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A phenomenological study of gardening practices and invasive plant management in the Sydney Basin

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**A phenomenological study of gardening practices and invasive
plant management in the Sydney Basin.**

A thesis submitted in fulfilment of the requirements for the award of
the degree

Doctor of Philosophy

from

University of Wollongong

by

Victoria Ufuoma Ikutegbe, BSc(Hons), MEnvSc

Australian Centre for Cultural Environmental Research

School of Geography and Sustainable Communities

University of Wollongong, Australia

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ABSTRACT

Invasive garden plants, also referred to as garden escapes, make up the bulk of environmental and agricultural weeds in Australia and gardening remains the most significant contributor to its spread. Gardening is also regarded as the most popular recreational activity in Australia, particularly among older adults who continue to seek new and exotic plants. As a result of this, and despite the notoriety of some of these plants which are considered to be noxious, garden escapes continue to be sold in nurseries and cultivated in domestic gardens. This research is, therefore, founded upon the prevalence of invasive plants on nursery shelves and in domestic gardens from where they spread into the wider environment. It explores the links between gardening and the spread of garden escapes so as to determine how current remediation efforts might be improved upon.

Weed management strategies typically seek to provide gardeners with more information about the invasiveness of some garden plants, with the aim of fostering a change in their gardening behaviour. However, research has shown that there are factors other than an information deficit which lead to the presence of invasive species in gardens, hence the need for a shift in management outlook. Using social practice theory, this study reconceptualises gardening as a 'practice' that is made up of several constituting elements which work together to determine the way it is performed. These elements include the materials which aid the performance of the practice, the competences which practitioners need for a successful performance, and the meanings associated with the practice. All three have to be present in a particular configuration in order for gardening to be successfully performed and changing any one element results in a corresponding change in the practice itself. On the basis of this theoretical framework, this research explores gardening enactments to determine which elements are currently associated with it and how these relate to garden escapes. This will, in turn, highlight potential avenues through which management interventions might be better directed to ultimately foster the much needed change in enactments that lead to garden escapes.

To achieve the objectives of this study, 15 weed managers were interviewed to elicit baseline knowledge about the extent to which garden escapes are a problem within the Sydney Basin. This information was then incorporated into subsequent semi-structured interviews with 27 gardeners who were asked to give detailed accounts of their gardening enactments. The recruitment of weed managers was done mostly through snowballing from existing contacts while the gardeners were recruited through garden clubs and using radio broadcasts. All participants involved were located within the Sydney Basin Bioregion, New South Wales, which was chosen as the study site for its rich abundance of plants and nurseries as well as its eclectic diversity of gardeners.

The findings revealed that gardening is in fact shaped by underlying elements which determine its performance, and this was evident in four main ways. First, gardeners' approach to gardening was shown to largely stem from a desire for the presence of animals in the garden space, and this led to a passive involvement in weed prevention and eradication. Secondly, experiential and social learning were shown to be the preferred way by which gardeners learn and this had to do with a perception that friends and family are the most reliable sources of gardening advice. Plant choices made by gardeners were not only driven by aesthetic ideals but also age and time constraints, which led to the cultivation of flamboyant and low maintenance plant species respectively. The fourth aspect of gardening enactments that holds some relevance for the spread of garden escapes relates to plant exchanges which the gardeners described as being a normal part of the practice. These exchanges were understood to be a physical demonstration of shared friendship ideals, and were also driven by gardeners' need to obtain plants as cheaply as possible. So not only are plant choices determined by aesthetics and low maintenance needs but affordability was also important, especially considering that most participants are retired and on a pension. Plant swapping, however, is one obvious way by which gardeners aid the spread of potentially invasive plants from one location to another, thereby perpetuating the garden escapes problem.

Conceptually, this research advances the utility of practice theory in the area of natural resource management where it has previously not been applied. The theory offers a more comprehensive way of apprehending gardening enactments, in contrast to other research approaches which focus exclusively on either the human gardeners or non-human actors. In this way, it opens up points of management intervention that may not have been previously considered. Recommendations have been made regarding potential intervention strategies that are based on the practice approach adopted here, and these offer a more targeted way of managing garden escapes. This research also contributes to ongoing debates surrounding the suitability of interviews as a methodological tool for eliciting accounts of routine practices. The merits of this data collection instrument are evident in the detailed and uninhibited responses given by the participants of this study, in relation to such a routine practice as gardening.

CANDIDATE'S STATEMENT

I, Victoria Ufuoma Ikutegbe, declare that this thesis, submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the School of Geography and Sustainable Communities, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Victoria Ufuoma Ikutegbe

09 July 2016

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Plate 1: A collection of garden plants encountered during fieldwork.

CHAPTER 1

INTRODUCTION

1.1 Background to the research

Walking along a street in my neighbourhood one morning, I was struck by the beautiful array of plants in the front garden of a house I was passing by. One plant in particular caught my eye and I was moved to take a picture of it. My intention was to find out everything I could about this plant so that I could go to the local nursery to buy it and, ultimately, plant it in my own home garden. I wanted that beauty for my own front yard and was determined to do everything within my power to achieve that goal. I secretly hoped that by adding this plant to my front garden, people walking by would look at my garden and feel the same sense of covetousness which I felt towards the owner of such a beautiful garden.

As soon as I got to my desk at the university, I went straight onto Google, as you do, and typed in the physical attributes of the plant: number of petals, colour of flower, type of plant (shrub/tree) and so on. In what appeared to be no time at all, Google processed the information I had typed in and returned some results in a matter of microseconds. After looking at a few of the resulting images, I finally found the one I was looking for; I could finally attach a name to the picture I had taken. Next, I wanted to make sure the plant would be easy to grow in my garden. So I typed the plant name into the search engine to determine its other characteristics, such as ease of propagation, maintenance requirements and flowering times. As soon as I clicked 'Enter', I was presented with a list of results which showed this plant to be one of the worst weeds there ever was. The plant I had just spent my morning so excited about was the dreaded LANTANA. Needless to say, I was very disappointed with the results of my efforts and could not, in good conscience, go ahead and plant it in my garden knowing how much trouble it was worth.

Lantana is a large flowering shrub that was originally introduced to the Australian landscape in early-mid 19th century as an ornamental garden plant from South America, where it grows as a native plant (Bhagwat *et al.*, 2012). It has since escaped domestic cultivation and is now reported to have invaded over 4 million hectares in northern and eastern Australia, causing damage to biodiversity and ecosystem services (Masson *et al.*, 2005). Currently listed as a weed of national and international significance, and considered to be among the world's ten worst weeds, lantana is a well-known invader all around the world (Sharma *et al.*, 2005). Biological attributes such as stress tolerance and vegetative propagation allow lantana to outcompete other plants, making it a very successful invader species (Drew *et al.*, 2010). However, there is a human aspect to the invasion

process which is made manifest when such invasive plants continue to be cultivated in private gardens, from where they spread beyond their original confines. The invasion process, therefore, follows a sequence of events: transportation of plant materials, introduction to and establishment in a new location, then eventual spread beyond that area (Lockwood *et al.*, 2005; Theoharides and Dukes, 2007; Gravuer *et al.*, 2008).

Looking back at how captivated I was by the beauty of the plants in the garden on my walking route, I began to wonder about outwardly beautiful gardens with something (invasive plants) to hide. To my mind it stood to reason that if I could covet a plant solely on the basis of its aesthetic appeal, then it seemed very likely that other people might do the same. This led to some initial curiosity-driven research into gardens and the problem plants they might conceal beneath a beautiful façade. It soon became apparent that there was indeed an issue there, with the continued cultivation and spread of invasive garden plants. As it turned out, not everyone willingly forgoes pretty plants on the basis of invasive potential or classification as weeds. This is, of course, presuming that the people cultivating these plants are even aware of or agree with existing ideas of invasiveness and what constitutes a weed, which may not be the case.

As has been noted with regards to labelling plants as 'native', 'weed' is another (invasive) plant label that continues to elude universal definition (Head and Muir, 2004). Kendle and Rose (2000, p. 19) rightly stated that choosing which plants are welcome in a particular landscape is a "heavily value-laden" decision that will vary depending on who is making the choice. To an ordinary person on the street, for example, a weed may simply be a plant they do not like or want in their garden, for whatever reason. Weed managers, on the other hand, operate based on the national definition of weeds: "any plant that requires some form of action to reduce its effect on the economy, the environment, human health and amenity" (Australian Government, 2016). It is this latter definition that informs the present research, mainly because it is what underpins current weed policies and actions taken to control the spread of these invasive plant species.

The vast majority of Australia's environmental and agricultural weeds are plants that were deliberately introduced for ornamental horticulture (Groves *et al.*, 2005). Over time these plants, like lantana, have continually spread beyond the spaces in which they were originally planted, thereby impacting the wider natural environment and agricultural land (Spencer, 2006). This category of weeds, termed 'garden escapes', are invasive plants of horticultural origins which have 'escaped' from the private gardens in which they were originally cultivated. They constitute around 70% of environmental weed introductions in Australia (Groves *et al.*, 2005) and their spread has now been listed as a key threatening process, under the *Threatened Species Conservation (TSC) Act 1995*

(Paul *et al.*, 2012). The TSC Act is the key piece of legislation within New South Wales (NSW) that serves to protect and manage biodiversity and threatened species. It is administered by the Office of Environment and Heritage (OEH) and, along with the *Noxious Weeds Act 1993*, is the legislative backbone upon which weed management strategies are formulated.

The prioritisation of garden escapes gives an indication of how much of a threat these plants pose to the proper functioning of environmental and ecological systems. Although past efforts to minimise the impacts of invasion have been somewhat successful, the fact remains that these plants still persist in gardens and on nursery shelves (Barker *et al.*, 2006; Coats *et al.*, 2011; Yue *et al.*, 2011; Crochetiere, 2012). There seems to be some difficulty in getting people to see these plants for the problems that they could and do cause, both within and beyond domestic gardens. As Elinor Ostrom stated, in reference to climate change, “many of those who need to change (their actions) have not yet accepted the reality of the threat and their need to act locally in a different manner.” (2014, p. 99). This statement also applies to garden escapes because the continually changing consumer demand for novel and exotic plants is what drives the horticultural industry to stock the plants they do (Gagliardi and Brand, 2007).

This relationship between the industry and consumers is a two-way one; nurseries promote certain plants to consumers, but they are also influenced by the plant selections which customers make (Bell *et al.*, 2003). Some of the plant characteristics which are commonly favoured by gardeners include attributes like ease of propagation, short juvenile period and stress tolerance (Drew *et al.*, 2010). These factors, however, are also good indicators of invasiveness because they enable a plant to successfully disperse its seeds and thrive elsewhere, with minimal or no maintenance input from humans. It is, therefore, necessary that efforts be made to explore the factors that influence plant choices, since gardeners reportedly play a significant role in the success of any weed management initiative (Timmins and Blood, 2003; Burt *et al.*, 2007). For this reason, the present research will strive to understand just what it would take to bring about the needed change in current gardening practices so as to curb the ongoing spread of garden escapes.

1.2 Research aims

This research is founded upon the continued prevalence of garden escapes on nursery shelves and in home gardens, from where they spread into the wider environment. As Timmins and Blood (2003, p. 6) put it, “the (gardening) public are both part of the threat and the solution to weed problems.” Therefore, a large part of the solution rests with gardeners who, by cultivating these plants, enable their spread; also because gardeners’ preferences partly determine what nurseries stock. In this

study, I explore the experiences and decision-making processes of everyday gardeners so as to create a better understanding of the way gardening is currently enacted. I specifically explore a trio of underlying elements namely materials, competences and meanings, all of which are reported to play a constituting role in the performance of any practice (Shove *et al.*, 2012). It is this performance, herein of gardening, which has been so often implicated in the spread of invasive garden plants (Groves *et al.*, 2005; Australian Weeds Committee, 2007).

Given the focus on garden escapes, knowledge of the stages of plant invasion mentioned earlier (transportation, introduction and establishment, and spread) has been useful for the present research. Drawing from this knowledge, I have split my exploration of the gardening practice into three identifiable phases leading up to the escape of invasive plants from gardens into the wider environment. The first phase occurs before the plants are even introduced into the garden (pre-cultivation phase), while the second relates to the way plants are managed once they have been cultivated (cultivation phase). In the third phase, I explore the various factors and events which, deliberately or inadvertently, facilitate the escape and eventual spread of the cultivated garden plants (post-cultivation phase).

Keeping the above points in mind, the overarching aim of this research is to understand current enactments of gardening and what implications these might have for garden escapes management. The following objectives are geared towards the achievement of this aim:

- Identify the elements of materials, competences and meanings which make up the three phases of gardening performance (chapters 5, 6 and 7).
- Demonstrate how the practice elements, working together, relate to the ongoing cultivation and spread of garden escapes (chapter 8).
- Highlight the potential points for intervention, in the gardening practice, where weed management efforts could be better focused (chapter 9).

Before proceeding any further, I must clarify the distinction between the three phases into which gardening has been divided and the trio of underlying practice elements which are explored. To do so, I use the example of another familiar everyday practice - cooking. There are several considerations which come before the actual cooking of a meal, such as the type of meal to be cooked, ingredients needed, and which supermarket to purchase items from. This preparatory step, prior to cooking, corresponds to the pre-cultivation gardening phase which precedes the introduction of plants into a garden. Next is the actual performance of cooking, where ingredients are put into a pot, seasoned, and continually monitored to avoid burning the meal. This, in

gardening, is the cultivation phase where plants are introduced into the garden and continually maintained by watering, weeding and fertilising. The third step in cooking relates to how the product of that performance, the cooked food, is used by the cook and, perhaps, other people. It is in this step that the food would normally be eaten. Similarly, the post-cultivation phase of gardening has to do with the way plants are handled after cultivation. This also relates to the way unwanted plant materials are disposed of.

The practice elements, on the other hand, still using the cooking example, refer to the materials, competences and meanings which shape the way a meal is cooked. Cooking cannot be understood as such unless there is some form of heat applied to a cooking vessel like a pot, containing food items and water, among other things. These are the materials associated with the practice. In the same way, there are inanimate objects like soil, gardening equipment and water which are associated with the routine performance of gardening and which make it recognisable as such. When cooking, there are also certain knowledge and skills which are required in order to successfully cook a meal, such as how much seasoning to use, how long to cook the meal for etc. Gardening, in the same way, cannot be performed successfully without the appropriate level of know-how, including when to water, how to prune, how to correctly use the relevant tools etc. The third practice element, meanings, refers to the mental ideas surrounding the performance of a particular practice. For example, ideas around the proper way to cook a specific type of meal, like a steak, will vary from one individual to another – well-done, medium-rare, blue. The meaning of gardening is also bound to vary among gardeners and these associated meanings might influence, in some way or another, their particular enactment of the practice. For example if gardening is thought to be a purely aesthetic pursuit, this could result in a gardener only planting exotic and flamboyant plants to the exclusion of all else.

The first objective of this study, therefore, is of particular importance because it leads to the identification of the various elements which are associated with the three phases of gardening. These will then be analysed to determine how they might result in the spread of garden escapes, whether through deliberate action or by accident (objective 2). Based on this understanding, recommendations will be made to show how future management efforts can be better directed in order to mitigate the impacts of invasive garden plants (objective 3). Given that the absence of any one element changes the way a practice is performed (Shove *et al.*, 2012), targeting the elements associated with gardening holds some potential for influencing the way it is performed. So how much do gardeners actually know about gardening and plant management? How skilled are they at performing the practice? Where do they obtain plants and gardening advice? Do they even bother to

seek advice regarding what they do in their gardens? These are all questions that need to be addressed before any management strategy can be successfully implemented to resolve the problem of ongoing domestic cultivation of garden escapes.

1.3 Overview of methodology

In order to realise the stated objectives of this study, I carefully considered the sort of data I would need to collect and what methodological instruments would be most suitable. My desire to elicit firsthand accounts of gardening experiences led to the decision to design the study in a qualitative rather than a quantitative manner, thereby allowing room for detailed responses. The participants were selected on the basis of their self-identification as gardeners and were recruited through garden clubs, and using radio broadcasts. Creating an understanding of the everyday practices of gardeners is a core focus of this research, and this made it necessary to purposefully include individuals who are actively engaged in the practice. It is, after all, those who actively garden that have the potential to effect the desired change in the way this activity is performed and thereby reduce the contribution it makes to the spread of garden escapes.

Although there are other means by which firsthand practice accounts can be elicited, semi-structured interviews was considered to be the most suitable data collection tool for this study. The reason for this decision had to do with my desire to create a conversational setting for the participants and, hopefully, allow an uninhibited account of such an everyday practice. I considered comfort to be an important factor because it has been suggested elsewhere that it can be difficult to get people to talk about routine or mundane practices (Hitchings, 2012). So by making the participants as comfortable as possible, I hoped to gain better insight into their everyday gardening performances and the motivations behind their engagement in the practice.

Prior to talking with gardeners, weed managers were interviewed so as to establish baseline knowledge about the current state of the garden escapes problem. Since this group of people deal with the impacts of weed spread, I considered them well placed to shed some light on the management challenges associated with the escape of invasive garden plants. I also wanted to understand their perception of current gardening practices, and what management strategies had been implemented in the past to control the spread of garden escapes. I thought it necessary to first highlight the successes and limitations of past efforts, before making any recommendations about ways of improving upon pre-existing management approaches.

All interviews were conducted at locations most suitable for the participants, usually at their home where we could also walk through their gardens. These interviews were audio-recorded, with the

participants' written consent, and then transcribed and analysed using the qualitative data analysis software, NVivo. The data analysis followed an iterative thematic process which allowed the data to be progressively interrogated, so as to ensure appropriate coding and interpretation of coded materials. All interview data were collected and stored in the university digital archives, as per ethical requirements. Chapter 3 gives a more detailed explanation and justification for the methodological pathways followed throughout this study.

1.4 Location and significance of the research

1.4.1 Location

This study was conducted within the Sydney Basin Bioregion (SBB), which lies on the central east coast of New South Wales (NSW) and is the most populated area in Australia (Penman *et al.*, 2013). As shown in Figure 1.1, the SBB extends from around Nelson's Bay in the north to just before Bateman's Bay in the south and nearly as far west as Mudgee. This is an area reported to have the greatest plant biodiversity in Australia, owing to a variety of favourable climatic and topographic characteristics (OEH, 2011). The implication of this is that there is an extensive list of plants which can potentially be grown within the region, making it an ideal place to study diversity in perception and practice amongst gardeners. A greater plant biodiversity in the region also removes any possible restrictions which might otherwise have been imposed on the study, due to a limited availability of plant species.

The choice of the Sydney Basin as the study location also had to do with the fact that its population density afforded me an eclectic range of gardeners with possibly varying preferences and practices. Its rich biodiversity allowed me to ensure that the gardeners' preferences were not unduly influenced or restricted by a limitation in the number of plants able to be cultivated in the region. The third fortuitous reason why I decided to conduct the study within the SBB was ease of access, which was made all the more easier by the fact that I live in the area. There also exists an abundance of nurseries and garden clubs of various sizes and specialties in the region, which provided me with an adequate number and diversity of participants required for the project.



Figure 1.1: Map showing the extent of the Sydney Basin Bioregion.

Source: Created by Alexander Tindale, School of Geography and Sustainable Communities, University of Wollongong.

1.4.2 Significance

Gardening is a practice that is rapidly gaining popularity, especially among older adults who engage in it for a variety of reasons from leisure to exercise (Ashton-Shaeffer and Constant, 2006; Cheng, 2010). The practice has been reported to play a major contributory role in the spread of garden escapes which make up the bulk of environmental and agricultural weeds in Australia (Groves *et al.*, 2005). This presents a management challenge because an increase in the number of gardeners could potentially exacerbate the problem if left unattended. It has been suggested that the achievement of greater management success relies upon changing the way the practice is currently performed and understood (Dempster, 2002; Paul *et al.*, 2012). This has, however, proved difficult to realise due to the fact that the site of performance for gardening is in private spaces which are relatively difficult for the weeds authorities to monitor and influence.

As evident by the ongoing purchase and cultivation of garden escapes by gardeners (Groves *et al.*, 2005), management strategies to date have not proven as successful as initially anticipated. It is, therefore, important to understand the various factors which determine plant preferences and the way gardeners go about performing the practice of gardening. The research reported here creates an understanding of some of the underlying factors which shape the way gardening is currently performed, and the motivations behind such performances. This will prove to be an important step towards facilitating the necessary adjustments in gardening enactments which will, in turn, prevent the continued cultivation of invasive plants in domestic gardens.

Previous attempts at resolving the issue of garden escapes have typically adopted a behavioural approach, attributing much of the problem to a lack of information on the part of gardeners (Masson *et al.*, 2005). The continued persistence of the problem, however, indicates a need for a more inclusive strategy which addresses factors that might have previously gone unexplored. Analysing gardening using social practice theory offers a different perspective, one that is better-suited to identifying aspects of the practice which contribute to the garden escapes problem. Chapter 2 gives a more detailed explanation of what a practice-led approach to gardening research might look like, and how it might be useful in efforts to resolve the ongoing spread of invasive plants. This project will, therefore, contribute significantly to the knowledge and research surrounding gardening and garden escapes management, by highlighting the underlying elements which shape the practice. Since nurseries also stock plants according to consumer preferences, this practice-led approach also presents an opportunity for ensuring that only non-invasive plants are put on the shelves for sale.

1.5 Thesis structure

I began this thesis with a description of how captivated I was by a beautiful garden that turned out to contain an invasive plant with devastating environmental impacts. I detailed how this got me thinking about how garden escapes can be hidden beneath the guise of a beautiful façade and how the fuse of my PhD journey into garden escapes management got lit. Chapter 1 offers a brief introduction to the practice of gardening and how domestic performances might influence the management of invasive garden plants. Following this is a description of the aim and objectives of the study, which uses practice theory to explore the underlying elements which shape current enactments of gardening. Finally, a brief overview of the research design and methodology is given and this is followed by a description of the location and significance of the study.

This thesis does not purport to give an all-encompassing or generalizable account of gardening enactments; neither is a silver bullet for addressing the garden escapes problem to be found within its pages. Rather, it is structured in such a way that each chapter gives insights into specific but interrelated aspects of gardening performance and how these affect the management of garden escapes. To this end, as shown in Figure 1.2, the thesis comprises nine chapters which offer a better understanding of how elements of materials, competences and meanings shape current enactments of gardening. Such an understanding will, in turn, inform strategies which are targeted at better managing the spread of invasive garden plants.

