



The winter blooms of *Eucalyptus caesia* in the pilot planting at Royal Park, Melbourne, Australia (image by Wendy Walls, 2023).



Grounding Woody Meadows: examining the application of horticultural research into landscape design

WENDY WALLS AND BRENT GREENE

This paper reviews the application and integration of experimental Woody Meadows horticultural research into landscape design projects in Melbourne, Australia. The Woody Meadows experiments investigate the use of Australian native plants as resilient urban planting. Benefits include reducing labour and financial inputs; maintaining striking visual displays; achieving high vegetation density and diversity; and establishing horticultural outcomes that are climate resilient (especially to the impacts of heat and drought). While the trials have proven successful, the experimental strategies applied through design are often conceived as technical additions rather than integrated elements in broader landscape design agendas. This paper catalogues Woody Meadows experiments within greater Melbourne to reveal three primary typologies for how research is incorporated in design: ‘pilot and demonstration plantings’, ‘upgrades and renewals’ and ‘design feature’. It also draws on researcher perspectives to discuss the challenges of applying experimental horticultural research to design projects. In looking across the project examples and researcher experience, the study reveals the significance of managing community and professional expectations, alongside the need for strategies that introduce innovative horticultural methods to established design workflows and processes.

Introduction

Woody Meadows are dense naturalistic plantings that are composed of Australian trees and shrubs exclusively. They are maintained through coppicing, a tactic that influences vegetal structural responses (such as re-sprouting and the development of multiple basal stems) and enhances the visual impact of a plant (by encouraging bold aesthetic outcomes and flowering). The first pilot plantings were installed at Melbourne’s Birrarung Marr and Royal Park in 2016. Now more than 24 examples are planted across Australia, covering a total of 6,000 square metres and numbering 40,000 plants from 150 species (Farrell and Bathgate, 2023).

As experimental research, the Woody Meadows project investigates plant selection, installation and maintenance aimed at developing climate resilience (especially to the impacts of heat and drought) with reduced labour and financial inputs while maintaining striking visual outcomes. The ongoing experiments have demonstrated innovative urban planting that celebrates the distinctive material and aesthetic qualities of Australian native vegetation. Despite these outcomes, the Woody Meadows plantings are often confined to sections of designed space and are rarely conceived of as part of larger design project agendas. This separation of aesthetic and maintenance criteria between Woody Meadows and larger spatial design begins to reveal the source of implementation gaps in applying innovative horticultural research to landscape architectural design in Australia’s public realm.

This paper considers these divisions by reviewing the evolution of Woody Meadows plantings applied to the public realm. First, we briefly introduce the research project’s background and ambitions. Second, we review Woody Meadows examples within greater Melbourne and catalogue the degrees to which they are incorporated into a design’s spatial context. Lastly, we draw on conversations with lead researchers, Associate Professors Claire Farrell and John Rayner from the University of Melbourne, who assist in contextualising the complex environmental and cultural conditions that influence the application of Woody Meadows research in design projects.

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Background

The Woody Meadows research project began in 2015 as a collaboration between Associate Professors Claire Farrell and John Rayner from the University of Melbourne, the City of Melbourne, the Royal Botanic Gardens Victoria (Cranbourne) and Professor James Hitchmough and Dr Audrey Gerber from the University of Sheffield. While the meadows draw from the University of Sheffield's experience with naturalistic plantings, the Melbourne-based projects were conceived to respond to the city's distinctive climatic conditions, notably heat and drought (University of Melbourne, 2021).

The research team shortlisted 21 plants from an original list of 1,200 Australian species, including cultivars of small trees and shrubs, for the initial pilot (table 1). Selection was influenced by two principal performances: a plant's ability to survive without irrigation (beyond establishment) and to resprout or develop multiple basal stems after being maintained through coppicing. Tube stock, which included *Acacia acinacea*, *Eucalyptus latens*, *Eucalyptus caesia*, *Alyogyne huegeli* and *Astartea fascicularis*, among other species, was planted into 200 millimetres of scoria substrate, which provided well-drained and weed-free soil conditions to promote establishment. Plants were then arranged as a vegetation community of three layers, named base (less than 1 metre), bump (1–2 metres) and emergent (more than 2 metres). This layering structure replicates 'shrub-based natural ecosystems' and provides 'visual interest' to the public (University of Melbourne, 2021).

