton Oaks Garden Archives (LA.GP.29.09)

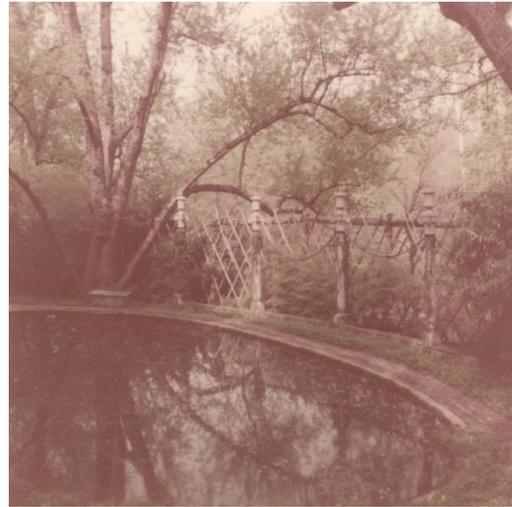


Figure 4. Reflecting pool and trellis, July 1957. Dumbarton Oaks Garden Archives (LA.GP.29.15)



Figure 5. Lover's Lane Pool, 1967. From *Plant Book*.



Figure 6. Lover's Lane Pool, likely late 1920s or early 1930s. Dumbarton Oaks Garden Archives (LA.GP.29.11)

Invasive species management in a historic garden requires evaluation on a case-by-case basis, unlike that of a natural area. Generally speaking, there are plants that should be kept, replaced, or removed immediately or in the future; factors to consider include how the plant spreads, feasibility of removal or replacement, and the historic significance of a planting. For instance, the Chinese wisteria on the trellis could be preserved because although it is not included in Farrand's examples

of trellis plantings, it is a climbing vine that provides screening and adds significant seasonal interest to the Lovers' Lane Pool area, which fits Farrand's description. Also, the seed pods of wisteria are large and has a limited spread, which poses less risk of spreading into surrounding natural areas. The bamboo to the east of the pool, on the other hand, would likely be kept until conditions are suitable for removal. This is because the removal of bamboo is a disruptive process that would likely damage the adjacent mature trees, and also because bamboo is only spreads vegetatively. When those mature trees die could be an opportune moment to remove both tree and bamboo and replace the bamboo with a less invasive plant, such as a native climbing vine on the trellis, or a clumping bamboo. On the west slope of Lovers' Lane Pool, the tangled mass of Japanese honeysuckle and porcelainberry has been removed in July 2018, an example of invasive plants that could be removed as soon as possible. Neither the honeysuckle nor the porcelainberry were specified to be planted there, but likely spread from other areas of the garden. The honeysuckle might have been used as plugs in the retaining wall (Fig. 5). Both are highly mobile plants, due to bird-dispersed seeds and growth habit as climbing vines.

2. English Ivy

English ivy, an invasive vine in the Eastern U.S., is one of the most used plants in the Dumbarton Oaks gardens and also one with significant cultural lineage in garden design. Shirley Hibberd's 1872 *The Ivy Monograph* traces the history of ivy to Virgil before describing the many cultivars of *Hedera*¹⁹. An American gardening reference book from the 1910s, *The Landscape Gardening Book*, includes an entire chapter on the use of vines as "harmonizer" in gardens²⁰. An evergreen vine that grows vigorously in shade and most soils, English ivy can be difficult to replace in the garden.

In the Dumbarton Oaks gardens, English ivy can be found growing in four different conditions (Fig 7.1, 7.2, 7.3, 7.4):

- 1) As groundcover for flat terrain (e.g. East lawn, South lawn),
- 2) as groundcover for slope (e.g. slope below Arbor Terrace),
- 3) as topiary (Urn Terrace), and
- 4) on walls or vertical structures (e.g. on wall between Rose Garden and Fountain Terrace).

Contrasting its pervasiveness with the mentions of *Hedera* in Farrand's *Plant Book* suggests that some instances of English ivy may not be intentional but had spread from other areas of the garden. Again, management strategies varies by case. Some general recommendations on English ivy treatment by type of use:

- 1) When used as groundcover for flat terrain, English ivy be removed gradually and replaced with non-invasive groundcover.