Chapter 2 provides a more in-depth review of literature relevant to gardening and the spread of garden escapes; it demonstrates the need for a practice-led management approach. Discussions begin with a brief history of gardening and the pathways through which the practice has evolved and been modified into the way it is currently performed and understood. Various reported drivers and motivations for engaging in the practice of gardening will also be discussed since these also form part of the investigations in the present study. Next is a review of the ways by which gardening research tend to be conducted, after which a practice approach will be suggested as it offers a more inclusive means of apprehending gardening enactments. Attention is then turned to the ways by which domestic gardening has been implicated in the spread of garden escapes and how gardeners' actions have been shown to perpetuate the problem. The chapter concludes by emphasising the utility of practice theory in garden escapes management and proposes that interventions be targeted at elements of materials, competences and meanings.

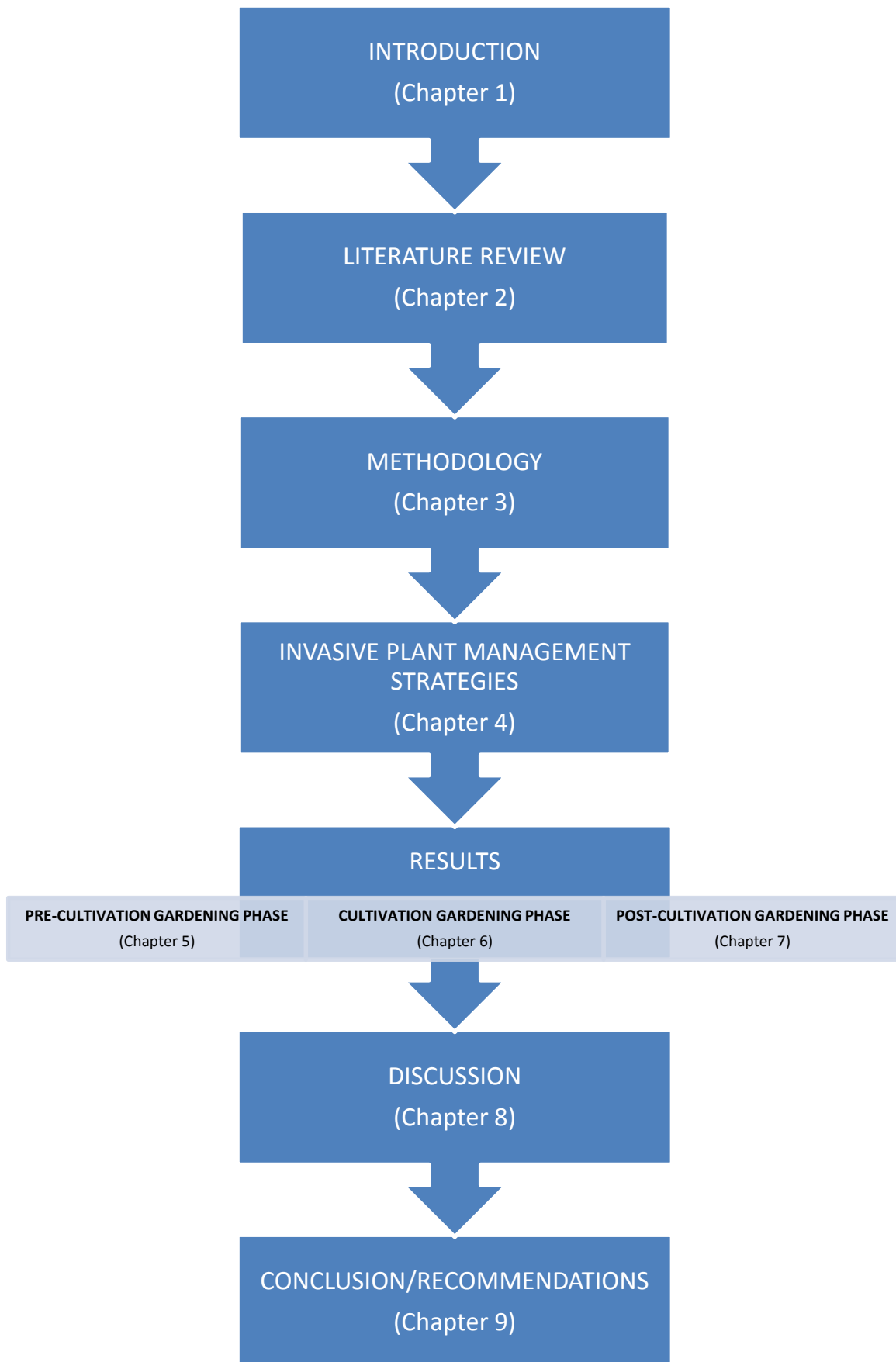


Figure 1.2: Thesis structure

Chapter 3 gives a detailed account of the methodological techniques employed in this study, and the rationale behind each of the choices made. I begin by discussing the underlying philosophical assumptions which inform the methodological pathways followed throughout the conduct of the research. After this, the research design is explained by referring to the fact that the study draws upon phenomenology as a theoretical perspective. Sampling techniques and recruitment methods are then discussed, as well as the strategies which I employed for data collection, analysis and the storage of resultant empirical materials. Following this, I draw on other practice-based research, especially the work of Russell Hitchings, to demonstrate the suitability of an interview methodology for the study of gardening practices. Finally, all ethical considerations are laid out along with the protocols which I administered to ensure that all the participants were adequately informed of the scope and objectives of the research.

Chapter 4 provides a review of approaches which have been employed in the past to manage the spread of invasive garden plants, and also presents findings from interviews with weed managers. It begins by examining how the Australian horticultural industry is structured to monitor and regulate the activities of those most implicated in the spread of garden escapes – nurseries and gardeners. Management strategies which have been previously implemented will then be analysed to determine how effective they have been at controlling the spread of invasive garden plants. The limitations of these strategies are also highlighted, so as to demonstrate the need for a better targeted approach to the garden escapes issue. In the final section, the findings from interviews conducted with weed managers in the study region are presented to give some insight into the way experts view and approach the problem.

Findings from interviews with gardeners are split across the next three chapters according to the previously mentioned three-way split into pre-cultivation, cultivation and post-cultivation phases. Each chapter identifies the materials, competences and meanings which shape the practice at various stages of performance, beginning from concept right through to disposal of plant materials. Chapter 5 is concerned with the factors which enable a gardener to anticipate and prepare for the arrival of plants into their garden. These include mental visualisations of garden style, decisions around plant choices, and preparation of the garden space, as some spaces may require work to be done before any plants can be cultivated. By drawing attention to pre-cultivation elements, this chapter highlights aspects of plant invasion which may not be as readily obvious as the actual purchase and cultivation of invasive plant species.

Chapter 6 investigates the life of plants within the garden space, beginning from acquisition to introduction into the garden and subsequent maintenance procedures employed by the gardener. It

explores the practice elements associated with the sourcing of plants; where gardeners prefer to get their plants from, and why some options might be favoured over others. Also of interest here are the various skills and knowledge which gardeners draw upon in order to grow plants successfully within the available space. So the various enactments which gardeners exhibit during their performance of the practice will be examined so as to identify possible points of intervention. The intention is to discover what kinds of capabilities a person would need to possess in order to be classed as a successful gardener, as well as what kinds of performance such a person would exhibit. This chapter allows for a closer and an on-ground examination of gardening performance, which is bound to differ from one individual to another.

Chapter 7 identifies the elements associated with the post-cultivation phase of the practice. It investigates the way plants are handled following a successful cultivation in the garden. In this chapter, ideas around what it means to be a gardener and what belongs in the garden space will be explored because this has been reported to influence the way plants are handled. Informal exchanges are commonly reported as being one of the contributing factors to the ongoing spread of garden escapes so this is an issue that will be investigated here. Also of interest, in this chapter, is the way garden debris are disposed of since there have been reports that illegally dumped garden materials is one of the most insidious sources of garden escapes. So dumping is just one of several ways by which gardening performances may hinder the management efforts regarding garden escapes, and this will be explored in this chapter.

The above results chapters will highlight some of the pathways through which meanings are constructed, skills are honed and relevant materials are incorporated into the gardening practice. In these chapters, sources of advice and gardening information will be explored to assess the knowledge and skills of gardening practitioners. This entails investigating if and where gardeners get skilled in the performance of the practice, or whether the practice is approached in a more heuristic fashion. If the latter is the case then what do they do with the acquired knowledge and experience? Does it get passed on to others formally, informally or not at all? These questions, among others, will be explored across all three chapters. It does bear noting, however, that as a result of the co-constituting and intertwined nature of all three practice elements, there will be inevitable overlaps across the results chapters. It would be near impossible to talk about any one element without touching on another since all three, in combination, are what emerges as an observable performance of the practice.

Chapter 8 gives an overview of the major findings of the research, paying particular attention to the ways in which previously identified elements potentially contribute to the spread of garden escapes.

Discussions in this chapter revolve around the main research findings, as interpreted from the data collected and in light of relevant research conducted elsewhere. By drawing on the findings from other relevant studies, this chapter highlights the significance of the present research to the broader issue of garden escapes management. It also demonstrates how much more effective a practice-led approach would be to invasive plant management, as compared with the more conventional behavioural approaches. I therefore argue for the examination of practice elements rather than supposed individual attitudes and behaviour, so as to more effectively curb the continued cultivation and spread of garden escapes.

The final chapter of this thesis reviews the aims and objectives of the study, to confirm that they have been successfully addressed. In this chapter, the key findings of the study are highlighted and arguments made within the thesis are reiterated to drive points home. There are suggestions made as to the possible implications which the study might have for theory, methodology, policy and practice, which is the third research objective stated earlier in chapter 1. Of practical importance, then, are the implications which the research findings have for the future management of garden escapes; several recommendations for improvement are made to this effect. I also give a brief reflection on some of the challenges I faced while analysing my empirical data using practice theory, and how my experience might differ from its application elsewhere. Finally, the limitations of the study are highlighted to emphasise that the findings are not meant to be generalizable but are, rather, aimed at creating a better understanding of the gardening practice. This understanding holds a greater potential for identifying points of intervention within the practice itself, which will more effectively lead to the desired change in gardening performance. In this final section, recommendations are also made regarding future research directions and how other researchers might advance and improve upon the work reported here.

CHAPTER 2

LITERATURE REVIEW: Reframing gardening as a practice and rethinking current approaches to garden escapes management.

Introduction

This chapter is focused on gardening as an everyday practice, and culminates in a discussion about the utility of practice theory in ongoing management efforts to stop the spread of garden escapes. It begins with an outline of the origin and evolution of gardening in Australia, and goes on to show how perceptions of the practice have changed over time. What follows is a review of existing literature which describes how domestic gardens and gardening tend to be studied, and how this contrasts with the practice approach suggested here. Next is a summary of the reported connections between gardening and garden escapes, which illustrates some of the ways in which gardening contributes to the spread of invasive plants. The principles of practice theory are then fully explained, and its merits are compared with those of the behavioural theories which currently underpin garden escapes management strategies. Finally, the practice theory conceptual framework is outlined, highlighting its exploratory focus on elements of materials, competences and meaning, all of which shape the everyday performance of gardening.

2.1 Gardening as an everyday activity.

2.1.1 A brief history

Gardening is described as the most popular recreational activity in Australia, and is commonly undertaken by older adults (Stocker and Barnett, 1998; Cheng *et al.*, 2010). This association between gardening and recreation has, however, not always been the case as there have been quite a few modifications made to the way the activity is perceived and enacted. Gardening is reported to have transitioned from a production-oriented to a more leisurely pursuit as technological advances minimised the need for subsistence gardening (Tyrrell, 2007; Schupp and Sharp, 2012). So while gardening in Australia may have once been necessary, present connotations associated with its enactment would suggest that this is no longer the case.

The history of gardening in Australia can be traced right back to the arrival in 1788 of the First Fleets, which brought plants and seeds from England as well as those obtained elsewhere along its route (Baskin and Dixon, 1996). Upon their arrival in Port Jackson, it became immediately apparent to the immigrants that food and shelter were two necessities which they would need to address for their

survival in this new land. The food stores which had been brought on the fleets were rapidly diminishing and this led to the creation of a number of gardens around Sydney Cove, the first of which was a vegetable garden (Baskin and Dixon, 1996). Supplementing their existing food resources with the vegetables grown on the land allowed the newly established colony to strengthen their chances of survival while they waited for more supplies to arrive.

Transportation in the eighteenth century was an understandably slow process, which meant that it took a very long time for supplies to arrive in Australia from other ports. During this time, the members of the colony became more adept in the cultivation of plants and more gardens were created as a result, with the primary purpose of augmenting food resources. Over time, anticipated food shipments arrived and available food stores became more sustainable. Subsistence gardening became less frequently practised, and gardens began to take on a more aesthetic outlook. Compared to the plain and practical look of the first gardens, the turn of the century following the arrival of the First Fleets saw ornamental garden designs become more popular within the colony. This is, perhaps, the first hint in Australia of a transition from “production-oriented ethic to a consumption-oriented pattern” (Tyrrell, 2007, p. 340).

It was inevitable that the ornamental gardens which emerged after the production-oriented period in Australia’s garden history would resemble the style of gardens found in England. This relates to the fact that the first white immigrants into Australia were Englishmen and, as a result, many of the plants and seeds they brought with them were sourced from their homeland. Creating gardens which bore a similarity to the ones they had left behind in England also presumably lessened any feelings of homesickness which they might otherwise have experienced. With the transition from subsistence to ornamental gardening gaining momentum, the first Botanical Garden was established in 1816 in Sydney about three decades after the arrival of the First Fleet (Morris, 2004).

There was a great diversity of plants in the botanical gardens which were sourced from all over the world, capturing the interest of the colonists. This period also corresponded with an increase in the number of free migrants to Australia who would also have brought with them ornamental gardening ideas from their countries of origin. The first nursery was established soon after by Thomas Shepherd near the current location of The University of Sydney, using stocks obtained from the already established gardens within the colony (Baskin and Dixon, 1996). Its purpose, similar to that of the botanical gardens, was to cater to the rising interest in ornamental gardening and provide as diverse a range of plants as possible to the public.

With modifications made to the enactments of gardening, formerly a means of subsistence but now a more aesthetic pursuit, perceptions regarding the garden space also began to change. Gardens became increasingly understood less as a productive space and more as a kind of status symbol for the wealthy members of society who would cultivate all sorts of exotic-looking plants (Francis, 1990). The picturesque design of the space itself was often considered to be a good indicator of the affluence of the home owner, a far cry from the previous geometric patterns of the early gardens (Baskin and Dixon, 1996). In line with this, self-expression became just one of many motivations which began to drive gardening engagement and which came about as a result of the various choices now available to people.

2.1.2 Changing perceptions and driving motivations

For much of the twentieth century, gardening was seen as a typically masculine activity and the garden was the “man’s domain” (Bhatti and Church, 2000, p. 190). The reason for this might be related to the fact that women do not feature as prominently as men do in recorded accounts of Australia’s gardening history. The reports of early settlement in Australia by white immigrants tend to suggest that there was a greater involvement in the practice of gardening by men than women (Baskin and Dixon, 1996; Tyrrell, 2007). Sir Joseph Banks, Governor William Bligh and Thomas Shepherd are only three of the men who are credited with the establishment of gardening as a popular activity in Australia (Baskin and Dixon, 1996). The passage of time has, however, brought under greater scrutiny any existing gender divide, leading to a re-examination of gendered roles and ideas of belonging within the garden.

A study by Parry *et al.* (2005) found that the gender relations within the garden space rather than being fixed and exclusive are enacted in an ever-changing manner. Their results showed that garden duties are usually assigned on the basis of individual preference rather than gender, even though labour intensive jobs like moving dirt were viewed as better suited to men. However, this is unsurprising given that men are often more capable of heavy-lifting than their female counterparts and in no way indicates any gender disparity. In fact, women far from being sidelined in contemporary accounts of gardening performance are reported to be more frequent participants than men and make up the majority of gardeners today (Power, 2005; Gross and Lane, 2007; Kurz and Baudains, 2012; Qvenild *et al.*, 2014).

The dismissal of any gender restrictions on who can engage in gardening has allowed the emergence of new motivations for engaging in the activity. One such motivation which is often reported by gardeners is the desire to be closer to nature and the natural environment, with some health

benefits also attributed to gardening (Clayton, 2007; Cheng, 2010). Several studies, tested in real world settings, showed that engaging in gardening activities can be a healthy form of recuperation from ailments (Neuberger, 2004; Van den Berg and Custers, 2010). In one such study, hospital patients with a view of nature from their ward rooms were reported to have experienced shorter stays in hospital and also required less medication for their ailments (Gross and Lane, 2007; Freeman *et al.*, 2012). It is unsurprising then that health is reported to be one of the two most important motivations for older adults who regularly garden, the other being fitness (Ashton-Shaeffer and Constant, 2006).

Stephen Kaplan's Attention Restoration Theory (ART) offers a possible explanation for some of the psychological health benefits associated with gardening (Kaplan, 1995). Based on ART, gardening represents an activity where minimal or no 'directed attention' is needed and practitioners can simply recover from the mental fatigue imposed by other activities. Not only is gardening viewed as a way of relieving the stresses of daily life, it is also perceived by some older practitioners to be a way of resisting the ageing process (Bhatti, 2006). With slogans like 'Eat Fresh' promoted by the popular restaurant, Subway, and Woolworths supermarket assuming the title of 'The fresh food people', gardening is even more tied to notions of healthiness. Schools now also teach their students about healthy eating by having them grow their own fruits and vegetables in school gardens. In this way, gardening is also perceived to be an avenue through which people can learn and be educated about plants and the natural environment.

The associations made between gardening and learning is not entirely new because one reason, besides conservation, for establishing places like botanical gardens is to teach people about plants. Regular engagement with plants and nature has also been reported to significantly enhance intellectual acuity both in older and young people as the practice helps to keep their minds alert (Hitchings and Jones, 2004; Ashton-Shaeffer and Constant, 2006). For some people, gardening allows them to learn how to better care for the environment in which they live and belonging to a garden group also affords them opportunities to learn from other gardeners (Kingsley *et al.*, 2009; Freeman *et al.*, 2012). Places like community gardens, in this way, serve as sites where plants can be encountered in a setting that allows for unhindered peer interactions and learning. Botanical gardens are also a popular destination for school excursions which are geared towards facilitating an interaction between young children and the environment around them. The sorts of discussions that take place in these types of settings have the potential to shape the ideas and perceptions which people hold towards gardening and nature in general.

Similar to the early transition of gardening into a more aesthetic pursuit, gardens are increasingly seen as an extension of the home, as a place where gardeners can show off their personalities (Gross and Lane, 2007). This is evident in the multitude of flamboyant and creative gardens displayed at Open Gardens and on television garden shows which viewers then attempt to recreate in their own home gardens. Aesthetic motivations are some of the most reported reasons why people take up gardening and have often been found to be the driving motivation for the plant choices made by gardeners. As Doody *et al.* (2014) found in their study of gardening performance and weed management, aesthetics was also the reason given as to why certain invasive plants were allowed to remain in the garden. One gardener, in particular, reported that she considered the invasive plant in question to be “aesthetically pleasing” and, therefore, not deserving of being referred to as a weed (ibid, p. 131). This just goes to show how much of an influence aesthetics can exert in the actual performance of gardening, especially if the garden is considered to be a means of self-expression by the gardener.

The reason why the above mentioned drivers can be written about with any credibility is because numerous observational and empirical studies have researched gardening as a topic of interest. These gardening studies tend to be underpinned by two main viewpoints: the first takes humans to be the central unit of analysis while the second concerns itself with the non-human components. In the present study, however, a third approach is introduced which offers some potential for better apprehending the various aspects of gardening, including both humans and non-humans. This approach conceptualises gardening as a practice with three underlying elements which interrelate to shape the way gardening is performed. In other words, a practice orientation contends that it is because of the interrelation between these elements that gardening comes to be performed the way that it is, and not because of individual actors. Further elaboration of all three approaches to gardening research is provided in the following section which also highlights the differences that exist between them.

2.2 Gardening research orientations

The approaches which have previously been adopted in gardening research have typically focused on two aspects – humans and non-humans. As we will see below, by focusing on people who garden, the first approach often targets human behaviour and the decision-making processes which inform them. To this end, behavioural approaches like rational choice theory are often employed to explain gardeners’ particular ways of gardening. The second approach, we will discover, is more concerned with bringing into focus the non-human components which are involved in the process of gardening. Actor network theory is a theoretical lens which has often been employed in these types of studies

because it enables the researchers to successfully apprehend and demonstrate non-human agency. In the suggested third approach, however, which decentralises both humans and non-humans, it is the gardening practice itself that is taken as the unit of analysis and this is done using practice theory. It is to these three approaches that we now turn.

2.2.1 The human-centred approach

The majority of gardening research conducted has tended to follow a pattern whereby humans are given central focus and taken to be the key aspect worth investigating. This has led to a plethora of studies which investigate behavioural issues, such as the reasons why people garden and the factors which motivate their continued engagement in gardening activities. These motivations are often tied to individual perceptions and understandings of gardening itself, so they have been shown to vary from one gardener to another. For example, as mentioned earlier, research has shown that there are several physical and psychological health benefits which motivate and sustain an individual's continued engagement in gardening activities (Kaplan, 1973; Wakefield *et al.*, 2007; Cheng, 2010).

One common outcome of this approach is the categorisation of gardeners based on a number of identifying attributes, such as plant preferences and drivers for engagement. Behe *et al.* (2010), for instance, broadly grouped her gardeners into low use, woody plant buyers or herbaceous plant buyers, according to their plant preferences. Head and Muir (2007) and Kurz and Baudains (2012), on the other hand, categorised their gardeners more specifically based on their reported preference for native and/or exotic plants. The attribution of the terms 'native' and 'exotic' to plant species, however, is an issue that has been debated among researchers for decades with no firm resolution as yet (Kendle and Rose, 2000; Aitken, 2004; Head and Muir, 2004; Davis, 2009; Preston, 2009). It has been argued that the concepts are not founded upon hard science but are, rather, dependent upon space and time which are social constructs and therefore relative (Kendle and Rose, 2000; Rotherham and Lambert, 2013). Nevertheless, categorising gardeners in this way appears to make it easier to explore their activities and other researchers have adopted the same approach, with Cheng (2010) splitting them into serious and casual gardeners.