Table 1. The 21 species in the City of Melbourne pilot plantings at Birrarung Marr and Royal Park

Layer type	Species
Base (< 1 m)	<i>Goodenia ovata</i> 'Gold Cover'
	<i>Dampiera alata</i>
	<i>Veronica arenaria</i>
	<i>Banksia spinulosa</i> subsp. <i>spinulosa</i>
	<i>Grevillea lanigera</i> 'Mini Prostrate'
	<i>Beaufortia sparsa</i>
	<i>Xanthosia rotundifolia</i>
	<i>Melaleuca thymifolia</i> 'Pink Lace'
	<i>Callistemon</i> 'Little John'
	<i>Veronica perfoliata</i>
	<i>Astartea fascicularis</i>
<i>Philotheca myoporoides</i> subsp. <i>myoporoides</i>	
Bump (1–2 m)	<i>Calothamnus quadrifidus</i>
	<i>Acacia acinacea</i>
	<i>Melaleuca nesophila</i> 'Little Nessie'
	<i>Grevillea</i> 'Coconut Ice'
	<i>Eucalyptus latens</i> 'Moon Lagoon'
	<i>Leptospermum polygalifolium</i> 'Cardwell'
Emergent (> 2 m)	<i>Eucalyptus preissiana</i>
	<i>Alyogyne huegelii</i>
	<i>Eucalyptus caesia</i>

The pilot planting was considered successful. Most plants resprouted after coppicing, achieving dense vegetation layers with flowering throughout the year. The substrate scoria reduced weed growth and maintenance costs. These outcomes were achieved even though the planting received no irrigation and less than 2 millimetres of rainfall in one summer month (Backhouse, 2016; Bolge, 2017; City of Melbourne, 2020; University of Melbourne, 2021). These results were later made publicly available as design guidelines and comprehensive plant lists (Backhouse, 2016; Kenefick and Farrell, 2021; Martin, 2017; University of Melbourne, 2021).

Subsequently, the Woody Meadows research approach has been applied as new urban plantings to suburban parks, roadside verges, streetscapes and new landscape projects. While the range of Woody Meadows projects and applications is much wider than the plantings covered in the next section, many of these outcomes are not yet well documented. The selection of projects for this study is limited to reviewing the more established examples, which better illustrate the distinctions in how horticultural research has been applied to varying urban sites and landscape projects.

Methodology

Our initial categorisation focused on 16 Woody Meadows plantings in greater Melbourne, implemented between 2016 and 2023 (table 2). It was drawn from existing literature, including project descriptions and guidelines (City of Melbourne, 2020; University of Melbourne, 2021). This review was further supported by site visits and observation that, as DePoy and Gitlin (1998) state, permit the researcher to ‘obtain information that incrementally leads to the investigator’s ability to reveal a story’ (p 232). In the context of this research, observation is a critical technique for recording and reflecting on a spectrum of Woody Meadows projects, helping to address questions such as: how these are achieved in the built landscape, and the degrees to which they have shifted through time and in response to varied maintenance regimes and site conditions.

The categorisation reveals three main typologies of Woody Meadows and their application within Melbourne: ‘pilot and demonstration plantings’, ‘upgrades and renewal’ and ‘design feature’. These typologies have emerged sequentially as the Woody Meadows research has become better known within industry, across multiple levels of government and among the public more broadly. While all Woody Meadows plantings are intended as horticultural experiments, the three typologies illustrate useful distinctions in how the research was implemented across landscape sites and design projects. Differences occur, for example, in when research is introduced into a project and in critical alignments between design, project and maintenance decision-makers.

Table 2. Summary of Woody Meadows projects in chronological order, showing site location, design context and application type

Site	Year	Region	Design	Application
Birrarung Marr	2016	City of Melbourne	Large park or existing designed space	Pilot
Royal Park	2016	City of Melbourne	Large park or existing designed space	Pilot
Bothwell 1	2021	City of Port Phillip	Streetscape	Visual amenity, revitalisation, renewal
Burden Park	2021	City of Greater Dandenong	Park upgrade	Visual enhancement
Dandenong-Rotary Park	2021	City of Greater Dandenong	Park upgrade	Visual enhancement
Ross Reserve	2021	City of Greater Dandenong	Park upgrade	Visual amenity, revitalisation
Norris Bank Reserve	2021	Whittlesea City Council	Park upgrade	Playground, low sight lines, renewal
Boulevard roundabout	2021	Whittlesea City Council	Streetscape	Visual amenity, renewal
Pandora Reserve	2021	Whittlesea City Council	Park upgrade	Visual amenity, renewal
Fritsch Holzer Reserve	2021	Boroondara	Park upgrade	Performative planting, ex-landfill
Jack Mutton Woody Meadow	2021	Merri-bek City Council	Streetscape	Visual amenity, revitalisation