¹⁹ Shirley Hibberd, *The Ivy, a Monograph; Comprising the History, Uses, Characteristics, and Affinities of the Plant, and a Descriptive List of All the Garden Ivies in Cultivation*, (London: W.H. and L. Collingridge, 1893).

²⁰ Grace Tabor, *The Landscape Gardening Book: Wherein Are Set down the Simple Laws of Beauty and Utility Which Should Guide the Development of All Grounds* (McBride, Winston & Company, 1911), 52-61.

2) When used as groundcover for slope, English ivy should be pruned regularly to avoid encroachment on trees; further experimentation on removal and replacement should be carried out in small sections before large areas of ivy are removed, due to significant risk of erosion associated with clearing ground on slopes. Possible replacements include *Pachysandra procumbens* (Allegheny spurge) or *Hexastylis virginica* (Virginia ginger), as well as the *Pachysandra terminalis* and *Vinca minor* already used in the gardens, which can also be considered invasive but spread less vigorously.

3) When used as topiary on Urn Terrace, English ivy may be replaced with another plant suited for a low hedge, such as dwarf box or *Sarcococca*. It is worth noting that on the Urn Terrace, the Rococo form of English ivy is not a Farrand design but a Ruth Havey alteration; Farrand had initially designed a boxwood border around the bed²¹.

4) When used intentionally on walls, keep pruned to a certain level and prevent from shifting to the mature form which can flower and fruit, to prevent seeds from forming and spreading. Some instances of English ivy on walls could be removed, especially there is no evidence of it being part of Farrand's design intent or where it has clearly spread from an intended planting (Fig 8.1, 8.2).



Figure 7.1. English ivy as groundcover for flat terrain



Figure 7.2. English ivy as groundcover for slope



Figure 7.3. English ivy as topiary



Figure 7.4. English ivy on walls

²¹ Farrand, *Plant Book*, 59-60.



Figure 8.1. Example of potential English ivy removal site:
on short wall on the north side of Urn Terrace



Figure 8.2. Example of potential English ivy removal site:
on wall outside Orangery

The case of English ivy demonstrates that invasive management strategies can be examined by type, or the planted form of a species. This approach provides an opportunity for experimentation, where ivy is used in a similar form across different sections of the garden. For instance, different methods of ivy removal and replacement on slopes may first be tested in the Dell, which is not open to the public and thus provides more flexibility. Viable methods could then be applied to the public portions of the gardens.

In addition, conversations with those managing nearby natural areas or gardens may provide insight into invasive species management at Dumbarton Oaks. Informal conversations with the Dumbarton Oaks Park Conservancy, which works with National Park Service to restore and maintain the adjacent Dumbarton Oaks Park, could be especially helpful, given its shared history with the upper gardens. The dialogue concerning invasive species in a historic garden could also be encouraged through different channels, because its broader questions are becoming increasingly relevant: how do we preserve historic gardens when confronted with inevitable environmental change? What ecosystem services can—and should—a historic garden provide?

Bibliography

Farrand, Beatrix. McGuire, Diane K, ed. *Beatrix Farrand's Plant Book for Dumbarton Oaks*. Washington D.C.: Dumbarton Oaks Research Library and Collection, 1980.

Karson, Robin S., and Library of American Landscape History. *A Genius for Place: American Landscapes of the Country Place Era*. Amherst: University of Massachusetts Press, 2007.

Swearingen, J, B. Slattery, K Reshetiloff, and S. Zwicker. *Plant Invaders of Mid-Atlantic Natural Areas*, 5th ed. Washington, D.C.: National Park Service and U.S. Fish and Wildlife Service, 2014.

Tallamy, Douglas W. *Bringing Nature Home: How You Can Sustain Wildlife with Native Plants*. Portland: Timber Press, 2009.

Wolschke-Bulmahn, Joachim, and Dumbarton Oaks Colloquium on the History of Landscape Architecture. *Nature and Ideology: Natural Garden Design in the Twentieth Century*. Washington, D.C.: Dumbarton Oaks Research Library and Collection, 1997.