The above studies have contributed towards existing knowledge about gardeners' motivations for gardening but they are usually underpinned by behavioural theories like Rational Choice Theory (RCT). In simple terms, RCT is an economics-derived theory which purports that individual behaviour is often predetermined by the perceived advantages they associate with that behaviour (Arrow, 1986; Green, 2002; Prager, 2012). So the decision making process preceding behaviour is seen as one of deliberate calculation where individuals weigh the pros and cons before deciding on the best

possible outcome for themselves. Based on this assumption, RCT researchers believe that the way a gardener behaves is driven by the merits which they associate with gardening. It is this belief which has prompted so many studies which have been aimed at discovering what motivates people to garden. As a result, there is now an extensive list of reported gardening motivations which includes social connection, fitness and recreation, health and wellbeing, relaxation and interaction with nature (Ashton-Shaeffer and Constant, 2006; Clayton, 2007; Gross and Lane, 2007; Kingsley *et al.*, 2009; Cheng, 2010). All of these, among other factors, are said to be what continue to sustain an individual's engagement in gardening activities.

Studies which adopt a human-centred approach have been useful for understanding the rationale behind gardeners' decision-making processes and the motivations which drive them. However, they also highlight the fact that gardening research is often dominated by a preoccupation with human activity, thereby neglecting other aspects which might also play an influential role. This has led to the emergence of a different way of studying what goes on in the garden, shifting the focus from the gardeners and broadening it to also include the materials which they utilise. In this way, humans are no longer viewed as the only or the most important analysable unit in gardening research and are, instead, treated as just one of several actors equally involved in gardening activities.

2.2.2 Attending to non-human components

The prevalence of human-centred approaches is not entirely surprising given the ineluctable fact that it is humans who are doing the investigating and reporting of gardening research. However, there are now an increasing number of studies being carried out which look beyond the human focus in order to attend to the non-human actors within the garden. This way of studying gardens and enactments of gardening is steeped in the recognition by researchers that non-humans are often neglected or relegated to the background of gardening discussions. So to address this oversight, studies adopting this approach have sought to reshape existing perceptions of non-humans as simply passive objects to be used at the discretion of the human gardeners. The same approach has been used to demonstrate other non-human agencies (Edensor, 2011; Hui, 2012) but when it comes to gardening, plants are often the focal point of research investigations.

Research into the agency of plants has been grossly underrepresented in geographical literature, especially when compared with their animal counterparts (Head and Atchison, 2009). This could explain why plants are so often the central focus in studies which are aimed at demonstrating non-human agency in gardening and garden-related matters. The agency of animals, like that of humans, is readily observable in their physical ability to act and to move from one place to another. Plants, on

the other hand, are less obvious in their doings which explains their being consigned to the periphery of explorations and discussions about gardening activities. Research has, however, shown that far from being merely passive recipients of human intervention, plants also possess the capacities to act upon just as they are acted upon (Hitchings, 2003; Power, 2005; Daniels and Kirkpatrick, 2006; Jones and Cloke, 2008; Head *et al.*, 2015).

In these kinds of research, gardening is approached not just as the human act of planting, pruning, weeding and harvesting but it is seen as also subject to the nature and structure of the plants in question. This leads to what has been described as “a re-scripting of gardens as hybrid spaces whose being occurs through the presence and interactions of heterogeneous actors” (Power, 2005, p. 42). In the garden, one plant requires more or less water, another only thrives under a certain amount of sunlight or shade, yet another has to be trimmed every so often in order to grow desirably. All of these demonstrate not human dominance over plants but rather the mutually constitutive agency that plays out within the garden space.

An oft-used theoretical lens which enables researchers to explore the complexities surrounding human and non-human interaction, is Actor-Network Theory (ANT) (Callon, 1986; Law, 1992; Latour, 2005). As Paget *et al.* (2010) explain, non-humans act as mediators, take part in the action and make associations between other actors possible, thereby ensuring the continuity of that action. So ANT elevates the non-human components of a particular activity like gardening to a higher level of importance, thereby making them more essential than would previously have been the case. In line with this, gardening research adopting the non-human approach assume the position that gardening cannot be fully apprehended unless its non-human facilitators are adequately accounted for. The view here is that a gardener is only identifiable as such because they utilise plants, soil, water and gardening implements, among other things, in order to carry out their gardening activities. It is all of these non-human components which are understood by ANT researchers to enable gardeners to successfully carry out their enactments of gardening.

The expansion of gardening research explorations to include non-human actors is a timely contribution to ongoing efforts to understand this increasingly popular activity. There is still a tendency, however, for gardening research to be narrowly focused on either the human gardener or the non-human components of the garden space, rather than analysing both aspects together. So in order to move beyond these isolated preoccupations, the present research introduces a third approach which bridges the gap between the previous two. By framing gardening as a practice that is comprised of multiple elements, human and non-human, a practice orientation broadens the analytical focus to allow for a more comprehensive gardening account.

2.2.3 A practice orientation

Reckwitz (2002) defines practice as “a routinized way in which bodies are moved, objects are handled... things are described and the world is understood” (p. 250). He goes further to describe practices as a ‘block’ of interconnected elements which cannot be reduced to any one of those elements. In this way, he conceptualises practice as a noun; that is, as a single *entity*. Theodore Schatzki, on the other hand, gives a more verb-like view of practice, as “a temporally and spatially dispersed nexus of doings and sayings” (1996, p.89), signalling an understanding of practice as *performance*. So by referring to gardening as a practice here, it is simultaneously understood to be an entity as well as a performance, concepts of which will be further explained in section 2.4.1 below.

In an attempt to bridge both of the above viewpoints, Shove and Pantzar (2005) describe practice as involving “the active integration of materials, meanings and forms of competence” (p. 45). They subsequently developed a version of practice theory that targets the three elements of materials, competences and meanings, all of which are believed to shape the way a practice is done (Shove *et al.*, 2012). Materials refer to the inanimate objects used in the performance of a practice. In gardening, these would be things like tools, soil, water, plants etc. Competences are the knowledge and skills that are required in order for an individual to be able to perform that practice. This refers to the skills associated with gardening that a gardener must possess. The third element, meanings, refers to the abstract feelings and attitudes which an individual associates with their particular practice. These are the motivations which drive gardeners to garden. Section 2.4 gives a more detailed account of practice theory as it is the conceptual framework which underpins the present research.

Similar to the ANT perspective described above (section 2.2.2), practice theory recognises the important role which non-humans play in the enactment of practices. However, this role is not as ‘actors’ per se but rather as facilitators of action; that is, items which are necessarily employed in a practice performance. As Warde (2014) cautions, to do otherwise would overemphasise the role of objects in the performance of practices at the expense of other dynamic processes which determine how objects are utilised. In simple terms, “[c]arrying out a practice very often means using particular things in a certain way” (Reckwitz, 2002, p. 252) so it makes sense that materials should be given a more central role in practice analyses. One benefit of a practice orientation to gardening research, therefore, lies in the fact that it incorporates both human and non-humans in its analysis without being exclusively focused on either one. This opens it up to apprehending aspects of gardening which may have been overlooked by the previous approaches.

Conceptualising everyday activities as practices is not entirely novel, except for the fact that it is not an approach that has been employed in gardening research. Other researchers, however, have adopted it in their explorations of seemingly mundane human activities like bathing (Scott *et al.*, 2012; Kuijer, 2014), cycling (Aldred and Jungnickel, 2014; Shove, 2014), tobacco smoking (Blue *et al.*, 2016) and energy use (Shove and Walker, 2014) with great success. What these studies have in common is the fact that they aim to understand why practices are performed the way that they are, and what sorts of interventions might lead to a change in performances. In other words, a practice orientation is typically geared towards fostering change in the activities that are being investigated. This is why it is so popular among researchers who study consumption practices. It is also the reason why this approach, rather than others, is deemed better suited to the purpose of the present research which seeks to first understand and then foster change in current gardening enactments. Before going into greater detail about the utility of practice theory for the present study, the following section describes the sorts of gardening enactments that require management intervention.

2.3 Domestic gardening as a pathway to the spread of garden escapes

Human activity has been widely implicated in the ongoing spread of invasive garden plants, with garden escapes making up around 70% of total weed introductions in Australia (Groves *et al.*, 2005). Of particular concern is the fact that a large proportion of these garden escapes continue to remain available for sale, and hence distribution, thereby posing a risk to Australia's environment. This continued availability for sale of these plants is one reason why garden escapes remain so problematic, especially because prohibitive bans are not uniform across all states and territories. There are, however, other factors relating to plant preferences, ease of acquisition and plant management methods which aid the spread of invasive plants from domestic gardens into the wider environment. These are all examined in greater detail below.

2.3.1 Plant preferences

As was previously mentioned, plant preference is a common motivation which drives people's engagement in gardening activities. It also partly determines the plant composition of people's gardens since gardeners often cultivate plants which they consider to be either visually or biophysically appealing (Kendal *et al.*, 2012a). Visual appeal is an especially recurrent feature in garden accounts, with Australian gardeners reportedly preferring aesthetically pleasing plants, most of which happen to be exotic species (Virtue *et al.*, 2004; Hu and Gill, 2015). These plants often possess features like brightly coloured flowers and foliage, which gardeners find desirable because

such attributes are thought to enhance the beauty of gardens. Unfortunately, however, these same features also contribute to the capacity of garden plants to escape confinement, sometimes aided by the action of non-human agents of dispersal.

Birds and insects are very good facilitators of plant invasion mainly because they have excellent colour vision which enables them to forage successfully for food and other provisions (Gosper *et al.*, 2005). They are attracted by the bright colours of certain plants from which they ingest fruit or nectar, subsequently depositing the plant propagules elsewhere through defecation or inadvertently. In this way, a gardener's preference for visually appealing plants, aided by the action of dispersal agents, culminates in the spread of potentially invasive plants beyond the garden boundary. This chain of events, initiated by a desire for visual appeal, shows a mostly unintentional causal link between plant preference and eventual plant invasion. However, there are other instances where gardeners deliberately cultivate plants which they perceive to be aesthetically appealing despite knowing such plants to be invasive (Doody *et al.*, 2014).

Another characteristic which gardeners find appealing in garden plants relates to biophysical traits such as low maintenance requirements and easy propagation (Kendal *et al.*, 2012b). These are features which would be especially appealing to time-poor gardeners who are unable to spend a lot of time gardening but still desire to have a garden. A low maintenance plant would require very little care and attention from the gardener and having a plant that is easily propagated means that more of the same plant can easily be produced from cuttings. While these characteristics may be desirable for a gardener, they also imbue escaped plants with the ability to invade and thrive in the wider environment without the need for human intervention. It is traits like these which make garden escapes such a successful group of agricultural and environmental weeds (Groves *et al.*, 2005; Barker *et al.*, 2006).

However paradoxical it might seem, the characteristics which make garden escapes such desirable plants in the eyes of gardeners are the very same features which make them invasive. Stress tolerance, for example, enables a plant to survive being neglected for a time but this is also a trait which is commonly found in a lot of established weeds (Drew *et al.*, 2010). So making plant choices on the basis of individual preference or time constraints can play an important role in determining whether that plant is able to escape confinement. Once a gardener has made their choice regarding the type of plants they would prefer to cultivate, the next decision to make is how to go about procuring the chosen plants and where to get them from. Some of the commonly utilised sources of garden plants include nurseries, botanical gardens, garden groups, friends and family, and perhaps less commonly, the internet (Hu and Gill, 2015).

2.3.2 Ease of acquisition

The gardening industry is, arguably, the largest contributor to the weed problem currently facing Australia because despite their invasiveness, these plants remain available for sale in nurseries (Groves *et al.*, 2005). Nursery plant stocks are, however, partly indicative of the plant preferences of gardeners since like any other market, demand is often a driving determinant of the products supplied and sold. In other words, if gardeners prefer to cultivate plants with invasive characteristics, then their plant purchase will undoubtedly reflect such preferences which will, in turn, influence nursery plant stocks. There are, however, certain plants which are listed as weeds and, hence, prohibited from sale or cultivation, though this does not always mean that such plants are not available through some other means.

Prohibiting the sale of invasive plants using weed lists is a challenging endeavour because these lists are not uniform across all states and territories in Australia. This relates to the fact that weeds are listed based on the severity of their impact in particular locations and differences in local conditions, such as climate, means that the plants are prioritised differently. As a result, some of the plants which are prohibited from sale in one state might not have the same status in another state. *Lantana camara* is one example of an invasive plant which has been listed as noxious and prohibited from sale in Queensland, but it has been found to be available for sale in parts of northern NSW (Groves *et al.*, 2005). For these reasons, garden escapes remain such a concerning issue because a gardener who really wants a prohibited plant can simply purchase it from another state where it is still allowed for sale. The increasingly popular use of online purchasing platforms, like eBay and Gumtree, makes this process of buying invasive plants interstate to circumvent sale bans even easier to accomplish (Humair *et al.*, 2015).

As Behe *et al.* (2008, p. 210) stated, “the internet has revolutionized the way consumers seek information, shop for products and services, and the way in which many companies do business.” So where brick and mortar stores are limited by geographical location, the internet offers a more ubiquitous platform which removes any need for proximity between buyer and seller. This means that using online platforms, gardeners can buy any plant they desire regardless of invasiveness, thereby facilitating the movement of these plant species from one location to another. Some research findings have indicated that online platforms are a less utilised source in gardening-related purchases than, say, nurseries (Behe *et al.*, 2008; Hu and Gill, 2015). However, there is other evidence which demonstrate the viability of the internet as a pathway for the spread of garden escapes, with a lot of these plants shown to still be available for sale online (Williams *et al.*, 2000; Groves *et al.*, 2005; Humair *et al.*, 2015).

The plant preferences which a gardener exhibits, and the purchases they make as a result, are just two aspects whereby domestic gardening can influence the spread of garden escapes. They also occur in the pre-cultivation phase of gardening. That is, before the plants are actually put into the ground in the garden. After procurement, however, there are certain actions which a gardener performs in the process of gardening which have also been reported to contribute to the establishment of invasive plants in the wild. These are actions which relate to the way plants are managed within a garden and also how gardeners go about disposing of the green waste generated from gardening activities like weeding.

2.3.3 Plant management methods

The sorts of ideas which people hold in relation to gardening often determines the way in which they go about their enactment of it, including how they manage the plants within their gardens. For some people, gardening is seen as a social and leisure activity which enables them to build or enhance social connections and it also helps to strengthen familial bonds (Clayton, 2007; Freeman *et al.*, 2012). Friends and family have also been reported to be a commonly utilised source of garden plants for a lot of gardeners who might give or receive cuttings of a plant they like (Hu and Gill, 2015). This is cause for concern because unbeknownst to either gardener, these shared plants could become invasive in their new location and then proceed to spread outside of it. So while the sharing or gifting of plants may be considered to be a friendly gesture, it is also a pathway through which invasive plants can spread.

Another pathway which is frequently implicated in the spread of garden escapes and has proved challenging for authorities to control, is the dumping of green waste in bushland and reserve areas (Csurhes and Edwards, 1998; Dempster, 2002; Foxcroft *et al.*, 2008; Qvenild *et al.*, 2014). Common reasons given for dumping garden waste in these areas have to do with convenience, necessity and a perception among gardeners that it could serve as useful mulch for the environment (Hu and Gill, 2015). Far from being useful, however, the deliberate dumping of plant materials in the bush only accelerates the time it would otherwise have taken for those plants to escape domestic confinement. Since a lot of these dump sites are also isolated and often unpatrolled by weed officers, the plants are further able to continue spreading to other locations due to the action of rummaging animals.

For all of the reasons stated above, human action remains a significant contributor to the ongoing spread of invasive garden plants from domestic spaces to the wider environment. The various gardening-related decisions which gardeners make, from plant selection and procurement to plant

management and disposal, have the potential to influence the spread of garden escapes. Some of the observed effects of these decisions are incidental, as in the preference certain plant attributes leading to the procurement of invasive plants which attract dispersal agents. Others are more deliberate in that there is no other foreseeable outcome other than the translocation of plants which may be invasive, from domestic gardens to the external environment. The deliberate cultivation of invasive plants and the illegal disposal of garden waste in bushland are good examples of just how gardening activities can contribute to the spread of garden escapes. Having described the ways by which gardening enactments perpetuate garden escapes, the following section demonstrates the significance and utility of a practice-oriented management approach.

2.4 Changing gardening performance using practice theory

As previously mentioned (section 2.2), gardening research has been typically dominated by human-centred approaches which, informed by behavioural theories, focus on individual decision-making. This decision-making process is what is often understood to result in the cultivation and spread of garden escapes (section 2.3), so changing behaviour is seen as essential for management success. However, as Warde (2005, p. 140) states, “the sources of changed behaviour lies in the development of practices themselves”. Consequently, it is important to first discern how practices become established over time before seeking to change them. Practice theory offers a way by which gardening can be fully apprehended to determine how it has come to be performed the way that it is, and also usefully highlights points for management intervention. As will now be discussed, it has a greater potential than behavioural theories for lessening the ongoing contribution which gardening makes to the spread of garden escapes. Before continuing, it is important to first explain the concepts of practice as entity and performance, which were earlier mentioned (section 2.2.3). These are the two levels at which changes occur in practices.

2.4.1 Practice as *entity* and practice as *performance*

The idea of an *entity* brings to mind something with a distinct structure that is easily identifiable as actually existing in time and space. In viewing practice as an entity, it becomes expected that one practice would be noticeably distinct from another practice whilst maintaining its own recognisable identity. For example, the practice of gardening differs from the practice of driving, and that too from the practice of cooking. Each one of these practices is identifiable by virtue of their constitutive elements which include, among other things, mental deliberations and bodily enactments of the practice (Reckwitz, 2002). These elements are configured in particular ways that are unique to the

practice and it is the persistence of these configurations which make the practice entity recognisable as such.

For instance, cooking spaghetti bolognese usually involves cooking the pasta in boiling water, making the bolognese sauce and then topping the pasta with the sauce or mixing it through before serving. In this way, the practice of making spaghetti bolognese continually endures over time as an entity because it is always composed of the same elements configured in a particular way. The actual performance of the practice, however, unlike the entity, is not as consistent or persistent over time and space but might be modified from one instance to another. Using the pasta example, one cook might decide to use the same ingredients but cook the pasta *in* the bolognese; another might make the sauce differently, or use chicken minces instead of beef. The end result would still be spaghetti bolognese but the way it was prepared is markedly different than the first instance where the pasta and sauce were cooked separately before being combined.

The distinction between practice as an entity and practice as a performance is not as clear-cut as one would expect, for the very reason that both are mutually constitutive of one another. It is the multiple and repeated *performance* of a practice that leads to its recognition as an identifiable and distinct *entity*. Conventional ideas around the recipe for spaghetti bolognese shape the way cooks everywhere prepare the dish, but it is the persistent use of one particular recipe that establishes it as convention. In other words, if people did not continually and repeatedly follow that recipe, it would not be as widely accepted as the established norm. Conversely, one cook somewhere might decide to modify the original recipe in some way, and add or remove certain elements to suit their personal taste. In the event that this changed recipe gets shared amongst other cooks then catches on and becomes popular, it has the potential to replace the old recipe and become the accepted standard to which everyone refers.

So in essence, the practice taken as an entity determines the individual performances of that practice which, like the changed recipe, might vary from one place to another. On the other hand, the persistence of a practice-as-entity is dependent upon the repeated performance of that practice, otherwise it might fade away to be replaced by another practice-as-entity. So practice-as-performance is inherently dynamic, as each moment of performance allows for the possibility of modification and it is, therefore, subject to change over time. When zooming out of the individual performances, however, it becomes apparent that a certain level of consistency still remains across various performances which make the practice recognisable as an entity. With this understanding of the connotations associated with the term 'practice' in mind, discussions now turn to the theoretical framework underpinning the present research.

2.4.2 Social theories of practice

The origin and evolution of practice theory can be traced back to the twentieth century works of Pierre Bourdieu, who is often credited with bringing practices to the forefront of sociological enquiry. At the time, his theorisation of *habitus* was seen within the field of geography as particularly timely given the ongoing dualistic debates surrounding structuralism and individual agency (Gregory *et al.*, 2009). *Habitus* here refers to “the structured and structuring social practices of daily lives” (Duncan, 2005, p. 73), and is positioned in a mutually constructive cycle with social structures and norms. In other words, societal structure is established based on individual *habitus* but it also influences the *habitus* within that society as individuals tend to act in accordance with already established norms.

Although Bourdieu’s works did not lead to a single uniform theory of practice, they did highlight the fact that practices emerge as a result of more than exclusively individual or social attributes. This propelled what is still an ongoing quest by researchers for a comprehensive theory of practice, one that would account for aspects of practice not previously addressed. Works by Andreas Reckwitz and Elizabeth Shove, relevant to the present research, are notable examples of just how far research efforts have come in “making practice theory more practicable” (Sahakian and Wilhite, 2013, p. 3). Reckwitz (2002) sought to construct what he referred to as “an idealized model of practice theory” (p. 244) by synthesising findings from prominent but divergent practice theory accounts. In his version, practices are made up of several interconnected elements: “forms of bodily activities... mental activities, ‘things’ and their use, a background knowledge..., know-how, states of emotion and motivational knowledge (Reckwitz, 2002, p. 249).

Given how extensive the above list of elements was and how difficult it would be to translate them into an applicable research framework, Shove *et al.* (2012) distilled them into a trio of practice elements (Figure 2.1). This latter version of practice theory concerns itself with core elements of materials, competences and meanings, all of which are believed to encapsulate the elements previously identified by Reckwitz (2002). The authors’ goal was to make practice theory better able to explain the emergence, persistence and cessation of routine practices and it is this version that has been variously adopted to that effect (Scott, 2008; Wakkary *et al.*, 2013; Aldred and Jungnickel, 2014; Kuijer, 2014; Mylan, 2015; Blue *et al.*, 2016). The present research also utilises this tri-element account of practice theory for the potential it offers for apprehending aspects of gardening that have so far proved elusive to previous research attempts. However, before moving on with discussions about the three elements, it is worth pointing out that there are ongoing debates around the

capacity of practice theory to foster change in performances. These mainly revolve around two of the principles which underpin the adoption of practice theory.

The first point of contention relates to the disassociation of practice theory from an exclusively individualistic or normative worldview, such that practices are taken as the unit of analysis. Watson (2012) suggests that by removing the analytical focus from either individual actors or the social systems to which they belong, practice theory risks missing other potential determinants of human action. As he put it, “this microfocus of practice research... risks missing the radical implications and potential of the concept” (ibid., p. 489). This is a point which Batel *et al.* (2016, no page number) cite as being one of the main critiques levelled at social practice theories, which tend to be seen as “too structural and therefore arguably reductionist” in their approach to changing performance. In agreement, Pink *et al.* (2013, p. 3) opined that in order to afford practice theory greater credibility, “there is more work to be done in terms of explaining how an understanding of practices can accommodate other contextual and individual elements”.