Site		Region	Design	Application
Cox Reserve Woody Meadow	2021	Merri-bek City Council	Park upgrade	Visual amenity, revitalisation
Maribyrnong streetscape	2021	Maribyrnong	Streetscape	Visual amenity, renewal
Multiple sites or level crossing removal	2020– 2022	Multiple	Railway siding, pocket parks, linear parks	Design feature, visual appeal
Flower and Garden Show	2023	Exhibition	Demonstration	Research display
New Student Precinct	2022– 2023	University of Melbourne	Urban open space, new design site	Design feature, visual appeal

Pilot and demonstration plantings

Pilot plantings are closely linked to early-stage horticultural research as additions to public parks that pilot the Woody Meadows experiments. Birrarung Marr and Royal Park (figure 1) typify this approach. At the time of their insertion, the plantings were conceptually and spatially distinct from the pre-existing vegetation communities of each park – and they continue to be so. The meadows were added as discrete rectangular planting beds, with no need to integrate them into the surrounding designed contexts of the parks.



Figure 1. The Royal Park pilot, initially planted in 2016, is now a dense and well-established planting (image by Wendy Walls, 2023).

More recently, pilot beds have evolved into demonstration plantings that showcase how Woody Meadows have naturalistic aesthetics and resiliency to heat and drought events. An added benefit of these plantings is that they test public responses to the horticultural experiments and maintenance tactics such as coppicing. For example, a recent (2022) meadow display at the Melbourne International Flower and Garden Show (in collaboration with Super Bloom and Hassell) highlighted the beauty of the layered and diverse planting approach to a public audience (University of Melbourne, 2023). While this example demonstrates design collaboration between horticultural experts and landscape architects, the display remains isolated from its surrounding context due to the temporal nature of the exhibition. Critically, in these cases the collaborators were not required to consider the impact or potential of the horticultural research in relation to site design.

Upgrades and renewal

The upgrade and renewal typology represents the majority of existing Woody Meadows plantings. Municipal governments implement these plantings to revitalise public sites such as suburban parks and roadsides. Woody Meadows are added to increase plant diversity and resilience to heat and drought, reduce maintenance and financial inputs, and enhance a site's aesthetic attributes. For example, figure 2 shows a Woody Meadow inserted along the perimeter of Cox Reserve as a naturalistic planting design addition that is distinct from the usual park typology of grass and trees. In this case, the planting contributes new vegetation characteristics and qualities to the open space.

While this typology demonstrates successful retrofitting of an open space design in Melbourne, the process of inserting Woody Meadows into a pre-existing site represents another gap between research and practice. It is unclear if or how the horticultural research can inform a park's larger spatial design due to the timing of the addition, at a much later stage in a park's development. Similar to the pilot planting, upgrades and renewals offer little opportunity for dialogue between the park designers and the horticultural researchers about how spatial and aesthetic criteria, as well as practicalities of maintenance, might inform the overall site design.



Figure 2. Cox Reserve in Merri-bek municipality, showing the Woody Meadow edge plantings in contrast to the grass and tree typology of a standard urban park (image by Wendy Walls, 2023).

Design feature

The third typology of the Woody Meadows application comprises featured design elements. Significantly, these plantings are embedded into the decision-making and design process at the beginning of a project's inception.

This approach is best demonstrated through the Victorian Government's Level Crossing Removal projects (figure 3). In these cases, design teams and infrastructure and horticulture experts – including the Woody Meadows lead researchers – collaborated at the earliest stages of the design project. This approach sees the Woody Meadows fine-tuned to site-specific constraints (such as water flows, light conditions and level changes) before the project is built. By engaging horticultural research at the earliest stages of a new design project, a stronger alignment between broader design agendas and Woody Meadows planting emerges.



Figure 3. The Woody Meadow addition on the Bell to Moreland section of the elevated rail project (image by Wendy Walls, 2023).

Reviewing the evolution of Woody Meadows reveals a progressive shift from isolated pilot experiments towards informing the other elements of a landscape design project, like the shape of garden beds or planning for light and water. However, across the three typologies, the influence of the Woody Meadows research remains as an additive element to design projects. Even the use of Woody Meadows as a substantial design feature is positioned as a discrete element rather than in reciprocal dialogue with the surrounding spatial design aesthetics or outcomes. It is clear that the timing of how and when planting decisions are incorporated in a project is critical to how research is aligned with other site planning and design decisions. The following section discusses this theme from the perspectives of lead researchers Claire Farrell and John Rayner.