These authors highlight the fact that by neatly categorising practice theory into a trio of elements, it is possible to overlook other influential factors that may not fit tidily under any of those elements. By its very tenets (see section 2.4.1), practice theory allows that each performance is subject to change by practitioners who are undoubtedly influenced by an eclectic range of factors. For instance, every individual comes with their own cultural and experiential baggage which might influence their response to particular events and this will differ from one person to another. So it stands to reason that practice elements rather than being neatly sorted would be quite open to ‘untidiness’, lending credence to the above critiques. However, as earlier mentioned, practice theory is still undergoing development in order to address issues such as this so the onus falls on researchers to be rigorous in their application of it. The present research certainly remains cognisant of the fact that the version adopted here is not a flawless one.

A second source of uncertainty in the application of practice theory relates to its end result; that is, the sorts of useful recommendations that can be derived from such an approach. To this end, Mellick Lopes *et al.* (2015, p. 243) describe practice theory as “a heuristic device, leaning toward speculative enterprises, prompting us to ask what it can help us to do?”. These authors pick up on the fact that the outcome of the application of practice theory is rarely clear in its recommendations about the interventions that might be implemented from its deployment. A point which Pettersen (2015) seems to support in his remark that practice theory offers an understanding of the dynamics of consumption but “it is not equipped ... for ... fostering change in new directions” (p. 206). It should be noted that these critiques on the applicability of practice theory stem from a design focus; in

other words, the authors query its utility in formulating design interventions. Nevertheless, the points they raise are valid concerns given that at first glance, practice theory appears to be more interested in shifting existing research orientations rather than giving useful results.

Shove *et al.* (2012, p. 120), however, give a clear outline of the various ways by which change can be engendered in practice following the adoption of a practice theory framework.

1. Practices change when new elements are introduced or when existing elements are combined in new ways. Elements of meaning, materiality and competence are themselves outcomes of practice.
2. Elements – being part of several practices at once – have somewhat independent lives of their own. If practices are to survive, they need to capture and retain practitioners willing and able to do this integrating and therefore willing and able to keep them alive.
3. Relations between practices take different forms – some collaborative, some competitive, some weak, some strong. Whatever form they take, such relations matter for the trajectories of the elements and individual practices of which composite bundles and complexes of practice are made.
4. The connections involved, between elements and practices and between one practice and another, are maintained and reproduced through intersecting circuits of reproduction that have dynamic qualities of their own.

So essentially, practices change when the elements that constitute them are targeted by interventions which seek to remove unwanted elements and introduce more desirable ones. Practices also change when practitioners are made to defect due to the unavailability of requisite elements, and other practitioners are recruited who will enact the desired performance. The third intervention strategy would be to target the links which tie two practices together such that the circuit of reproduction is interrupted, leading to a change in practice performance. For example, cycling and driving both form bundles with shopping because both are enacted with the goal of achieving the latter, so breaking those links is one way to initiate a change in either practice (Watson, 2012). Obviously the actual intervention strategies that result from the adoption of practice theory will not be equally achievable in every instance which is, perhaps, the reason why some do not find it useful. Here, however, they do offer a greater potential for apprehending and eventually fostering a change in the aspects of gardening enactments that contribute to the spread of garden escapes. Below is a description of each element and how they interact to shape practice performances. Following this, practice theory will be compared with other behavioural theories so as to demonstrate its utility.

2.4.3 Materials, Competences and Meanings

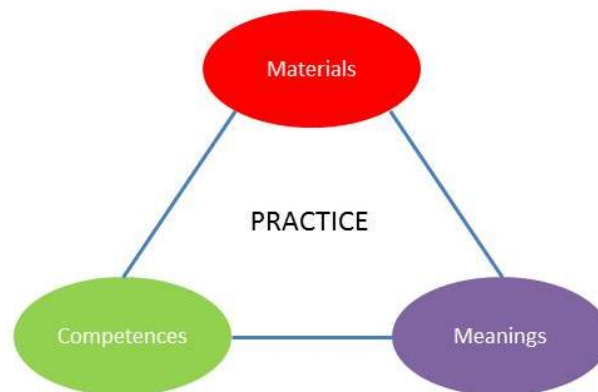


Figure 2.1: The interconnected elements of materials, competences and meanings.

Materials refer to both tangibles and intangibles, like tools, infrastructures, air and the human body, all of which serve as a sort of nexus where other practice elements congregate. The absence of the required materials would entail a change in the way a practice is performed or, in some cases, would lead to the complete abandonment of that practice. Referring back to the example used earlier, about cooking spaghetti bolognese, there are a number of materials that would be required in order for this practice to be carried out successfully. These might include a pot, stove, water, tomatoes, seasoning etc. Without these materials, and others besides, it would be impossible to perform the much loved practice of cooking spaghetti bolognese. The absence of these materials is one reason why practice entities change or become obsolete when there are adjustments in performances (see section 2.4.1).

This recognition of the central role which materials play is relevant for the present research because the practice of gardening also necessitates the availability of certain materials. Plants, watering can, water, a plot of land, soil and gardening implements are just some of the materials necessary for the enactment of gardening and a successful performance depends upon their availability. It is worth noting, however, that while the appropriation of materials for use in a practice sometimes requires that they be physically relocated, not all materials are equally available or transportable (Shove *et al.*, 2012). For this reason, certain practices may undergo some modification or even be discarded as the practitioners proceed to make do with readily available materials. This is how certain practices become dynamic.

Although important, the availability of materials is only the first element that is fundamental to the performance and sustenance of practices over time and space. The second constituting element of

practice is collectively referred to as competences and has to do with the skills, understandings and background knowledge necessary for the performance of that practice (Shove *et al.*, 2012). There exists, here, an important distinction between mastering an understanding of how a practice is performed, and knowing how to actually perform that practice (Warde, 2005; Shove *et al.*, 2012). For instance, in the culinary world, food critics are not necessarily good at cooking, but they are respected for their ability to gastronomically evaluate meals prepared by various chefs. Chefs on the other hand, who do possess the practical skills and understanding required to prepare the meals, might differ in the way they go about preparing that one particular meal.

In the pasta example, there is a certain level of know-how that comes with performing the practice: what temperature to have the water at, how long to cook the spaghetti for etc. Similarly, the practice of gardening requires some knowledge about plant morphology, preferred habitat and plant growth requirements. Of course this knowledge, and the associated skills, do not reside entirely within the human practitioners but can also be 'delegated' to the non-human performers in the practice (Latour, 1992). So a gardener, knowing how much water the plants in his garden require and when to water them, might delegate this task to a sprinkler system programmed to water the plants at the right time of day.

The skills employed in the performance of a practice often draw upon (socially) shared ideas about what 'best practice' to follow in order to achieve the desired results. This is especially relevant to the practice of gardening where practitioners often hone their knowledge and skills by watching garden shows on television, radio, and by reading articles in gardening magazines. These sources, and the advice they offer, represent the fashionable trends in gardening, giving practical illustrations of how to reach those goals, and this makes it all the more appealing to gardeners. These types of learning and active skill enhancement collectively contribute to the way in which a gardener goes about their gardening and also help to shape the ideas they hold regarding the practice.

Meanings, the third and final element of practice, broadly encapsulates the "mental activities" which Reckwitz (2002, p. 249) refers to in his definition of a practice. Shove *et al.* (2012) take it to "represent the social and symbolic significance of participation at any one moment" (p. 23), and point out the need to treat it as part of practice rather than something external to it. So although meanings might collectively refer to feelings, emotions, motivations, ideals, norms etc., it is not a quality possessed by the individual but is, rather, inherent within the practice itself (Reckwitz, 2002). Gardening, for example, is commonly understood to be a recreational, aesthetic or environmental pursuit *inter alia*, and it is from these established meanings that gardeners derive their own ideas. However, the reason why these meanings became established in the first place is because of the

repeated engagement in gardening of people who are motivated by those ideals. Like the other two elements, meanings are also subject to reconfiguration in the event that the requisite materials and skills are no longer available or have simply been replaced by others.

There was a time when the main method of communication was letter writing using pen and paper, which would then be posted or hand-delivered and take a long time to reach the recipient. Once accepted as the norm in communication, the meaning of this practice over time has now been reconfigured to include phones and email, even though pens and papers as materials still exist. Sahakian and Wilhite (2013) demonstrate that well-established norms, like that of communication, are not usually questioned but, instead, are tacitly accepted by practitioners as the general rule. It is this tacit acceptance and the continued (re)enactment of the practice that establishes it as the socially accepted norm, in a way linking back to Bourdieu's earlier notion of habitus. The meanings associated with gardening are similarly influenced by the accepted social rules governing the practice which is, in turn, shaped by the materials available, and the skills required for their use.

Despite appearances, the three elements of materials, competences and meanings are by no means completely separate from each other. Rather, certain overlaps exist as each element mutually constitutes the others in a dynamic process that is only ever temporarily stable. The availability of certain materials required for carrying out a practice determines the skills needed for the performance of that practice and, over time, this may become the generally accepted norm. In the same way, the continuous and repeated performance of a practice using particular materials in particular ways, over time, shape the meanings practitioners hold regarding that practice. Shove *et al.* (2012) use the analogy of a map where each element represents one of three layers of the map which, put together, would show instances where the practice can be performed. Upon placing the layers one over the other, only those locations where materials, competences and meanings exist together in the required form will the practice be successfully performed. Otherwise changes take place within the practice-as-performance, as practitioners attempt to make use of the available elements. To conclude the discussion about practice theory, the following section compares its utility with that of the behavioural theories which underpin current approaches to garden escapes management.

2.4.4 Behavioural versus practice-oriented theories

The emphasis within behavioural theories on the autonomy of individual actors often portrays them as rational thinkers who make informed decisions according to logical thought processes. This focus on individual intentionality typically assumes the Attitude-Behaviour-Choice (ABC) model of

behaviour (Shove, 2010) and has, as a result, influenced policy directives regarding garden escapes. The problem is often portrayed as being a matter of choice - the choice to cultivate or not to cultivate invasive garden plants. However, is the explanation as simple as ABC, where Attitude determines Behaviour which then leads to Choice (Shove, 2010), as existing management approaches seem to suggest, or is there more to it than that? Attitude, here, refers to an individual's feelings towards the performance of certain actions, whether positive or negative. Behaviour is the actions being performed, and choice refers to the mental decision-making that sees an individual pick between alternative courses of action.

Research has demonstrated that the behaviours exhibited and choices made by individuals are not always a reflection of their professed attitudes, especially when it comes to environmental matters (Robbins, 2007; Hitchings *et al.*, 2013; Sahakian and Wilhite, 2013). The use of environmentally harmful lawn maintenance chemicals by a self-proclaimed pro-environmentalist in *Lawn People* (Robbins, 2007) is a typical example of individuals not practising what they profess. In situations like this, there are other factors such as existing neighbourhood expectations which also play a role in determining the behaviours exhibited by an individual. This results in the value-action gap which Pickett-Baker and Ozaki (2008) refer to in their explorations of marketing advertisements geared towards promoting green consumerism.

Practice theories, while acknowledging that attitudes might influence performance in some way, do not support the notion that observed performance are simply the outcomes of individual preferences (Shove *et al.*, 2012). The links between cause(s) and observed effect are, instead, taken to be more networked than linear as the ABC model would suggest. So in the above lawn example, the reasons for the value-action gap had to do with the fact that there was an established social norm in the neighbourhood about acceptable lawn standards. The point here is not to suggest that practice theories are an antithesis to behavioural theories, in the sense of being more accepting of normative explanations of behaviour. Rather, the merits of a practice theory approach is that it sees value in aspects of both schools of thought while maintaining that there are more than solely individual or social factors shaping behaviour.

Within behavioural theories, the individual is placed in a central position and the decision making of said individual becomes the sole unit of enquiry. This gives only a limited view of what is undoubtedly a complex interaction between individuals and others, especially in an inherently social practice like gardening. Others, here, refer to both humans and non-humans, tangible and abstract because, as explained earlier, the availability of certain elements determine how a practice is performed, if at all. It is unsurprising, then, that current approaches to resolving the garden escapes

issue, despite identifying gardening as a major contributor, remain unsuccessful in resolving the problem. A focus on only one aspect of the issue, individual decision making, gives only a limited potential for completely grasping the nature and extent of the problem.

A practice-oriented approach pulls the focus away from the individual and places it on the actual practice being performed, a practice in which the individual participates. So rather than giving them autonomy, individuals are treated merely as 'carriers' of the practice such that for a particular practice, they are only important during their moment of performance. This is not to say that individuals play the passive role of an automaton during practice performance. On the contrary, a practice as an entity endures only as long as it is continuously and repeatedly performed by practitioners, otherwise it ceases to exist. When it comes to explaining or facilitating a change in performance, the objective then is to pay closer attention to the combination of elements which allow a practice to be performed a certain way. These elements of materials, competences and meanings are interconnected and work together in dynamic configurations to shape the performance of the practice under scrutiny (Shove *et al.*, 2012).

Another important difference between behavioural and practice-oriented theories lies in the attribution of cause and effect regarding the change in question. For behavioural theories, individual attitude is believed to drive behaviour which, in turn, leads to the choices made one way or another (Shove, 2010). This means that these theories are usually geared towards predicting individual action, and resultant strategies to facilitate the desired change attempt to intervene in the decision making process. In invasive plants management, the default strategy is to provide more information to the public using publications and labelling systems, in the hopes that having that information will induce a change (Timmins and Blood, 2003). Needless to say that that this strategy has not been as successful as hoped, thereby pointing to the existence of other important factors which may previously have gone unexplored.

For practice theory, a change in performance is understood to be tied to the endurance or ease of disposal of practices and the elemental configurations which constitute them. The emergence, persistence or disappearance of a practice is, hence, the result of the making and breaking of links between the underlying elements of materials, competences and meanings (Shove *et al.*, 2012). The particular links between elements, and the configurations which they form, are what manifest as an observable practice and a change in configuration inevitably changes the practice performance. So in order to facilitate change in a practice such as gardening, a practice theory approach would see the links between elements targeted so as to (re)shape existing configurations. This might yet involve

education in order to either affect skill or change meanings, but the point is that education is merely an incidental tool rather than a targeted strategy aimed at inducing rationality.

2.4.5 Conceptual framework

While it is generally understood that gardening plays a major contributing role in the continued use and spread of garden escapes, current management approaches have proven unsatisfactory. This is mainly because existing control strategies and policies are largely informed by behavioural theories like RCT, which operate on the assumption that actuality is a product of rationality. In other words, these theories assume that the behaviour exhibited by individuals, regarding invasive garden plants, is a by-product of 'rational' thought processes. This line of thinking is inherently flawed given the socio-material nature of the gardening practice and it, therefore, offers only a partial understanding of what is a more complex issue.

The purpose of the research undertaken here is to closely examine the practice of gardening, in order to discover what previously unaddressed factors might be linked to current enactments. A practice-led approach offers a more inclusive way of apprehending the intricacies of the gardening practice by focusing not on individuals but, rather, on the practice in which they participate. This approach will, in turn, highlight better points of intervention within the performance of the practice, in order to achieve the necessary change in performance amongst the gardening public. Based on the synthesis of practice theory initiated by Reckwitz (2002), and ultimately fine-tuned by Shove *et al.* (2012), the following points summarize the conceptual framework adopted in this study.

- Practice theory is not a 'theory', in the sense that it does not provide a generalizable account for all practices. Rather, it should be thought of as a different way of explaining and understanding seemingly mundane practices which are comprised of multiple actors and complex interactions.
- Individuals feature in a practice theory analysis not as the centre of attention but, rather, as participants or 'carriers' who play a role in the performance of the practice. This role is not a passive one but it is not autonomic either, as individuals perform practices by interacting with other individuals and things.
- A practice-led approach acknowledges the existence of some value in both individualist and normative theoretical approaches, while not completely supporting either one. It serves as a sort of middle ground bridging the apparent chasm between the two approaches and taking practices, rather than the individual or the social, as its unit of analysis.

- The underlying factors which constitute a practice and which enable it to persist or disappear are elements of materials, competences and meanings. All three elements, present in particular configurations, are what manifest as an observable practice and the absence of any one element renders the practice impracticable.
- There are dynamic links which bind the constituting elements within a practice and give it its stability and recognisability. When these links are (re)made or broken during practice performance, it causes an inevitable change in the practice as an entity thereby leading to a change in the way the practice is performed.

2.5 Summary

The purpose of this chapter was to create an understanding of gardening enactments and how practice theory might be useful in ongoing management efforts to prevent further garden escapes. It began with a description of the evolutionary pathways through which perceptions of the practice have been modified leading up to the way it is currently understood and performed. This showed how enactments of gardening in Australia have changed over time, beginning as a necessarily subsistence endeavour and transforming into a more leisurely and aesthetic pursuit. Following this, existing approaches to gardening research were reviewed and revealed a tendency towards human-centred and non-human focused studies, both of which are limited in their explorations. Gardening was then conceptualised as a 'practice' and practice theory was introduced in order to offer an alternative and more inclusive approach to gardening investigations.

Discussions moved on to some of the common ways by which gardening has been reported to contribute to the spread of invasive plants, from domestic gardens into the wider environment. Existing research indicates that while some of these causal links are unintentional, they are also sometimes deliberate such as when factors like aesthetic preferences are prioritised over invasive potential. This led to further discussions about the significance and utility of practice theory in overcoming the limitations of previously adopted behavioural theories, with comparisons made between both. Finally, the conceptual framework of the study was outlined and shown to revolve around explorations of materials, competences and meaning, all of which shape the performance of gardening.

CHAPTER 3

METHODOLOGY

Introduction

The purpose of this chapter is to give a clear and comprehensive report of the methodological instruments and procedures that were employed in the conduct of this research. It begins with a discussion of the phenomenological research design which underpins the study, given that the research aim requires the elicitation of firsthand accounts of gardening performances. The research methods and instruments employed are then described in detail, outlining the data collection, management and analytic procedures used. During the ensuing discussions, explanations are given to justify the decisions and choices that were made throughout the research journey. The chapter then concludes by highlighting the ethical issues which were taken into consideration during the planning and implementation stages of the research.

3.1 Research design

Social science research is usually driven by the desire to answer particular questions about *what* is happening and *why* it is happening. de Vaus (2001) classifies research according to two categories - descriptive or explanatory, depending on which set of questions it seeks to answer. To demonstrate how important it is to first work out the research design before deciding on research methodology, he likens it to the role which an architect plays in the construction of a building. Before going ahead to order construction materials, even before developing the work plan for the building, there would have to be a decision made as to what type of building is to be constructed. The intention may be to construct an office block, residential apartments or an industrial building, the choice of which would need to be designed by an architect to suit the building's purpose. It is the type and future purpose of the building which determines how it will be built, and what construction materials will then need to be ordered.

In the same way, the conception and conduct of research necessitates a determination of what type of research it is going to be and what purpose it hopes to serve. Each type of research, whether descriptive or explanatory, has its individual merits and neither one is better or more useful than the other. In fact, there are situations whereby each type serves to complement the other and vice versa. For instance, the census data collected every five years in Australia is of a descriptive nature, showing where and how many people live in various locations across the country at any given time. However, this sort of descriptive data is what galvanises exploratory research into the possible

reasons behind particular ethnic distributions or unemployment levels in regions within the country. Only after working out the research design can the researcher then move on to address the *how* questions which detail the processes and procedures involved in conducting the research.

It is common for researchers to merge the research design and research methods into one phase in the research process; rarely do they bother to separate the two. This is evident in the definition of research design given by Creswell *et al.* (2007), which includes the collection, analyses and reporting of research findings, all of which are methodological concerns. de Vaus (2001) makes the distinction clear, stating that the function of the research design is “to ensure that the evidence obtained enables us to answer the initial question as unambiguously as possible” (p. 9). In other words, it is in the design phase that the researcher ensures that he knows what kind of data he needs to go out and collect if he is to successfully fulfil the research objectives. Collecting only data about crime frequency in an area is only minimally relevant, and does not satisfy the purpose of research aimed at understanding the factors influencing the perpetration of crime. Collection of irrelevant data is what de Vaus (2001, p. 2) refers to as “mindless fact gathering” and while the data might be useful for a descriptive report, it is not adequate for an exploratory study.

The present research explores issues surrounding why the practice of gardening is performed in the way that it currently is. Addressing these *why* questions involves either the construction or testing of theories based on the data collected, using processes of inductive or deductive reasoning respectively (de Vaus, 2001). The grounded theory approach is one example of theory construction whereby the researcher first collects data and then proceeds to build a theory informed by findings from the collected data (see Strauss and Corbin, 1994; Goulding, 2002 for more details on grounded theory). In theory testing like the kind undertaken in the present study, a theory is chosen prior to data collection and it is this theory which then determines what kind of data the researcher collects. It should be noted that these two strategies are not mutually exclusive, as the construction of a theory based on field observations will often need to be empirically tested so as to determine its reliability. The following section examines in greater detail the phenomenological approach which underpins the research methodology adopted in this study.

3.1.1 Phenomenology

Phenomenology, as a methodology, situates itself in opposition to more positivistic methodologies which approach reality as something ‘out there’ to be studied separate from the individual. The primary aim of this approach is to enable the researcher to gain deeper insight into the essence of people’s lived experiences, in relation to a particular social phenomenon. In the present study, the

phenomenon of interest is gardening and I seek to understand how the individuals who perform this routine practice experience their particular performance of it. Understanding the way gardening is currently enacted is a step towards identifying potential avenues through which the practice performance can be influenced to prevent further garden escapes.

Phenomenological research, therefore, takes an interpretative and qualitative form which allows a researcher to delve beneath surface responses in order to get at the true essence of an experience (Ajjawi and Higgs, 2007; Flood, 2010). As a methodology, phenomenology seeks to answer the question “what is this experience like?” and targets seemingly mundane experiences so as to draw out latent meanings (Lavery, 2008, p. 4). A simple observation of the phenomena in question is inadequate in these situations because the aim of the research is to understand participants’ views of it and how this affects their lived experiences. So rather than simply carrying out an observational study of people gardening and then drawing inferences from that observation, I allow gardeners to give their own accounts of their performance. The people who actually perform gardening activities are better placed to explain the decision-making processes that go into it; merely observing from a distance only gives a partial understanding.

So the findings of phenomenological studies largely depend upon participants’ firsthand accounts of their perceptions and experiences of the phenomena, in addition to the researcher’s interpretation. As Goulding (2002) puts it, “the phenomenologist has only one legitimate source of data and that is the views and experiences of the participants themselves” (p. 23). To this end, research participants are only selected and included in a phenomenological study if they have actually experienced the phenomenon under investigation. This is the reason why the main participants sought for inclusion in the present study are gardeners who are actively engaged in carrying out gardening activities. Keeping this objective in mind allowed me to develop a methodological framework which would best suit the exploratory purposes of a phenomenological research design.

3.2 Research methods

This study began with a number of objectives aimed at exploring the reasons why gardening is performed the way that it is, and what implications this might have for the management of garden escapes. Understanding the many details of everyday life and practice, however mundane or habitual it may seem, is a core aspect to human and cultural geography. These types of studies lead to a better understanding of the reasons why humans (and non-humans) act the way they do, and highlight potential points of intervention to change these actions. The following subsections address

the *how-to* issues regarding the conduct of the present study, and provide justification for the methodological pathways followed throughout.

3.2.1 Sampling

My research is based largely upon the reportedly significant role which gardeners play in the ongoing cultivation and spread of garden escapes (Groves *et al.*, 2005; Australian Weeds Committee, 2007). I began the exploratory phase of the study by ascertaining the validity of these reports, and its relevance to the situation within the Sydney Basin Bioregion where the research was conducted. In order to do this, and to apprehend the garden escapes problem from an expert's perspective, I identified a sample of weed managers, starting with existing contacts. I then asked these initial contacts to recommend other weed managers located within the study region, who later contacted me to express their interest in participating in the study.

Expert elicitation was undertaken because it has been shown to be a most useful way of going about conducting studies of complex NRM issues which are characterised by limited empirical data (Kuhnert *et al.*, 2010; Runge *et al.*, 2011). The garden escapes problem presents just such a case because while gardening has been reported to be a major contributor to its persistence (Groves *et al.*, 2005), very little is known about exactly how this happens. Since attempts to stop the cultivation of these plants have so far proved less than successful, it was important for me to first understand managers' perspectives before exploring the actual gardening practice. Talking to weed managers allowed me to gain an understanding of how management organisations not only understand the garden escapes issue but also how they view gardeners' roles in it. For this expert elicitation phase, 15 weed managers, including horticulturists, Landcare team leaders and noxious weeds officers, were identified and interviewed.

Having gained some insight into the state of affairs regarding the continued cultivation and spread of garden escapes, the next phase of sampling was targeted at active gardeners. To be classified as an active gardener, a person had to tend their own private garden and make the decisions regarding the acquisition, planting and management of the garden plants. The resulting technique employed to achieve this was, therefore, purposive or non-probability sampling where only a subset of the target population was purposefully selected to take part in the study. The target population here is the gardening population which might include both active cultivators and passive plant lovers who are more plant admirers and delegate the job, than actual practitioners.

The use of purposive rather than probability sampling techniques in this study was driven by the phenomenological nature of the research, which places emphasis on participants' lived experiences.

The goal, unlike that of other probability or random sampling techniques, is to “enhance understandings of the selected individuals or groups’ experience(s)” (Devers and Frankel, 2000, p. 264). It is worth stating that findings from this research are not meant to be generalizable or even representative of the entire gardening population, but serve only to provide greater insight into the practice. For this reason, and true to the nature of phenomenological enquiry, only participants who have actually lived the gardening experience were included in the study. The resulting participants turned out to be mostly aged over 65 years old, which was not entirely surprising given that they are likely to have more time to dedicate to gardening than younger people. It should be noted, however, there was no age restriction imposed on the recruitment process and every effort was made to include younger people in the study, though with little success. Twenty-seven gardeners, in all, participated in the study and this comprised gardeners who belonged to garden clubs (20) as well as those who did not have club affiliations (7).

In qualitative studies, appropriate sample size is normally determined by the point of saturation encountered during the data collection and analysis phases. This is the point during research when there are noticeably recurrent themes and no new insight is emerging from the data. It is, however, necessary to decide upon an estimated sample size during the research design stage, as this has implications for proceeding with the conduct of the research. In certain grant funded studies, for example, it is a requirement that the projected sample size be specified and justified prior to funding being made available to the researchers. Although no such funding requirements apply to my research, it was still necessary to have a predetermined estimate of the number of participants which would suit a qualitative study of this nature. Following recommendations by Guest *et al.* (2006) and Francis *et al.* (2010), I estimated that a minimum of 10-12 participants would most likely be adequate since it is at this point where saturation has been found to occur. My final sample size was, however, higher than the above recommendations so as to allow for greater rigour in the thematic analysis phases discussed in section 3.2.4 below.

3.2.2 Participant recruitment

I began the first stage of recruitments (weed managers) by calling on two existing contacts, each one located within the Illawarra and Sydney areas respectively. This was done on the recommendation of Devers and Frankel (2000), who suggest that using personal contacts who can vouch for a researcher could prove critical to recruitment success. Both of my initial contacts received a recruitment email explaining what the research is about, and were asked to forward this email on to their own colleagues who might be beneficial to the study. The snowballing process was left entirely in the hands of the participants, such that they were asked to forward the details of the study to potential

participants rather than giving me their contact details. In this way, I could negate any perceptions or feelings of obligation on the part of the other participants, who might feel pressured to participate if contacted directly by me.

This snowballing strategy was very well received and led to the addition of thirteen other weed managers, all of who contacted me expressing a desire to participate in the study. Participants in this group were spread out across the expanse of the Sydney Basin and brought with them varying levels of expertise regarding the management of invasive plants. Included in the group were 3 horticulturists, 4 biodiversity conservation experts, 1 weed inspection officer, 3 Landcare officers and 4 bush regeneration specialists, including volunteers. By incorporating such a diverse range of expertise, I was able to successfully establish a more rigorous knowledge foundation upon which subsequent research explorations could be based.

The next stage of recruitment was targeted at the everyday gardeners within the study region, who make the decision whether or not to cultivate invasive plants in their home gardens. Given that the primary aim of this research is to understand the factors which shape the way gardening is currently performed, I sought to recruit gardeners who are active practitioners. Plant retail outlets, like nurseries, seemed to be a good venue for recruiting such gardeners since they could be approached while in the process of buying garden-related products. This method has been a useful way by which gardeners have been recruited by researchers in other studies (Clayton, 2007; Crochetiere, 2012), so it appeared to have a good potential for success. However, in my case, nursery operators were not keen to have someone 'bothering their customers' and were, therefore, unwilling to grant permission for this to go ahead. This meant that I had to devise another means of recruiting gardeners for my study.

With the failure of the 'intercept' method described above, I turned to garden clubs as my next potential recruitment site. These clubs are commonly understood to be a congregation of people who love gardening, so it stood to reason that it might offer a means of recruiting gardeners. I began by contacting Garden Clubs of Australia, in order to access the individual clubs located within the Sydney Basin (Devers and Frankel, 2000; Groenewald, 2004). To this end, I sent a recruitment email to the organisation's website hoping that they would in turn forward it to the relevant garden clubs who would then inform their members. However, I was informed in a reply email that theirs was not an umbrella organisation and that each garden club exists independently of them. I was further advised, by the organisation, to contact each club individually if I hoped to be able to access and recruit their members.

Having identified a number of garden clubs located in the Sydney Basin, using the Clubs of Australia website, I proceeded to contact each one by email and phone, explaining my research objectives. A number of them responded with an invitation for me to attend one of their monthly meetings, where I could then introduce the research and address in person any queries members might have. I honoured these invitations and was able to successfully recruit a total of 20 gardeners, through their garden clubs. This was, however, not the end of my recruitment attempts as I was unsure as to whether the fact that all 20 belonged to garden clubs would mean that they all exhibited similar gardening attributes. To address this uncertainty, and to determine if and how group affiliations might affect gardeners' approach to the practice, I decided to also include gardeners who were not members of any garden club.

Recruitment of gardeners who were not garden club members presented an initial challenge, due to the failure I had already experienced during previous attempts to recruit through nurseries. I eventually came to the realisation that in order to reach this group of gardeners, I would need to employ a different recruitment method. In a study by Freeman *et al.* (2012), broadcast media was one of the tools employed to recruit gardeners so I decided to adopt the same strategy, specifically using radio broadcast. To this end, I contacted Gardening Australia, a popular gardening programme run by ABC Radio, using an email form found on their website. In the email, I included my contact details and explained what my research is about, also specifying the type of gardener I was interested in. That is, those who are not members of any garden clubs. These details were broadcast across the Sydney Basin, during the weekend programme, and listeners who fit the criteria were encouraged to contact me if they were interested in participating in the study. Again the choice to participate was left entirely up to the gardeners, with no pressure whatsoever. This radio recruitment method yielded 7 additional gardeners who provided me with a group of gardeners who are not garden club members.

3.2.3 Data collection

One important objective of this study is to explore weed managers' and gardeners' perceptions of the practice of gardening, by allowing participants to give first-hand accounts of their experiences. This objective necessitates the use of qualitative rather than quantitative research tools, due to the inability of the latter to allow the kind of detailed and subjective responses which the study calls for. At the start of the data collection process, participants were invited to complete a short survey which served mostly as a type of ice-breaker to put the participants at ease. These surveys also helped to get them thinking about the topic for discussion, and have been shown to be a useful

instrument for eliciting gardening-related information and invasive plant knowledge (Kelley *et al.*, 2006; Conklin and Drackett, 2011; Barnidge *et al.*, 2013).

Although the above introductory surveys helped to 'set the scene' in the minds of the participants, the main method of data collection used in this study was face-to-face semi-structured interviews. These interviews were all audio-recorded using a voice recording device, and each one ranged in length between 30 minutes and 1 hour. The use of voice recorders, in contrast to note-taking, allowed me to fully concentrate on the responses given and also engage with the participants, while staying alert to potential cues for further exploration. The small and inconspicuous size of the audio-recorder also meant that participants did not have to be as self-conscious as they might otherwise have been if I were using a larger recording device.

Before being interviewed, participants were provided with an information pack containing necessary details about the research and researchers, as well as consent forms which required their signature. These have been provided as appendices to this thesis document (Appendix C, D and F). Getting the written consent of the research participants, prior to the interviews, ensured that they knew what was expected of them and that they could also withdraw at any time without penalty. The choice of location for the interviews was left up to the participants, who were encouraged to pick a time and place that best suited them. For some, the preferred location was their place of work, while others preferred their homes where they could show me their gardens. I hoped that by allowing them to pick the time and place for the interview, I would be making it more convenient for them and any perceived burden on their time or person would be minimised.

In order to elicit as much information as possible from the participants, regular face-to-face interviews were also augmented by walk-through interviews, in which 25 gardeners participated. This entailed walking with the gardeners through their gardens, while they described the processes and decision-making that went into the cultivation of the plants present in the garden. This type of walking interview, as Hitchings (2003) explains it, allows both participant and researcher to be "constantly reminded of the material presence of the plants in the garden" (p. 103). Given that non-human materials is one of the core elements investigated by the practice approach adopted in the present study, this aspect of the interview process was useful for fulfilling this objective. So, according to practice theory, a garden is essentially more than just the product of the gardener's efforts alone; it is also dependent on the agency of its non-human inhabitants. This is a point stressed by Power (2005), in support of walk-through interviews. She sees merit in this type of interview as a way of ensuring that non-humans are always present in conversations about gardening practices, which are inevitably influenced by non-human agency.

With continuing interests in everyday activities, such as walking (Waitt *et al.*, 2008), shopping (Young *et al.*, 2010), eating (Edensor and Falconer, 2014) and showering (Shove and Walker, 2010), interviews remain a widely used research instrument for social researchers. This qualitative data collection tool enables researchers to elicit information from participants who are encouraged to express, in great detail, their views and experiences of a particular issue (Kajornboon, 2005). It has, however, been argued that because these practices, like gardening, are usually performed without conscious thought, the use of interviews only ever gives an incomplete account of the practice (Thrift and Dewsbury, 2000; Waitt *et al.*, 2008; Hui, 2012). The suggestion here is that interviews are only ever effective when augmented by the use of another data collection method, such as diary entries, video recording and participant observation.

To counter this perception, Hitchings (2012) carried out a re-examination of his own previous research into everyday practices where interviews were adopted as the data collection method. This exercise revealed that while it may sometimes be tricky to get people to talk about mundane practices, it is by no means impossible and people can indeed talk about practices when interviewed. He gave some suggestions on how best to garner a revealing account of everyday practices using interviews, and called on other researchers to empirically test the efficacy of interviews in their own studies. Humair *et al.* (2014) also point out another benefit of face-to-face interviews in that it allows participants to uninhibitedly express their views, without the group biases which might be inevitable in focus groups. Some of Hitchings' (2012) suggestions which I drew upon in my own interview process are clarifying the research aims, asking seemingly obvious questions and allowing adequate time for responses. This enabled me to ensure that the most in-depth accounts of the gardening practice could be given by the study participants.

During the development of the gardeners' interview schedule, questions regarding invasiveness and invasive plant management were introduced in latter stages of the interview. This was deliberately structured to avoid a misperception by participants that my role involved being 'weeds police', which might then cause them to balk at going ahead with the interview. So the purpose for this delay was not one of deception but rather assurance. I wanted participants to understand that the research objectives had more to do with their gardening practices and decision-making than any attempt to catch them in possession of invasive plants. So by using this strategy, I hoped that any such fears would have been allayed by the time the interview progressed to the section on invasive plant management, such that they could still talk unreservedly.

Two different interview schedules were used during the data collection stage: one for the weed managers (Appendix G) and another for the gardeners (Appendix H). The goal of the weed

managers' schedule was to create baseline knowledge about the issues and concerns relating to the ongoing cultivation and spread of garden escapes in their particular area. The structure of the schedule went from general to more specific questions, beginning with background information about their job description. Next, I asked questions about particular garden escapes of concern to them and finally rounded out the interview with a set of questions that invited them to talk about their management strategies. The questions in this schedule were open-ended to encourage utmost elaboration, and the information elicited from the weed managers informed the development of the second interview schedule.

The questions contained in the gardeners' interview schedule were grouped into three sections, all focused on different but related aspects of gardening performance. The interviews began with a set of general questions about the processes that went into the establishment of participants' gardens; whether the gardens had indeed been initiated by them or were inherited. The next lot of questions were about specific activities and was aimed at understanding gardening competences, the second practice element investigated as part of this research. So participants were invited to talk about how they obtain information about gardening-related issues, as well as their perceptions of particular gardening enactments such as dumping and plant swapping.

The third section of the gardeners' interview schedule was focused on invasive plant cultivation and management. I wanted to know what the awareness levels were amongst the gardeners regarding the invasiveness of certain plants and what they thought about such plants, if they did think about them at all. The nature of the questions in this interview schedule was also open-ended, so as to encourage elaboration on the thoughts and opinions of the gardeners. Gaining insight into these mental associations which gardeners make, regarding their gardening, was important for addressing the third practice element of meanings which this study also investigates. Having open-ended questions enabled me, as the researcher, to avoid leading participants in any way, although I used prompts when necessary to draw them back to the topic at hand, if they veered off topic.

3.2.4 Data analysis

The audio recordings of each interview were initially transcribed verbatim using the transcription software, Express Scribe. These transcriptions were then checked for accuracy by reading through the transcripts while listening concurrently to the audio recordings, which ensured that I did not miss any part of the participants' responses. Following the transcription of the recordings, I did a lot of iterative reading of the transcripts in order to familiarize myself with the content of participants' responses. Also, despite obtaining consent from participants to use their responses in the writing or

publication of my findings, all audio files and transcript materials were anonymized during analysis and writing. Only after doing all of this did I proceed with the subsequent stages of data analysis, which are described below.

The analytic process for this research took the form of thematic analysis, which has been described as “a method for identifying, analyzing and reporting patterns (themes) within data” (Braun and Clarke, 2006, p. 79). The process was facilitated by the use of the qualitative data analysis software, NVivo, which has been shown to be a most efficient way of dealing with qualitative data (Ajjawi and Higgs, 2007; Minato *et al.*, 2010; Paddock, 2015). Bhattacharjee (2012) describes this type of software as a “way to quickly and efficiently organize, search, sort and process large volumes of text data” (p. 117). He does, however, caution that these software programs cannot perform the actual analysis for the researcher or give interpretations for the data input, points which are duly acknowledged here. All interview transcripts were, therefore, imported into NVivo and further analysis was guided by the six-step process outlined by Braun and Clarke (2006).

The first step in my thematic analysis began with the transcription of the audio recordings of interviews and followed on to the previously mentioned iterative reading of interview transcripts. I chose to carry out this task myself so as to enable me fully immerse myself in the contents of the transcripts, and thereby familiarize myself with the participants’ responses. This immersion is an important aspect of the analytic process because subsequent steps are founded upon initial understandings of the transcribed responses (Braun and Clarke, 2006). Whilst reading and re-reading the transcripts, I also ensured that I took notes about possible ideas and patterns of meanings which might prove to be of some relevance to the rest of the analysis. Having conducted the interviews myself, I came into the transcription phase already possessing some ideas about the participants’ responses and this helped in the execution of the next analytic step.

In step two, my focus was on exploring the transcripts and selecting bits of the text that appeared relevant to the research question and aims, thereby creating initial codes of the material. Codes here refer to selected words, phrases or sentences which represent essential aspects of a particular data item, in this case the interview transcripts. The collection and categorization of codes led to the generation of themes, which Saldaña (2012) defines as “an *extended phrase or sentence* that identifies what a unit of data is *about* and/or what it *means*” (p. 175, emphasis in original). This initial coding was done in a somewhat loose manner since the purpose was to more generally highlight all relevant text in the transcripts, what Attride-Stirling (2001) calls basic themes. The more critical identification of themes is, however, the purview of the following three steps which do this in a necessarily recursive fashion.

The development of themes and the actual interpretation of the transcribed data began in the third step of thematic analysis. The objective here was to organize the codes identified in the previous step into clusters or groups that relate to the same or similar issues, thereby creating organizing themes (Attride-Stirling, 2001). By going back over the codes previously selected, I was able to make categories or themes which served the purpose of explaining what the inherent groupings of codes were about. The themes generated in this step are not definitive, in the sense that they might not remain as they are but might be subject to a reshuffling further down the track. As Braun and Clarke (2006) put it, "some initial codes may go on to form main themes, whereas others may form sub-themes, and others still may be discarded" (p. 90). So these themes only served to organize the long list of codes generated in the initial coding step into workable categories which made further interpretation more feasible.

Step four is where the review and reshuffling of organizing themes happens as they are reexamined to determine their legitimacy, refining where necessary. During this step, I went back over all the previously identified themes and the codes therein to determine whether they all belonged in their assigned locations and had been coded appropriately. The essence of reviewing themes in this way was to check that basic themes did indeed fit their organizing theme and vice versa, although this is only one aspect of the reviewing process. Considering the fact that the culmination of thematic analysis is satisfying the research goals, the codes and themes also have to be checked against the research aims to ensure that they are still in alignment. This step also gave me the opportunity to include previously uncoded pieces of relevant data which, upon closer examination and with greater insight, now appeared relevant. Once I was satisfied with the arrangement of codes and themes, I moved on to the third 'thematic' step.

By step five, I had put together a diagrammatic representation of the arrangement of the basic and organizing themes, showing how they all related to each other (Appendix J). Doing this allowed me to visually ascertain that the codes and themes were grouped in such a way that each one was geared towards putting forward the main argument of the research. Thinking about it like a thematic network, the basic themes are the outermost codes which cluster to form organizing themes which, in turn, when grouped, form a global theme (Attride-Stirling, 2001). So the global theme is a group of organizing themes which, together, push forward the main argument for the conduct of the qualitative research. Upon reaching this step, I checked to make sure that each organizing theme was able to stand alone but was also related to one another with minimal overlap. Names and definitions of themes were also finalized in this step, ready for the next phase of the thematic analysis which is the reporting of findings.

The final step of thematic analysis, as with any other research methodology, is the writing up of the findings of the research. The diagrammatic representation of the thematic analysis created in the preceding step helps, in this step, to provide a sort of structure or framework which guides the writing process. “Follow the thing” methodology was especially useful for writing up the findings on the material elements of gardening, as it has been shown to be a useful way of apprehending objects used in a practice (Hui, 2012, p. 200). In proceeding with this step, compelling samples of text extracts were carefully selected from the codes identified in the transcripts, in order to demonstrate the arguments made within the report. Here, the completed thematic analysis is checked against the research questions and relevant literature so as to give not just a descriptive account of the findings but also a comparative and analytical one. The entire analytical process was ultimately geared towards the production of the final report, which takes the form of this dissertation.

3.3 Ethical considerations

The code of ethics which guide the conduct of research may differ across disciplines; what is permissible in science may not be in the social sciences. However, the conduct of any research involving humans has, at its core, the same ethical requirement which the medical practice does and that is to ‘do no harm’ to the participants involved. Harm here does not just refer to physical hurt, but also includes embarrassment or any sort of psychological distress resulting from their participation in the study. Due to the sensitive nature of human research, there are a number of protocols put into place at institutions such as the University of Wollongong, to ensure ethical propriety in research. The following subsections outline some of the ethical concerns which are relevant to my study, and the steps which I took to address them.

3.3.1 Institutional ethics

Before proceeding with the recruitment and interview of research participants, it was necessary that I seek approval for my proposed recruitment strategy and interview procedure. To achieve this, I provided all the necessary documentation relating to the field work aspect of my study to the Human Research Ethics Committee, the approving body within the university. As part of this ethics application process, I was required to clearly detail the objectives of the study, what methods I would be employing and how the generated data would be handled and stored. Approval was also subject to an annual (re)evaluation of the initially proposed methodologies, which could be amended or augmented in the event that a modification is needed.

A core requirement for the conduct of any research involving human participants is the protection of the rights and safety of the people involved. So prior to conducting interviews with my research

participants, I ensured that they were provided with an information pack containing details about the research and its objectives. Through this means, they were also informed of any expectations I, as the researcher, might have of them and could then decide whether they would be able to meet those expectations. After reading through the information provided about the research aims, if they decided to go ahead with participating in the study, they were then issued with a consent form which required their signature.

3.3.2 Fieldwork ethics

The consent form (Appendix F) is a way to formally document the participants' willingness to be involved in a study and confirms that they are doing so voluntarily, without undue coercion from the researchers. It states that the researchers have fulfilled the ethical requirement for full disclosure pertaining to all aspects of the study, and that the participants have had the opportunity to clarify any uncertainties. The contact details for the researchers as well as the university ethics approval committee are also provided in the consent forms, in the event that participants develop any concerns or complaints. Since there may sometimes be sensitive issues discussed during interviews, participants are also given the option here to choose whether or not to be identified as the source of information. So confidentiality is assured, should they require it.