Researcher perspectives

Farrell and Rayner suggest that the complexity of applying Woody Meadows approaches to designed spaces begins from the negotiations between stakeholders in public projects, who include researchers, landscape architects, contractors, the community and local government. Over the last eight years, they have collaborated with Australian landscape firms such as Oculus, Hassell, Tract and Pollen, as well as with local government and community groups. Through these experiences, they have encountered a spectrum of responses to Woody Meadows, from enthusiasm for the native plant palette to concerns around coppicing. Such responses impact on aesthetic outcomes (such as flowering and foliage) and demonstrate the complexities of applying Woody Meadows research as projects are implemented and managed.

For example, Farrell and Rayner describe challenges that have emerged between researchers and contracted professionals, who use established planting and maintenance methods that are distinct to the layout and maintenance of a Woody Meadow. They explain that some contractors have ‘weeded out’ a meadow’s base layer, selected untested species as substitutes and refused to coppice the plant community.

The researchers also explain that communities can react negatively when Woody Meadows are managed. Referencing the Bothwell Street upgrade in South Yarra (figure 4), they describe the public’s unfavourable sentiment following the first coppicing, which greatly shifted its visual impact. They note that signage in these landscapes is critical to communicate with members of the public and educate them on the critical role of management in achieving high-quality planting outcomes.



Figure 4. Bothwell streetscape planting in South Yarra (image by Brent Greene, 2023).

When working with plants in public spaces, managing assumptions and expectations while introducing new methods and outcomes, particularly new maintenance and stylistic outcomes in the urban realm, is a challenge to the successful integration of research into design. In Australia, these tensions are part of an ongoing and complex conversation about climate, the Australian landscape, gardens and colonisation (Greene and Johnson, 2020; Raxworthy, 2019). Catherine Bull (2002) comments:

The majority of designed landscapes in Australia have resulted from a process of clearing indigenous plant species and eradicating or smoothing away irregular characteristics ... landscapes designed to rely on regular and predictable watering ... modelled on traditional [European] notions of the garden. (p 20)

Farrell and Rayner explain that the most successful outcomes such as the University of Canberra's Woody Meadow (2022) develop when they work closely with landscape architects and maintenance teams across the life of a project. This engagement, they believe, supports the robust sharing of expertise, properly understanding site conditions (which impact plant selection) and managing a client's expectations before planting begins. Where they have aligned project teams in such cases, they can also communicate, negotiate and educate as the project develops.

However, this kind of direct and ongoing collaboration becomes limited in larger, more complex project structures like the Level Crossing Removal or the New Student Precinct. While still engaged in the early stages of the project, designers have far fewer opportunities for consistent consultation, communication and feedback. For example, it is not uncommon for engineering specifications and landscape plans to be updated separately in large projects. This means designers can be working with incorrect site information, with the result that they allocate spaces for planting that are misaligned with the light and water specifications for how the plants will perform. In these cases, the researchers suggest it is beneficial to have key representatives or champions who can maintain oversight of objectives in big projects as well as helping with communication about site constraints and between the planting design, construction and maintenance teams.

Discussion and conclusion

As bridging research with design practice becomes increasingly important, particularly in responding to the challenges of climate change, and urban warming, we need to challenge the assumption that rigorous research will easily flow through to design. The Woody Meadows examples discussed here demonstrate that the knowledge of plant selection, layout and maintenance for creating resilient and beautiful urban planting designs already exists. However, even with eight years of ongoing research and practical demonstration, the extent to which this knowledge is applied to design projects varies. Often Woody Meadows research is positioned as a separate technical achievement within a cost-saving agenda (requiring low maintenance and minimal irrigation) and involves little response to the surrounding site design. As a consequence, the Woody Meadows research operates in isolation from broader spatial and vegetative systems or design agendas and misses the opportunity for influencing wider-scale resilient urban planting.

This gap between research and practical application highlights the critical nature of *strategic communication* in design project workflows. Certainly communication is critical to introducing the purpose and method of the initial research. More than that, it extends to how a design project and its key players manage expectations in the design context – notably, in maintaining information flows across the life cycle of a project, not just communicating the initial research itself. To be effective, projects clearly need implementation strategies that assist in upskilling designers and maintenance contractors to understand the intent of horticultural research. Further, such skills encompass navigating the challenges of application and maintenance, social expectations and the norms of construction in large-scale, multi-actor projects.

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