At the start of the recruitment process, some participants developed the notion that I was working for the weeds authorities, and was somehow there to see what weeds they had in their garden. It was, therefore, important to reassure them that I was not in any way affiliated with the weeds authorities. The participants also reported that they found it reassuring to know that they could opt-out of the study, should they wish to do so at any time, without any sort of penalties. In the interest of full disclosure, I also made them aware before proceeding with the interviews that they were going to be audio-recorded so as to allow me accurately capture their responses. They were all happy for this to happen and seemed unfazed by the prospect. Every one of the interviews ended with an invitation for the participants to express any concerns about the research or thoughts previously unexplored, so they could fully have their say.

3.3.3 Ethics in reporting

Despite obtaining consent from some participants, pseudonyms were used in place of participants' names during the data analysis and writing up of the findings. This was done to ensure participants can in no way be identified by the readers of the report simply from their responses or the descriptions given. This means that a reader who is a weeds inspector, for example, cannot target specific houses within the study region, based on the reported presence of certain invasive plants in

their gardens. Bhattacharjee (2012) stresses how important it is to remove any identifying information about participants from research reports, by citing two admittedly extreme examples which were taken to a court of law.

3.4 Summary

This chapter began with a discussion about the research design which underpinned my exploration of gardening practices and invasive plant management within the Sydney Basin. The phenomenological design of the study, which is aimed at eliciting firsthand accounts of gardening experiences from active gardeners, also had implications for the methodological choices made. All of these implications were suitably discussed, with explanations given for the decisions taken. One requirement of phenomenology is that only participants who have actually lived the gardening experience can be included as part of the research. This meant that only active gardeners, most of who turned out to be aged over 65, were purposively sampled and recruited for participation in the study. It is the enactments of this active cohort, regardless of their age, that has the potential to effect a change in overall performance since they are the ones involved in gardening activities. The recruitment strategy was also elaborated upon, with justifications given for the sampling techniques chosen, which included both garden club members and non-members.

Although the main data collection instrument was audio-recorded semi-structured interviews, short surveys were also initially administered to the participants and served as a sort of ice-breaker. The audio data were then transcribed and analysed using the six-step thematic analysis outlined by Braun and Clarke (2006), which was facilitated through the qualitative data analysis software, NVivo. Finally, the chapter addressed some of the ethical concerns which were taken into consideration before, during and after the fieldwork component of the research. Before moving on to report the findings from interviews conducted with gardeners, the next chapter first gives an overview of the way the Australian horticultural industry is currently structured. Findings from initial interviews with weed managers located within the Sydney Basin are also presented to offer some insight into the way they perceive and approach the problem of garden escapes.



Plate 2: Some of the garden escapes encountered in participants' gardens (top-left: Cotoneaster, top-right: Agapanthus, bottom-left: Seaside daisy and bottom-right: Japanese honeysuckle).

CHAPTER 4

Weed management strategies: existing frameworks guiding the prevention and control of garden escapes.

Introduction

This chapter focuses on the various strategies which have previously been employed in the management of invasive garden plants and weeds in general. Its purpose is to determine how effective these strategies have been in the past, and also demonstrate what needs to be done in order to improve management outcomes. The chapter begins with a description of the Australian horticultural industry and the various organisations which give it structure, so as to highlight any existing regulatory or monitoring potential. Attention is then turned to the various levels at which invasive plants are managed, with particular focus on the roles and responsibilities of stakeholder groups at each management level. What follows is an examination of the main strategies which have been considered and implemented in the past to curtail the ongoing sale and cultivation of invasive garden plants. Finally, the findings from interviews with weed managers are presented to offer some insight into their perceptions of the garden escapes problem, given that they deal with the impacts of these plants.

4.1 Organisational and regulatory structure within the Australian garden sector

The main purpose of this section is to provide a baseline understanding of the state of the Australian horticultural industry, as it pertains to the sale and cultivation of garden plants. Monitoring and regulatory mechanisms will, therefore, be examined to discover how they influence the way gardening is currently enacted in Australia. The two groups of interest here are the nursery and garden industry, and gardening groups because they both present opportunities for monitoring the activities of nurseries and gardeners. In other words, these groups are highlighted because they represent the stakeholders who are most implicated in the spread of invasive garden plants; that is, nurseries and domestic gardeners (Groves *et al.*, 2005; Australian Weeds Committee, 2007).

4.1.1 Nursery and Garden Industry

The sale and cultivation of plants in Australia remains largely unregulated by any governing body due to the fact that there are numerous, and differently scaled, plant retail outlets (DPI officer 2016, pers. comm., 25th February). At one end of the spectrum, there is the large scale nurseries, such as the Sydney Plant Market and Hargraves Nursery located in the Sydney metropolitan area. On a much

smaller scale, however, there are people who simply propagate plants in their backyards and take them over to the local markets and fetes for sale. Keeping track of all these retail outlets has proven to be a challenging task for governing agencies like the Department of Primary Industries (DPI), especially because it depends on nurseries voluntarily registering themselves as such. This difficulty has contributed to the current lack of regulation apparent in the nursery industry and has led to a different kind of structure, albeit one that is more to do with support than regulation.

The Nursery and Garden Industry Australia (NGIA), according to their website, are “the peak industry body representing commercial growers, retailers and suppliers in Australia.” This organisation serves in a capacity similar to any workers’ union; that is, as a support group to which commercial nurseries can become members in order to derive benefits like industry representation. Member nurseries also, reportedly, have greater access to expert consultants who can provide them with specifically tailored advice regarding ways to maximise productivity while reducing cost. The latter is one of the main selling points for getting nurseries to become members of the NGIA, in contrast to the other nurseries which remain independent of them. Membership is, however, voluntary on the part of the nurseries and, as a result, not every plant grower or retailer in the country belongs to such an organisation.

The NGIA role as ‘peak industry body’ in commercial horticulture has enabled it to pursue industry initiatives, including those relating to plant choices and the issue of invasiveness. Notable initiatives in which the NGIA has been involved include the development of recommended plant lists for sale and cultivation, as in the *Grow Me Instead* publications (Kachenko, 2013). These lists are available across all states and territories, and suggest particular plants which cater to local conditions and which possess characteristics that are considered by gardeners to be desirable. There are also biosecurity initiatives, such as the *National Nursery and Garden Industry Biosecurity Plan*, which the NGIA developed in collaboration with Plant Health Australia (PHA) (NGIA, 2016). The aim of this plan was to enable stakeholders within the Australian horticultural industry to pre-empt and be better equipped to deal with pest plant incursions.

So although there is no established regulatory system for monitoring the sale of garden plants, the existence of such groups as the NGIA brings some level of organisation to the trade. The involvement of the NGIA in research and development of plant initiatives, alongside government and other industry representatives, also allows access to nursery accounts of sales experiences. This is an important aspect in specifically tailoring strategies to suit consumer preferences and is knowledge which only people (nurserymen) who deal with said consumers would have. There are branches of

the NGIA all across Australia in the states and territories, and each one strives to provide more localised support services to their member nurseries.

4.1.2 Gardening groups

Difficult as it is to monitor the activities of plant retailers, it is an even harder task to keep track of the gardening activities enacted within domestic spaces. Moreover, active and enthusiastic gardeners often become members of gardening groups which align with their individual motivations for engaging in the practice. For example, a gardener who is passionate about growing native plant species might be drawn towards a group that promotes the cultivation of native Australian plants over other exotic species. Belonging to a gardening group also presents gardeners with the opportunity to share their passion with other people who have similar interests. For these reasons, and more besides, there are now quite a number of groups which are specifically dedicated to different gardening styles and attract gardeners accordingly.

The largest and, perhaps, the most obvious gardening group is the Garden Clubs of Australia (GCA), an organisation comprising most of the garden clubs in Australia. It is a largely volunteer-run non-profit organisation which was formed in 1950 by Mrs Margaret Davis OBE, as a way of bringing the culture of gardening to the wider community (GCA, 2016). There are now over 670 clubs and 45,000 individuals affiliated with the GCA and, as a result, it offers one of the most diverse platforms for accessing gardeners with varying predilections. The popularity of the GCA might also be attributed to its widely promoted emphasis on the social benefits of gardening, made evident by the organisation's motto - "Friendship through Gardens". Clubs affiliated with the GCA are also not as specific in their membership criteria as some of the other gardening groups which only cater exclusively to a particular type of gardener.

The Australian Native Plants Society (ANPS), for example, is popular among gardeners who exhibit a preference for endemic Australian plant species. Formerly known as the Association of Societies for Growing Australian Plants (ASGAP), this group was founded in 1957 by Mr. A. J. Swaby, a native plant enthusiast who was based in Melbourne (Hockings, 2016). As the title suggests, and as advertised on their website, this group is specifically focused on the "cultivation, propagation, conservation and appreciation of Australia's native flora". It is a gardening group which would be especially attractive to gardeners who own native gardens and/or are looking to broaden their knowledge of native plant species. They also offer additional resources such as publications, seminars and biennial conferences, all of which are geared towards demonstrating to participants the rich diversity of the Australian native flora. The specificity of the ANPS could be considered a negative attribute which

precludes non-native gardeners. However, existing affiliations in all states and territories would suggest that the group is still very much favoured amongst native plant cultivators.

About two decades after the establishment of the ANPS, The Diggers Club was formed in 1978 by Clive and Penny Blazey, a husband and wife duo particularly passionate about sustainable gardening (Diggers, 2016). The couple were initially motivated by a desire to reduce public dependence on chemically treated, commercially grown food and described the organisation as “a club for subversive gardeners”. The aim of the club is very much sustainability-centred and the founders seek to “help our members grow beautiful and sustainable gardens”, as a way of reducing the effects of climate change. There are now several club-owned gardens in Australia which serve to trial plants in various conditions so as to provide members with seeds and plants which are suitable for their particular location. With climate change issues being at the forefront of sustainability discussions today, this is a club that would no doubt appeal to the more environmentally conscious gardener.

The gardening groups mentioned above are only three of many to which gardeners belong, although not every gardener necessarily belongs to a club. However, the fact that so many do suggests that groups like these might hold some potential for monitoring the activities of individual gardeners, as a way of preventing the cultivation of invasive plants. This monitoring happens across various levels of government and society, with each stakeholder level having particular roles and responsibilities regarding the management of garden escapes. In the following section, management jurisdictions will be explored to understand how each stakeholder group contributes to the overall prevention and eradication of garden escapes.

4.2 Management responsibilities across various stakeholder levels

Managing the spread and wide-ranging impacts of invasive plants is a costly endeavour that has to be the shared responsibility of all stakeholders, governments and individuals, if it is to be successful (Australian Weeds Committee, 2007). In Australia, invasive plant management is carried out across various levels of government and industry, guided by a number of policy directives and legislations. These legislations inform stakeholders of their roles and obligations regarding the control of garden escapes and encourage collaboration across sectors, in order to ensure efficacy. The following subsections give a brief description of the relevant stakeholder levels at which invasive plants are managed, as well as some of the strategic tools which enable them to fulfil their roles.

4.2.1 National and International

The Australian Weeds Strategy (AWS) is a national guiding framework for invasive plant management in Australia (Australian Weeds Committee, 2007). This document, administered by the Invasive Plants and Animals Committee (IPAC), outlines multi-level collaborative strategies required to keep Australia's assets secure from the impacts of plant invasion (DoE, 2014). IPAC members comprise stakeholders from government, states and territories, industry and communities, so as to ensure that each interest group is adequately represented on the committee. The primary aim of this committee is to facilitate a coordinated national approach to the prevention and management of the spread of invasive plants (and animals). The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Quarantine Act 1908* support this aim by regulating plant and animal imports (Australian Weeds Committee, 2007).

Australia is also a signatory to a number of international conventions which require that steps be taken to protect the nation's biodiversity, and reports be given on its invasive plant status. Some of these conventions include the International Plant Protection Convention (IPPC) and the Convention on Biological Diversity (CBD). The IPPC is aimed at preventing the introduction into a country of pests of plants and plant products. This includes invasive plants which both threaten floral and faunal habitats and also compete with desirable species for establishment in the local environment (Schrader and Unger, 2003). Since plants spread by deliberate international trade and accidental movement via attachment to mobile media, this convention also makes provisions for governments to protect their plant resources. The goals of the CBD are similar to those of the IPPC, as regards plant protection, though its main purpose is ensuring the conservation and sustainable utilisation of biological diversity.

4.2.2 State and Territory

State and Territory governments are tasked with facilitating responsible weed management within their borders, and preventing the inter-state movement of invasive plant species. Some of the strategies employed in tackling these objectives include setting up educational programs and offering management incentives to landholders who are impacted by these plants. There are also assistance schemes such as grant funding, which serve the purpose of supporting the efforts of councils and individual landholders to control weeds on their land. These governments are also responsible for implementing national weed management priorities, such as the prevention and eradication of Weeds of National Significance (WoNS).

The WoNS are a list of 32 nationally identified priority plant species which need to be actively suppressed due to the significant environmental and agricultural damage which they cause (Glanznieg *et al.*, 2004). In addition to this WoNS list, states and territories also have a noxious weeds list which identifies state-prioritised invasive plants causing detrimental effects to the state environment or economy. The NSW Invasive Species Plan 2008-2015 and the NSW Biosecurity Strategy 2013-2021 are examples of state initiatives which direct the prevention and eradication of introduced weeds (Paul *et al.*, 2012; Gordon, 2014). The main purpose of these strategies is to evaluate and strengthen, where necessary, existing approaches to weed management in order to achieve the state's biosecurity goals. These goals have to do with successfully managing biosecurity threats like plant and animal pests, diseases and weeds, all of which require cross-jurisdictional cooperation.

There is also the *Noxious Weeds Act 1993*, which is the main driving legislation behind the implementation of weed management strategies. According to the Act, invasive plants are grouped into five classes based on presence, impact and likelihood of spread. Control requirements for these plants range from outright eradication and complete suppression (Class 1) to restricting, as much as possible, the sale and movement of the plants within affected areas (Class 5). In NSW, this Act is administered by the Department of Primary Industries (DPI) but the implementation of its statutes falls to the Local Control Authority (LCA) within the relevant area. Of particular concern for these LCAs are invasive plants in Class 1, 2 and 5, which are prohibited from sale because of the threats which they pose to primary production and the local environment.

4.2.3 Local and Regional

Local governments have an on ground presence and awareness of weed occurrences which higher level governments might struggle with. This places them in a much better position to expedite control strategies by drawing on a closer proximity to affected areas and the relevant land owners. In line with this, and under the *Noxious Weeds Act 1993*, local governments are responsible for implementing and enforcing the identification and control of noxious weeds within their local area. Councils employ dedicated weed managers who routinely inspect both private and public lands to ensure that landholders meet their legal obligations to control noxious weeds on their property. These inspections also present avenues for opportunistic education whereby weed managers advise landholders of best management practice for particular invasive plant species.

Local governments also play a supporting role for volunteer groups like Landcare and Bushcare by providing much-needed on ground training and weed management expertise. In addition to this, they also devise various strategies for raising public awareness of invasive plants using means such

as social and mass media, stalls at community markets and information brochures. There are some occasions, however, where management strategies are better implemented regionally than locally and councils may decide to collaboratively tackle their weed management objectives. The Illawarra District Noxious Weeds Authority (IDNWA) is one such collaboration and has been the local weed control authority for the Illawarra region since 1993. This group of weed managers draws from Wollongong City, Shellharbour City and Kiama Municipal Councils, and purposefully focuses on addressing the weed management obligations of the region.

4.2.4 Research and Innovation

The majority of the weed management strategies mentioned above are reliant upon ongoing Australian and international research, which help to determine the invasive potential of these plants. Understanding relevant plant characteristics as well as possible invasion pathways, based on studied invasion elsewhere, gives a good indication of the likely success of management strategies. There is, therefore, a need for continued collaboration between policy-makers and the researchers who study invasive plant characteristics and associated responses. The Weeds Risk Assessment (WRA) process which is used to assess the invasive potential of plant imports is, after all, the result of scientific research into plant characteristics and invasion elsewhere (Steinke and Walton, 1999). This WRA process is essentially the main biosecurity tool for determining whether or not to allow the importation of unknown plants into the country.

As described in the previous section (4.1.1), the horticultural industry has also taken innovative steps toward preventing the introduction of invasive garden plants through nursery sales. One notable example is the 'Grow Me Instead' series of gardening guides which provide gardeners with information about popular garden escapes and presents them with non-invasive alternatives. With assistance from state governments and industry professionals, there are now 'Grow Me Instead' publications specifically targeting garden escapes in different regions within each state. The main idea behind this initiative is to show gardeners that non-invasive plants can also possess the same desirable characteristics which they would otherwise find in garden escapes.

4.2.5 Communities and Individuals

Volunteer groups like Landcare and Bushcare are comprised of members of the community with a passion for restoring natural environments which have been impacted by invasive plants. Although no exact figures have been reported, studies have shown that volunteer efforts in groups like these contribute significantly to invasive plants management (Sinden *et al.*, 2004; Masson *et al.*, 2005). The work of these volunteers assists other remediation efforts by providing the labour and manpower

needed for the accomplishment of weed management goals. Without volunteer assistance, already limited resources would be further stretched to meet labour requirements. It must be noted, however, that these people often have little or no technical weed management expertise so, as Masson *et al.* (2005) point out, there still needs to be ongoing government support. This will ensure that the volunteers get the training they need in order to perform the required tasks appropriately, using the right techniques.

4.3 Previously implemented management strategies

As earlier mentioned, the *Noxious Weeds Act 1993* is the main legislative instrument which guides the formulation of strategies to control the spread of invasive plants. The objectives of this Act are two-fold: to reduce the impact of weeds by establishing control mechanisms and also to provide for monitoring and reporting on the effectiveness of those mechanisms. Based on these objectives, a number of strategies have been developed and implemented within NSW, the more notable of which are examined below. These strategies are usually geared towards engendering voluntary conformity and, as a result, rely upon nurseries voluntarily removing garden escapes from sale and gardeners avoiding their cultivation. This, of course, presupposes that stakeholders approach gardening in a rational manner such that information provided, regarding plant invasion, would result directly in preventative action being taken. However, as detailed in Chapter 2, there are other underlying practice elements which have not been accounted for, thereby making this presupposition incomplete at best.

The loose structure of the Australian horticultural industry and the limited coverage of the NGIA are yet other factors which prevent voluntary initiatives from being successful or effective (Moss and Walmsley, 2005). This is because there is an inherent tendency for stakeholders involved in any sort of collective action to free-ride, which would result in some groups being disadvantaged by the inaction of others (Olson, 1965; Monge *et al.*, 1998; Reuben, 2003). Notwithstanding all of this, voluntary measures have often been considered to be more palatable to stakeholders, which would explain why weed management strategies have tended to favour them. The following subsections examine more closely some of these strategies, so as to determine how effective they have been at managing garden escapes and highlight any potential areas for improvement.

4.3.1 Grow Me Instead (GMI)

The 'Grow Me Instead' (GMI) publications are the result of a consumer awareness campaign developed by the NGIA, with assistance from the Australian Government (Kachenko, 2013). This campaign was initiated as a way of educating the gardening public about popular but invasive

garden plants and presenting gardeners with alternative, non-invasive species. As a result, there are now state-specific booklets which identify garden plants that are common to a particular area and which have the potential to become harmful environmental weeds. Being an industry-driven initiative, the GMI scheme has been touted as a more acceptable alternative to other externally-imposed mandatory options such as a national plant labelling system (Glanzrig, 2006; Crochetiere, 2012). The fact that it is a voluntary scheme is also slated to appeal to the commercial sector of the horticultural industry, which has been shown to prefer voluntary initiatives over prohibitive legislations (Baskin, 2002). However, as mentioned earlier, this can also be a limitation.

Another celebrated success of the GMI program is the fact that it demonstrates stakeholder collaboration and intention to better manage and reduce the spread of garden escapes (Australian Weeds Committee, 2007). Its straightforward structure also potentially makes it more likely to influence the plant choices made by gardeners since it succinctly describes the problems associated with invasive plants and offers alternatives. This means that gardeners can obtain all the information they need to make better-informed plant choices, without being put off by the prospect of elaborate and possibly testing searches. Of course simply providing easy-to-read information, regarding plant invasiveness, does not automatically mean that gardeners would or do follow the recommendations contained in the GMI booklets. The strategy also partly rests on the presumption that this information will be sought by its target audience, which may not be the case.

Although the promotion of alternative plant choices has been suggested as a way of changing consumer demand for invasive species (Drew *et al.*, 2010), no studies have been carried out to prove its effectiveness. Crochetiere (2012) did, however, conduct a study in Canada to determine whether the promotion of alternative plants in garden centres would in fact reduce the sale of invasive species. Her findings revealed that while gardeners did express an awareness of the detrimental impacts of invasive plants and the need to avoid them, this did not translate into the plant purchases they made. Invasive plants continued to be bought from the garden centres in spite of reported awareness among gardeners. Similar conclusions were also drawn by Palma *et al.* (2011), whose investigations revealed that vibrant colours, price and low maintenance were more important considerations for gardeners than invasiveness. In both studies, reported plant purchases were determined by factors other than a concern about potential invasiveness. This would suggest that the approach adopted by the GMI program in promoting alternative species might not achieve the desired outcome of preventing the cultivation of garden escapes.

4.3.2 Garden Plants Under the Spotlight (GPUS)

GPUS is another strategy which was collaboratively developed by the horticultural industry and the Australian Government to tackle the spread of invasive garden plants (Burnett and Roush, 1999). The emphasis of this strategy was on restricting the sale of garden escapes, by educating stakeholders and identifying species which should be removed from nursery shelves (Moss and Walmsley, 2005). However, unlike the GMI strategy, GPUS did not proceed past the development stage and was, therefore, never fully implemented, although several recommendations were made during its proposal. These revolved around the creation of a 'Garden Thugs' list, a composition of 52 invasive garden plants considered to be unsuitable for domestic cultivation and which ought to be made unavailable for sale (Atkinson, 2000). It was thought that creating such a list would provide a more definitive way of restricting the sale of garden escapes.

There were some merits to the GPUS initiative, such as its objective to raise awareness among stakeholders about the need to actively prevent the ongoing cultivation of garden escapes. It also highlighted the fact that the garden escapes problem is one which affects multiple stakeholders, who would need to collaborate and cooperatively come up with solutions. However, these positives were greatly outweighed by certain feasibility flaws which made it difficult to implement the strategy with any degree of confidence. Firstly, the idea of a blanket list of plants is undermined by the fact that a plant which is invasive in one region may not be in another, which makes it unfair to suggest its removal across the nation. Being a voluntary initiative, GPUS would also have resulted in non-compliant nurseries having unfair market advantage over others who are cooperative, through their continued sale of listed plants. Essentially, as Moss and Walmsley (2005, p. 6) put it, "the financial bottom line of running viable businesses remained incompatible with the aims of the strategy." This was seen as a significant drawback given that the entire initiative is based around the removal from sale of garden escapes, which necessitates nursery participation and support.

4.3.3 Ad hoc management strategies

Apart from the voluntary initiatives mentioned above, there are also ongoing practical steps which Local Control Authorities employ to ensure that their weed management obligations are met. One of the steps taken is the conduct of routine inspections by weed officers to properties which are thought to contain invasive plant species. These inspections, however, are not capable of being solely relied upon since, as Klepeis *et al.* (2009) explained, they are carried out so infrequently that they do not make much of an impact. Inspections are also a control rather than a preventative strategy because they more often deal with the aftermath of plant invasion, when there is already

an observable growth of the plant. This would not be particularly useful in efforts to prevent the initial cultivation of the invasive plants in question, which explains the apparent preference by managers for more educational approaches.

The types of education which weed managers engage in, apart from the advice which they might give during inspections, takes place at venues like community markets and school fetes. These informal settings have been flagged, alongside nurseries, as potential pathways for plant invasion due to the number of garden escapes that have turned up for sale there (Craw *et al.*, 2002; Groves *et al.*, 2005; Dehnen-Schmutz *et al.*, 2007). It is not uncommon for gardeners to simply pot up some cuttings of plants which have been taken out of their home gardens, and sell them at local community markets. This presents a problem if those plants turn out to be invasive because these market sales could aid their translocation to other areas, after they have been purchased by various buyers. In recognition of this possibility, weed managers and affiliated groups like Landcare now operate stalls at community markets, using them as a means of raising awareness about garden escapes.

Much of the discussion so far, in relation to the management of invasive garden plants, has been based on a review of existing literature on the topic. In the following section, however, I present empirical evidence, in the form of findings from interviews with weed managers located within the Sydney Basin where this research was carried out. This group of people deal with the impacts of garden escapes on the local environment and are well placed to offer some valuable insight into what they understand to be the precursors to its spread. As will become apparent, the views they expressed regarding the links between gardening and the spread of garden escapes were sometimes speculative but often also based on firsthand experience.

4.4 Expert perspectives on the garden escapes problem

Weeds are not just the responsibility of noxious weeds officers; we're just a tool to enforce things but everyone has to share the responsibility ... if everyone chipped in, then things would move along a lot quicker. ... If everyone did their bit, then there'd be no need for a noxious weeds officer. (Dominic)

Like Dominic, there was great frustration expressed by the weed managers about what they considered to be a blatant disregard, by gardeners, of the threats which invasive plants pose. Gardeners were reported to frequently prioritise factors like the aesthetic appeal over invasive potential, thereby leading them to continue cultivating flamboyant garden escapes. As to the sources of these plants, nurseries, community markets and the internet were identified as 'high risk

pathways' because they apparently make it easy for gardeners to procure invasive species. There was also a general perception amongst the interviewees that, when it comes to gardening, inaction matters just as much as actions do; both can lead to the spread of invasive plant species. As a result, the two most concerning issues reported are a perceived unwillingness, amongst gardeners, to seek expert gardening advice and the illegal dumping of garden waste in unauthorised areas. Education was unanimously considered to be the key to resolving these issues and helping gardeners make better-informed choices, though there were different ideas as to who should be educated.

4.4.1 Aesthetics as a core driver for gardening enactments

It's probably like with any other thing where people have differing reasons for doing the things they do. (Grant)

These 'reasons', according to the weed managers, are often to do with aesthetics; the pursuit of aesthetic appeal is what they have reportedly found to be a common driver of gardeners' actions. As the following comments indicate, this continues to be a source of great frustration for weed managers because of how often it leads to the deliberate cultivation of garden escapes:

...you go to visit one of your friends and, because you think he's got a nice plant, you take a cutting of it and bring it home to plant in your own garden ... If the plants benefit you in some way, then you're less likely to want to remove it. ... people still like the aesthetics of it. (Dave)

The problem lies with people wanting to buy the newest and most fashionable plant. ... People don't understand that the exotics ... can also be problems, when they're within the gardens, and jump the fence but also when they're dumped as well. ...people don't know, but then when they know, they think they're doing the right thing. (Ned)

The ochona or Mickey Mouse bush is another one ... often people don't notice when they pop up in their gardens, or when they do they just think it's attractive. (Cam)

Patrick has been involved, over the last 22 years, in the environmental strategies division of Wollongong City Council. His job involves coming up with innovative ways of dealing with invasive species, so he works closely with a range of stakeholders and landowners. Gardeners, he explained, are his most challenging stakeholder group because they often consider themselves to be more knowledgeable than experts like him, which leads them to ignore proper advice. He described them as being 'mostly old folks' who are so 'set in their ways' that they do not appreciate 'the fact that

garden escapes are a big deal'. Mind you, he does not consider younger gardeners to be much better, a point which he made abundantly clear by the following statement:

Gardening these days seems to be something people do like a set-and-forget kinda thing. And of course the escapes are going to come into those sorts of areas. ... There's just not that connection that used to be there between people and their garden.
(Patrick)

So, on the one hand, Patrick believes there is a kind of disconnect between people and their gardens, such that they are not paying close enough attention to the plants in there. Cam, however, expressed the opinion that the reverse is sometimes the case where people are so passionate about their gardening that they attempt to extend it beyond their domestic boundary. In the course of his job, he has come across people who deliberately take their garden into any available space around their house, in an attempt to beautify their surroundings. The frustration for him is that the plants these gardeners consider to be beautiful are often invasive and likely to spread beyond the initial cultivation site.

It's a shame when people are told "hey that's a weedy plant", or you point a weed out to them in their garden and they say "but I like it, it's pretty"... that comes down to the aesthetics... They don't wanna plant something that's not so extravagant when it flowers. ... There's also this idea that you've gotta beautify the bush and people buy a property near the bush and they'll go in and they'll actually plant *Agapanthus* in the bush, to beautify it. (Cam)

Dave, who actually has a PhD in garden escapes management, also agreed that aesthetics are probably one of the most challenging aspects of dealing with gardeners. He recalled going out to dinner recently and being confronted with the very plant he had studied for his doctorate - Ground asparagus (*Asparagus aethiopicus*). 'It was growing in hanging baskets', he said, proceeding to explain that the reason why this plant is so invasive is because 'it produces nice little fruits, birds eat them and then spread them.' This enables the plants to very quickly extend their natural range of distribution and despite their declaration as Weeds of National Significance (WoNS), they are apparently still being sold and cultivated. He supposed that to the restaurant owner, who appeared completely unaware of the invasive characteristics of *Asparagus* spp., the plant in the basket was nothing more than an ornamental piece.

Alex has also dealt with the impacts of *Asparagus* spp., and gave a description of just how problematic these invasive plants can be:

Asparagus species are one of the biggest problems we have here. It is bird-dispersed and can invade disturbed sites. It has a big crown and a massive rhizome underground so nothing else can grow once it's there. (Alex)

The opinions expressed above by the interviewed weeds managers are just that – opinions; they do not necessarily give a true reflection of the reasons why garden escapes are still being cultivated. While it is not unreasonable to suppose that aesthetics might play a role in determining plant choices, it is fallacious to assume that it is the main determinant or even the most important one. This is because there could be a number of reasons why certain plants are cultivated, which could have little or nothing to do with aesthetics. So there are at least two possibilities here, both of which could explain the observed cultivation of flamboyant but invasive garden plants. In the first instance, the weeds managers may be right in their presumption that it is aesthetics which drives gardening performance but they would also be wrong in viewing this linearly as 'cause and effect'. The alternative scenario is that what weeds managers perceive as an aesthetic basis for plant choice could merely be an incidental outcome of other gardening preoccupations.

Using the practice lens, aesthetic appeal is a meaning which a gardener might associate with their garden and this will vary from one gardener to another; what is beautiful to one person may not be to another. It is, however, only a mental construct at this stage and will require that the gardener be able to acquire certain types of plants, and other materials, which conform to their aesthetic desires. In the event that the gardener is unable to get the materials needed, they would have to either abandon that idea altogether or get substitute materials to replace the unavailable ones. All of the above (procuring materials that relate to a particular gardening ideal) will mean nothing if the gardener is unable to realise that aesthetic ideal, by competently utilising the relevant materials. Only when a gardener is successful at combining all three elements of meanings, materials and competences, does he proceed to enact a performance that reflects an aesthetic drive. So the nomination of aesthetics, by weeds managers, as the driver behind observed gardening enactments is flawed to say the least.

It is not uncommon for people to grow certain plants in memory of friends and loved ones who pass away; there are memorial gardens, after all, which are cultivated to commemorate the dead. So consider a hypothetical situation whereby a gardener loses someone and, knowing what their favourite plant was, decides to cultivate it as a sort of homage to the deceased. This plant may turn out to be invasive and may look visually appealing, which could suggest to an external observer that it is for this reason that it was cultivated. A weeds officer, certainly, on encountering this plant in

that garden, only sees that a visually appealing invasive plant is being cultivated but has no idea about the backstory that led to its presence there.

The assumption about aesthetics leading to the cultivation of the plant, in this case, would be completely wrong because it was not even a factor during the decision to cultivate it. Rather, the gardener was clearly motivated by sentimental feelings which would be associated with a pre-existing notion that plants are a good way to honour the life of loved ones who pass away. This meaning would, in turn, necessitate the procurement of particular plants which meant something to the deceased and, of course, it helps if the gardener knows how to go about growing the plants. The point here is that there is always more to an observed performance than a linear attribution of cause and effect; other factors, often ignored, may also play a part in the decision making process.

4.4.2 'High risk pathways'

...there are new weeds appearing now and then ... as the nursery trade brings out new plants that they're trying to promote. It's not an obvious process but gradually you tend to see new weeds arrive in the garden scene. (Cam)

Nurseries represent what weed managers refer to as 'high risk pathways' because, as Dominic put it, these retail outlets 'sell a whole range of plants, some of which are invasive'. As a result of their high risk potential and the fact that they are a common source of garden plants, nurseries are routinely targeted by weed inspectors to ensure that no invasive plants are being sold. When asked how this inspection process works, Dominic explained, 'we basically go thru the phone directory... unless people tell us about one, then we'll go there.' The reason for this selection method, as it turned out, is because a lot of nurseries tend to go out of business, making it necessary for weed managers to resort to random sampling and word of mouth. Their stated objective is to stop these invasive plants at the point of sale, before they are bought by gardeners and cultivated in variously located home gardens.

We normally target them [nurseries] just before Christmas because at that time, people are getting a lot of Christmas stock and they'll try to promote those plants at that time. (Dominic)

Kelly is a weed manager on the New South Wales (NSW) south coast and expressed just how much of a concern nursery sales pose, by citing a previous personal experience. While shopping for groceries, she reportedly found some Jasmine (*Jasminum polyanthum*) and Bamboos (*Phyllostachys spp.*) being sold in her local Woolworths supermarket. This was despite the fact that both plants

have been identified and listed as Class 4 noxious weeds within the state of NSW. Upon making enquiries in the store, she discovered that the plants are 'supposedly an Asian thing for good luck' and quite popular amongst customers who give them to friends and family as Christmas presents. Jane also reported that she occasionally finds cultivars of Lantana (*Lantana spp.*) and Morning glory (*Ipomoea indica*) being sold in some nurseries, in spite of their high profile invasiveness. These plants are all serious environmental weeds which often escape from gardens and their continued sale is one reason why nurseries were so often highlighted as a concerning pathway to plant spread.

Attempting to see things from the nurseries' perspective, Grant postulated that the issue may not be as simple as it is often made out to be. As he explained it, 'back in the old days, there was an agreement by nurseries that if a plant is an environmental weed, then they don't sell them.' In those days, according to him, 'the lists were of course shorter, and this agreement was easier to implement.' Now, however, weeds lists are compiled by local councils who 'have got a very big list of what they consider environmental weeds, so theoretically nurserymen shouldn't be selling them.' The outcome of this extensive and sometimes varying listing process, in his view, is that invasive plants are now being sold 'under the counter' in some nurseries.

Mick expressed a similar opinion, stating that 'the nurseries will keep selling these plants as long as there's a demand for it', especially because not all 'bad' weeds are listed and prohibited from sale. The onus, as these weed managers see it, then falls on gardeners to make better and more informed plant choices. In Ned's words, 'the task is to make that heart to head jump, so individuals start making better choices, and then the market will follow the demand.'

A lot of these weeds are bulletproof, such that they're easy to divide in your backyard and then go and sell them at a market. (Patrick)

Apart from nurseries, there are reportedly many other trajectories through which invasive plants can travel, each one presenting its own challenges to management efforts. Plants were described, during the interviews, as being something that gardeners often share freely and unreservedly amongst themselves. This was highlighted as being especially troubling because it presents the very real possibility that invasive plants might inadvertently be exchanged or given away, through this process of exchange. As Melvin stated, some of these invasive plants can be found at places like markets and fetes 'for \$2 or so ... someone's just broken up a piece and thrown it in a pot, then taken it to a market the next day.' Dominic also expressed a similar concern about invasive aquatic plants like Salvinia (*Salvinia molesta*), which replicate their quantities very quickly and might then be shared amongst gardeners.

Salvinia are very easily spread along waterways, and double their size in a week. ... people then realise they've got too much of it and then decide to split it up and give some to their friends and neighbours. (Dominic)

Citing a real-world example, Dominic recounted a 2013 case where one Wollongong gardener was found to be growing Salvinia in some backyard ponds and then selling them out of his residence. Considering the fact that this plant is a Weed of National Significance (WoNS) and a Class 2 notifiable noxious weed in NSW, this was and still is a very serious offence. The illegal act was brought to the attention of the Illawarra District Noxious Weeds Authority (IDNWA), where Dominic works, through a DPI tip off informing them of the perpetrator and his location. Dominic quoted the law governing the cultivation of noxious weeds: 'According to the law, and under the Noxious Weeds Act 1993, it is an offence to sell, purchase or distribute any notifiable weed'. The problem with legislative enforcement of this kind is that it presupposes that the gardener in question is aware of the sorts of legislations governing plant cultivation and sale, which may not be the case.

As for the earlier reported preoccupation with nursery inspections, there is an inherent assumption that nurseries are the most utilised and, hence, the most appropriate target of management efforts. But by their own admission, the weeds managers are aware that there are other possible avenues through which gardeners acquire plants, such as at markets, fetes and through informal exchanges. A gardener's chosen source for plants is, therefore, tied to so many other factors which might relate to existing ideas of, and the need for, convenience, proximity and preference, among other things. It is only a combination of all of these pre-existing factors which results in the observed preference and utilisation of one plant source over others.

For example, if a person approaches gardening in a casual way, treating it as a relaxing activity with minimal stresses, this might mean that they are not picky about where their plants come from. So they may not go to the trouble of buying plants from a nursery and, even if they did, it would be one that is located closest to their place of residence. The choice of nursery may also be tied to the gardener's preferred plant type; that is, whether or not they exclusively prefer native and/or exotic plant species. In this way, the meaning which they associate with gardening (a casual, relaxed practice) determines the kinds of materials they employ, in the form of the nurseries and plants. Another result of this casual approach to gardening could be the enactment of a *laissez-faire* style of plant management, where there is very little input from the gardener in the garden. A less than desirable outcome of this gardening style could then be that plants come into and escape from the garden without being checked by the gardener, thereby leading to further spread.

4.4.3 The internet as a newly emerging 'high risk pathway'

The internet represents another avenue through which plants can be bought or sold, and was another 'high risk pathway' flagged by some of the weed managers interviewed. Mick remarked, 'the internet has opened up a whole new can of worms because people can just get things from other states, and even countries.' The fact that these transactions occur in a virtual space makes it incredibly challenging to carry out any sort of monitoring or inspections, which is one reported reason why it is so concerning. Added to this is the fact that in Australia, the system of classification of invasive and noxious weeds is such that a plant that is listed as invasive in one region or state may not be so in another. Purple morning glory (*Ipomoea indica*), for example, is listed as a Class 4 noxious weed in NSW but is not declared as noxious under the Queensland legislation. This means that a person who is resident in NSW could potentially purchase the plant from Queensland, using the internet, and not get caught unless a weed inspector came round to their garden. As Jane put it, 'unless a plant is specifically marked as illegal ..., it will not be stopped before reaching the buyer'; so any gardener can acquire practically any plant they please, regardless of invasiveness.

Another point of concern raised is the fact that the sale of items over the internet is not restricted to only legitimate businesses, but also includes sales made by unlicensed individuals. In the case of plant sales, any person with an excess of plants in their garden can just put it up for sale on the internet, using far reaching and well known websites like Gumtree and eBay. It was recently stated in the University of Washington Conservation Magazine that 'you can buy just about any plant in the world with nothing more than a laptop or smartphone and an internet connection.' This statement illustrates just how easy it can be to get plants online; even a cursory perusal of the plant category pages on Gumtree shows how popular plants sales are, both locally and interstate. Dave also made a similar discovery about Hawkweeds (*Hieracium* spp.), which are state-prohibited weeds, saying, 'it's banned from sale within Australia but you can still buy it on eBay.'

The internet is not only used for the acquisition of garden plants but it is also increasingly used as a medium for sourcing information relating to gardening. Recognising this, weed managers now incorporate online resources as part of their strategies for dealing with the spread and ongoing cultivation of invasive plant species in domestic gardens. Resources like the Grow Me Instead publications are now made available both as online resources and also as hard copies which can be picked up at council offices. The WeedWise website is also another important online resource through which information about invasive plants within the state of NSW is made available to the public. Administered by the Department of Primary Industries (DPI), the NSW WeedWise provides an extensive list of noxious and environmental weeds within the state, including governing weed

legislations. Having these resources readily available potentially makes it easier for gardeners to steer clear of invasive and listed plants, but the question becomes: do gardeners actually seek out this information?

This is a question worth addressing for a number of reasons which relate to comments made by Patrick earlier, regarding the types of people who comprise gardeners today. Firstly if, as he stated, gardeners are 'mostly old folks', this could affect the popularity of internet usage in gardening, given that this demography is not well known for their utilisation of technology. Secondly, if gardening is performed by the younger demographic in what Patrick described as a 'set and forget' manner, this would indicate that they may not be interested in seeking any sort of advice. Whatever the case may be, there are other elements of meanings and competences which determine whether or not the internet is employed by a gardener in the conduct of gardening activities.

While the internet is commonly understood to offer a quick and convenient way of accessing products and services, its use requires the gardener to make those associations themselves. So the use of the internet would depend on a gardener's approach to gardening; whether they have a desire for convenience or whether that does not matter to them. The user would also need to have knowledge of how to correctly use a computer in order to access the information on the internet, as well as what website to go to in order to search for the information. So while it is a good idea to use online platforms as a way of raising awareness about the management of invasive plant species, it must be noted that the internet may not be as widely used as imagined. Understanding who uses it and why is important for ensuring that weeds management resources are distributed in the most efficient way possible, to maximise efficacy.

4.4.4 Efficacy of information dissemination

There are a number of ways through which knowledge, relating to gardening, can be generated and subsequently distributed. These could take the form of more formal education, such as would be found in a classroom, or it could be more ad hoc, as in information shared amongst friends and through enquiries at nurseries. Part of a weed manager's job is to communicate information regarding invasive plant species to gardeners who may, otherwise, not be aware of the impacts associated with these plants. One of the ways by which weed managers communicate this information is by organising information sessions and operating stalls at events like local markets, which are frequented by gardeners. Dominic described the various methods which he uses to disseminate information to gardeners, in his capacity as weeds officer for the Illawarra region:

We try to link whatever we're doing with what's going on generally, like tree week, or we also use opportunities like market days... I also write articles for NRM newsletters ... we've also got brochures and fliers that we print and hand out to people. We also have field days; so if there's a new and emergent weed that we want to raise awareness for or there's a new technique for dealing with existing widespread weeds, we'll hold field days to give people information about what the weed looks like and how to identify and control it. (Dominic)

Kelly gleefully relates how she came up with a 'clever ploy' to capture the attention of people at markets who were just after 'pretty plants', with no regard for potential invasiveness. Working with her local bush care group, she picked up some of the most attractive weeds which had been dumped in bushland and displayed them in one of the stalls at the local Australia Day markets. Below, she explains how the plan was executed:

You'd be surprised how many people came up and wanted to buy these weeds to go put in their gardens. ... the weeds we picked were the most pretty and attractive ones and we then went on to tell them where these plants were a problem. (Kelly)

Using this tactic, the displayed weeds were a sort of conversation starter which enabled Kelly to talk to customers about the invasiveness of the plants that they might otherwise have bought. This was, in her estimation, an effective way of getting people's attention and increasing their awareness of the impacts of invasive plants on the environment. The reason why markets are so often targeted, Dominic explained, is because 'that's where you get a lot of these backyard sales going on... the things they sell there are probably of an undesirable nature.' By 'backyard sales', he was referring to people who pot up the cuttings or excesses of plants from their gardens and take them to markets and fetes where they then sell them to other gardeners.

There is a downside, however, to using markets as an avenue for community engagement; it often results in a situation which Martha refers to as 'preaching to the converted'. She went on to explain that this happens when the only people who stop by the stalls to hear the information are 'those who are already doing the right thing.' It is a source of continuous frustration for a number of weed managers like her, who try to reach the 'unconverted'; that is, people who do not appear to even make any effort to seek this information. As a result, it has become necessary for weed managers to come up with more innovative ways of getting information out to gardeners who may not necessarily source them through regular channels.

One way of doing this is through the 'tree day' programs run by high schools, where students go on excursions to places like botanic gardens to get practical information which they can then apply. For example, the Wollongong Council Green Plan nursery, located within the Wollongong Botanic Gardens, gets a large number of gardeners come in every year to visit and buy plants. In addition, high school students also visit once a year as part of their school program. Cam takes advantage of this opportunity to incorporate a little 'weed education' into his work at the nursery, while showing people around. He explains:

when I'm working with our green plan nursery, obviously I'll use that as a forum to educate people, as well as show them alternative plants that they probably hadn't realised they could use. (Cam)

He reportedly prefers educating the kids because he believes they are young enough to still be receptive to the message, as opposed to adults who might not be. In his words:

Start with schools, when they're young as opposed to adults that are set in their ways. ... getting to people when they're younger would be good. ... that (annual tree day) is a good opportunity to get at them. (Cam)

Kelly also expressed the opinion that targeting children will, likely, be a more effective way of increasing the public's awareness of invasive garden plants and the impacts they cause. Her view, which other weed managers appeared to share, is that the outcome of knowledge disseminated now may not become evident in people's gardening practices for years to come. She likened it to previous attempts by the environmental sector to get people to stop putting all their waste into the one bin and to, instead, recycle more habitually:

It takes time for these things to sink in and it might be a generational thing, where one generation receives the information, but it's the next generation that actually puts things into practice. Like the recycling thing which started about 20 years ago but is only now taking hold in people's minds. My son's very good at it without giving it much thought, because he's never known any different. (Kelly)

Education will, no doubt, play an important role in effecting a change in those aspects of gardening enactments which facilitate the escape of invasive plants. However, at the moment, the educational strategy appears to be largely unfocused and is, instead, more opportunistic. Weed managers essentially cast their nets as widely as possible using multiple platforms, in the hopes that the disseminated information might reach its target audience. This is not a bad strategy in itself but

there are several considerations that need to be factored into the strategy, if it is to be made more efficient. Firstly, who is the target audience? How do they prefer to learn about things? Are they even interested in seeking the sort of information that is being disseminated and, if not, how can the information be made more relevant to them? Addressing these sorts of issues will prove to be important for improving the success of educational strategies that are aimed at managing the ongoing cultivation and spread of garden escapes.

The practice approach recommended in this thesis offers just such a way for weed managers to gain a better understanding of the people they are trying to reach – gardeners. It gives an indication of the types of people who are actually engaged in the gardening enactments, thereby making it possible for disseminated information to be more target-specific. Understanding the ideas gardeners hold regarding gardening gives necessary insight into what needs to be changed, and the kind of information that will be needed in order to effect that change. Exploring existing competences is also of particular importance for educational strategies because this element has to do with how gardeners learn about gardening and how skilled they are at it. So a practice-led approach highlights what gardeners are doing to aid the spread of garden escapes, whether intentionally or not, and is a basis upon which information can be better targeted to change performance.

4.4.5 Improper disposal of garden waste

Dumping is one of the commonly reported ways by which invasive garden plants get spread from domestic spaces to the wider environment. According to Alex, a weed manager in the Shoalhaven region of NSW, the reasons given for engaging in this act range from avoidance of tip fees to a desire to beautify the bush by using the waste as compost. He reported that common dump sites are those interfaces between urban areas and bushland, where ‘people trim the lawns and prune their gardens and just dump it across the road.’ This is a major problem in this region, particularly, because there are a large number of holiday home owners who usually end up with more garden waste, during their visits, than they can fit into their bins. As Alex explained, ‘when they come down say several times a year, everything’s overgrown and they immediately mow and trim’, the excess of which gets dumped in surrounding bushland areas.

Despite the fact that each property in the Wollongong region has a green bin, the issue of dumping is just as problematic and recurrent as it is in the Shoalhaven where there are no green bins. Kelly finds the situation especially confounding because she is constantly trying, with very little success, to keep on top of and eradicate the plants dumped on her worksites. She shook her head saying, ‘I don’t understand the mentality behind it (dumping) ... people don’t want to go to the tip with it’. She

could only speculate that the reason might be because people consider the tip fees to be overly expensive, thereby preferring the cheaper yet illegal option of dumping. To demonstrate how insidious dumped garden waste can be, Kelly conducted a little 'experiment' by throwing an offcut of the Yucca plant (*Yucca elephantipes*) into the bush to see what would happen. Below she reports on the outcome of that experiment:

It's been there for two years and still hasn't died but it's grown a bit and started to put down aerial roots. Who would have thought it was just an offcut. So people don't often see things like offcuts as a problem but, as with this one, even after two years, it was still alive. (Kelly)

The point of this experiment was to show how, sometimes, there might be a lag time before dumped plant materials begin to show signs of spreading. In Kelly's words, it is frustrating because 'you might do the dumping on a site without any problems arising for a couple of years and then, bam!, the plants start to spread.' This is an especially concerning issue because, when the harmful consequences of dumping are not immediately apparent, it could potentially lead perpetrators to believe that there are none. A similar problem exists in the Sydney region where Mick is based. He described how African olive (*Olea europaea* subsp. *cuspidata*) had sat idly for years without being an issue but has, 'in the last 20 years, just gone ballistic through the landscape in Western Sydney'. Like the African Olive, he explained that 'a lot of weeds have gone over the back fence and washed down into the creeks, from garden waste dumping.' The result of all of these invasions, much to the frustration of these weed managers, is that a large proportion of their time is now spent trying to get rid of the dumped garden materials. This frustration was made very evident by Cam's remarks about what he considers to be the underlying reason for gardeners dumping their garden waste in the bushland and reserve areas.

It's ignorance and it's arrogance as well where people think they know better than the environmental experts. ... people aren't encouraged enough to have and manage their own compost heaps on their property. (Cam)

Doris, sharing a similar view, opined that it is more likely to be ignorance than malice which leads people to think that dumping is an acceptable way to dispose of garden debris. The way she understands it, gardeners would be less likely to illegally dump their garden waste in the bush if they had access to the right kind of information. She stated,

I often give talks to garden clubs and I've found that often it's not that people are deliberately trying to cause these problems, but they just don't realise the problems associated with these plants. (Doris)

Kelly and Alex, however, had a different opinion. They view dumping as being an outcome of recalcitrance rather than ignorance, on the part of the offenders. The way they see it, people are more likely than not aware that dumping is illegal, yet they still go ahead with it regardless. One of the common justifications he gets from perpetrators, Alex says, is that '... people just think it will serve as good compost.' So they often admit to deliberately spreading their garden clippings in the bush to provide more nutrients for the soil. For Kelly, when it comes to informing people about the illegality of dumping,

...it's not the message but rather that people just don't want to hear it. It's unpleasant news and makes people feel bad about themselves, so they don't want to hear it. (Kelly)

The need for better targeted education was again highlighted by the way the weed managers spoke about how the dumping of garden wastes contributes to the spread of invasive species. There were also a number of speculations relating to the reasons why people continue to engage in dumping activities, despite knowing that it is an illegal act. These speculations may be right but until they are validated by the perpetrators of this act, it remains just hearsay and any strategy based on such unconfirmed accounts will always be fraught with uncertainties. By exploring the meanings and materials which gardeners associate with dumping, the practice approach offers an opportunity for weed managers to operate based on facts rather than suppositions.

So depending on how gardeners respond to questions around their perception of and engagement in dumping activities, efforts can be better directed towards countering the actual drivers of the act. If it is, as weeds managers say, an overabundance of trimmings that leads people to illegally dispose of their garden wastes in inappropriate locations, then the material elements could be targeted. More green bins could be given to gardeners, where they are not available in sufficient quantities, or tip vouchers could be offered as an incentive for taking garden debris to the local waste depot. Whilst there were a lot of speculations made during the interviews with weeds managers, there was also an expressed desire to discover more effective ways of reaching the 'uninformed' gardeners. For this reason, the views expressed by weeds managers were incorporated into subsequent interviews with gardeners to ascertain how accurate the former were in their assessments.

4.5 Summary

This chapter has tried to create an understanding of the way garden escapes are currently being managed in Australia, so as to demonstrate the need for a change in approach. It began with an examination of the Australian horticultural industry and the organisations which might present opportunities for monitoring and/or regulating stakeholder activities. The two groups investigated were nurseries and domestic gardeners, since both are most frequently implicated in the ongoing spread of invasive garden plants. Following this was a breakdown of the various levels at which management occurs, showing how important stakeholder collaboration is for the successful prevention and eradication of invasive species. To determine how effective previous remediation strategies have been at fulfilling the objectives of the *Noxious Weeds Act 1993*, some notable examples were identified and scrutinised. This highlighted a predilection for strategies which aim to raise awareness about invasive plants, whilst also seeking to foster voluntary conformance within the nursery industry and among gardeners.

In the final section, findings from interviews with weed managers were presented to offer firsthand accounts of the challenges associated with garden escapes management. There were a number of issues raised, including concern about the ease with which invasive plants can now be obtained and also dissatisfaction with the way plants are disposed of after cultivation. Some of the points raised by weeds managers were investigated during subsequent interviews with gardeners and these later findings are reported in the following three chapters. The presentation of gardeners' accounts is organised according to a three-way grouping of gardening enactments – pre-cultivation influences, cultivation procedures and post-cultivation concerns. Reported findings also highlight the adoption, in this research, of a practice theory conceptual framework as explorations revolve around the various materials, competences and meanings associated with gardening.



Plate 3: A participant in her garden in Balgownie NSW.

CHAPTER 5

PRE-CULTIVATION PHASE: Pre-existing factors which determine eventual plant cultivation.

Introduction

How does one become a gardener? What are the factors that shape the type of gardener they turn out to be? Where do they first obtain the skills necessary for being successful at this practice? These are some of the questions which this chapter will address, to offer a behind the scenes look at the processes that occur even before plants are introduced into a garden. Some of these processes, as the following sections will illustrate, can be traced right back to the childhood of the gardeners in question while others have evolved over the years since. They revolve around the mental formulation of particular ideas surrounding the practice of gardening, as practitioners decide what type of gardener they want to be and the type of garden they want to have. It is based on these abstract ideas, which serve as a sort of blueprint, that gardeners then create (or modify) their particular garden space to suit their mental imaginings, before proceeding to acquire plants. Given that the impacts of some garden escapes do not become evident for years after cultivation, this chapter offers useful insight into possible reasons why gardeners might unwittingly plant such species.

5.1 Origin of gardening interest

During the interviews, gardeners were invited to cast their minds back to when they had first been introduced to the practice of gardening and who had got them interested in it. The majority of the participants reported that family interest in gardening had played quite a significant role in igniting their love of the practice and shaping their current engagement in it. Gardening had always been a part of their childhood and, as a result, knowledge about the practice was something that they learnt while growing up with parents who were keen gardeners. Over the years, this knowledge has been expanded using subsequent gardening experiences, as participants went on to either mimic the practices of their parents or adjust it to suit their own preferences. In the following subsections, the trajectories of gardening knowledge are explored so as to understand how previously acquired knowledge translates into observable enactments of gardening. The findings will also show how gardeners might be led to believe that their plants are suitable, in spite of existing potential for invasion. After all, to them, the plants may have never caused any problems.

5.1.1 Childhood influences

Tom's garden, which he took over from his dad, is now mostly comprised of native plants: 'when I say natives, it's those that are exclusively endemic to the Illawarra.' These native plants which he views as 'necessary' for the future, allow him to express his passion for environmental sustainability and, as a result, they are the only type of plants which he cultivates. His garden, however, had not always been the way it currently is, given that it was his father who tended it while Tom was growing up. So, as he explained, the origin of his interest in gardening stems from watching his dad garden in the backyard of his childhood home, where he grew mostly Buffalo grass (*Bouteloua dactyloides*). Following his father's passing, Tom kept some of the grass as a tribute to him but he eventually transformed the garden to reflect his own personal preference, which is for native species.

Basically, when my dad was in charge of the garden, we had buffalo grass because he loved it. So front and back was mostly grass interspersed with other trees. He developed motor neurone disease and passed away. ...I decided about 5-6 years ago that I would change the looks of the front and backyard and it was going to be exclusively natives. I still maintain some grasses in the front but it's more a sentimental thing towards my dad. (Tom)

Tom's initial introduction to gardening, while observing his father as a child, clearly set the stage for his future performance of it, particularly because there was already a garden available to him. It was during his childhood that he began to get a feel for what gardening entails, how to go about performing it and what it means to be a gardener. Although some of the materials changed, as in the replacement of Buffalo grass with native plants, he already had an idea that a garden could be used as a means of expressing personal preferences. His father had, after all, only cultivated his favourite plant, the Buffalo grass and Tom, upon assuming control, replaced these with his own preferred native species. At the same time, and in spite of his own personal preference, he retains a section of Buffalo grass in memory of his father, signalling the idea of plants as a fitting tribute to deceased loved ones.

Kate and Eva were also first introduced to gardening as young girls growing up with parents who were keen gardeners. When asked how they came to be so passionate about gardening, they gave the following responses:

Just sort of knowledge obtained over the years growing up. My parents gardened and it's just something that's initiated into you and you know what to do. (Kate)

My dad was a keen gardener so I was introduced to gardening at a very young age. ... put it this way: my father had 14 siblings and they were all into gardening. (Eva)

For both of them, as for many others, gardening was simply a part of growing up and it was inevitable that they would themselves take up and continue the practice of growing plants in a garden. Today, a lot of their knowledge and skills can be traced back to their childhood participation in gardening activities, alongside family members who passed on the necessary skills. Mabel similarly had parents who were very passionate gardeners and she credits them with passing on the love of and ideas around the practice, which she now holds. Much of her gardening, she explained, is expressly directed at exemplifying subsistence just like her parents did. Now she rarely spends any money on vegetables, since she grows all what she needs in her vegetable garden behind the house, while also enjoying her ornamental front garden. So witnessing her parents' approach to gardening, and possibly being involved in it, led to the realisation that a garden does not have to be solely ornamental but can be productive as well.

My parents were avid gardeners. They grew all our veggies and that's something I've fallen on is growing my own veggies. (Mabel)

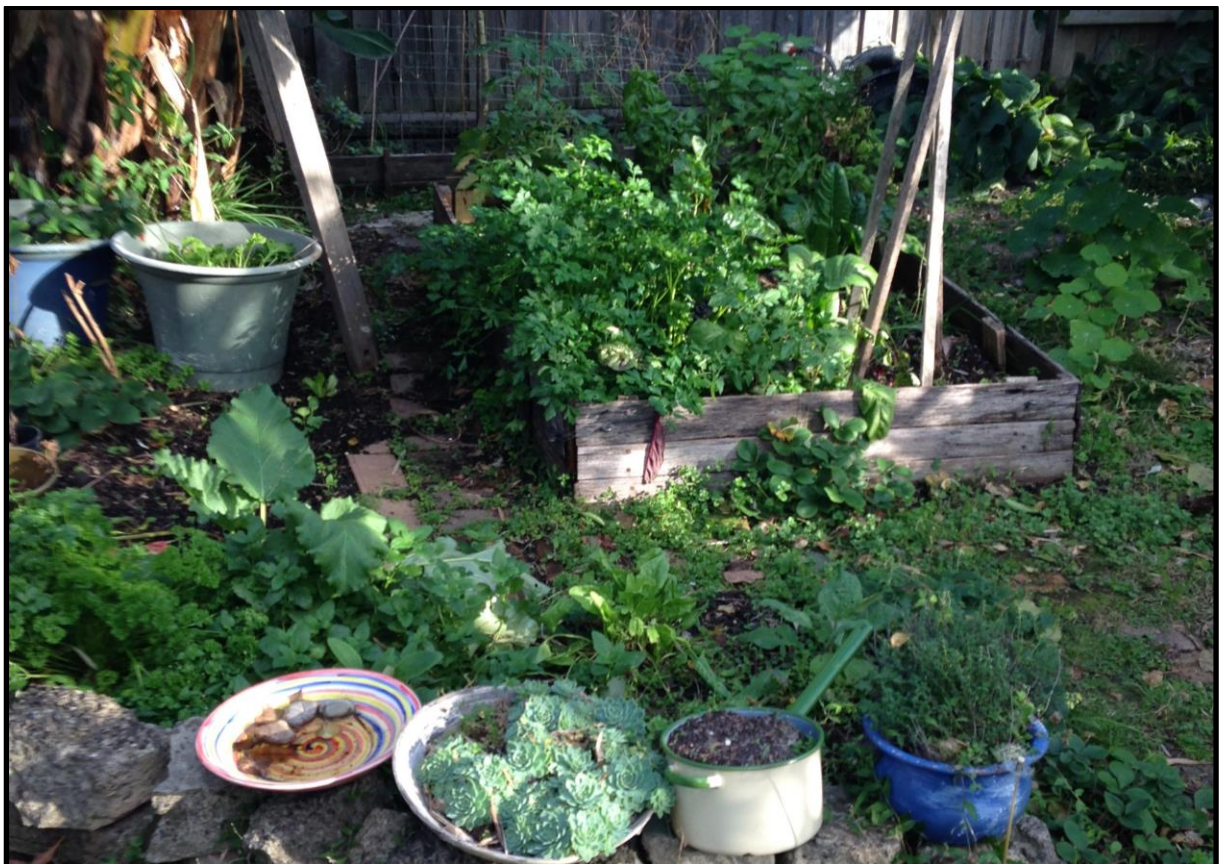


Plate 4: Mabel's backyard vegetable garden.

Petra's love for gardening was also the direct result of childhood years spent watching her mother garden in their home. Reminiscing on those early years, she recalled how beautiful her mother's garden used to be and how that made her decide to one day own her very own 'cottage garden', which she now does:

My mother was a gardener, you see, and I learnt to love it from mum and I just love to see prettiness, I love to see plants and it's peaceful. It gives the house a sort of lived-in peaceful and pretty look ... more attractive than a lawn would be perhaps. (Petra)

One challenge with garden escapes management, as previously highlighted by the weed managers, is the fact that there can often be a lag time between plant cultivation and eventual spread. Some of the invasive plants listed as noxious today did not always bear that label of 'weed'; years ago, they would have been perfectly fine to have in gardens and posed no threat to the environment. Now, however, with changing climate and increasing awareness of invasion impacts, it has become apparent that these plants do, in fact, cause significant environmental damage. So when gardeners base their gardening practice on childhood experiences, in the way that participants have reportedly done, it can lead them to cultivate previously benign but currently invasive species. This is one factor that potentially contributes to the ongoing cultivation of garden escapes, especially if gardeners do not make attempts to investigate the invasive potential of plants before cultivating them.

5.1.2 Later influences

Although a lot of the participants attributed the origin of their gardening interest to parental influence while they were children, it was not the only familial influence reported. For Eliza, gardening is a passion she used to share with her husband who passed away one year prior to the research interview. She fondly remarked that though she also had an interest in gardening, he was probably more of a gardener than she was, referring to him as '*the* gardener'. Much of what she now knows about gardening is, in large part, knowledge which has been accumulated over the many years she spent working alongside him in their garden. So as a tribute to him, she continues to grow mostly native plants, which were his preferred choice, although she has recently started making some of her own colourful additions, as she explained:

My husband was *the* gardener. And he died last year so I've continued... I mean I've always participated, but he was the keen gardener. ... I prefer natives because my husband only grew natives. Though when he died, I thought I'd like a bit more colour. So I've been putting in little colourful plants... (Eliza)

Ariana gave a similar account to Eliza's, explaining how she had learnt a lot about gardening from engaging in it with her husband who passed away in 1998. This, she said, has enabled her to become aware of which plants will and will not grow in her garden, as a consequence of the poor soil condition caused by construction works previously done on the land. So the way she understands it, plants that would grow well in other people's gardens will not in hers because of the less than favourable soil condition which makes it uncondusive for some plants.

My husband died in 1998 and he always used to be *the* gardener, but I've always been interested in gardening as well. ... I've learnt from experience what will and won't work in my garden. (Ariana)

Unless the spouse in question has relevant expertise in the area of plant invasion, which was not the case with either Eliza or Ariana, there is nothing to suggest that their particular enactment is correct. These mentors may, themselves, have been driven by other considerations such as aesthetics or convenience, in their choice of garden plants and their particular approach to gardening. So learning from spouses, in this way, is fraught with the same kinds of uncertainties that are inherent in directly mimicking or relying exclusively upon childhood gardening experiences. Neither one is grounded in current facts relating to the invasiveness of certain plants because no effort appears to have been made, on the part of either gardener, to update existing knowledge and skills.

The above accounts illustrate how previously acquired knowledge, even as far back as childhood, can influence the way gardening is enacted later in life. Participants could always recall when they first became interested in gardening and often referred back to that time as being the basis for their current engagement in the practice. These previous experiences, in combination with personal preferences, are what enabled gardeners to first imagine their ideal garden and then work towards actually developing that plan. In the following section, some of the thought processes that went into conceptualising participants' gardens are explored to show how these abstract ideas eventually came to fruition.

5.2 Mental visualisation

In the process of learning about gardening, whether through observation or personal involvement, gardeners begin to gain a sense of their own gardening style and the type of garden they want. A certain level of foresight is required for this conceptual stage of the gardening process because success depends on a gardener's ability to follow through on their vision. For example, Tom desired an environmentally sustainable garden which celebrates the native plants of the Illawarra region. As he put it, his goal was always to 'encourage other people to go down the path I am'; that is, he

wanted to highlight to passing observers the appeal of an exclusively native garden. Petra, inspired by her mother, always wanted a cottage garden with lots of colour and 'prettiness' through it. For Mabel, it was about being able to demonstrate that a garden can be both productive, as in a vegetable garden, and aesthetic, in equal measure.

5.2.1 Creativity and self-expression

Ariana highlighted the fact that visualisation does not necessarily refer only to the use of plants within a garden; her motivation has always been to 'tell little stories' through her gardening. Being a very creative and imaginative person, she views gardening as 'something you can have fun with' and designed her garden in line with this focus on creativity. The entrance to Ariana's garden begins with a brick-laid pathway which leads the way into a cosy arrangement of variously coloured plants of different sizes and shapes. On either side of this pathway are a vast number of little figurines and statuettes strategically located amongst the plants, to tie in to the theme of her garden which she cleverly calls 'Fairydale'. Little bespectacled frog statues sit, as though in a confab, beside a lily pond where birds come in to drink and bathe, seemingly in conference about some issue to do with the running of the place. Around the corner, in a little dark nook, are a group of little sheep statuettes gathered around the statue of a milk maid who appears to be leading them back home to the farm. Ariana always had a clear vision about what she wanted her garden to look like and it was apparent that the front garden was also a product of that imagination.

Out the front, I like having the trees on the footpath, because there's no fence. I like to think that as people walk down under it, they feel like they're walking through a park. That's what I like to think that they think... now whether or not they do, that's different for everybody. (Ariana)

Creativity, for other gardeners, pertains to the use of colour within the space and their gardens were described as a sort of canvas on which they display their favourite colours, using the plants. These gardeners reportedly started off with a colour scheme in mind, which they then worked towards developing throughout their gardens. For Matt, two criteria were most important in his choice of plants for his garden: 'I like native plants that are endemic to the Illawarra region', and 'orange and red is my theme.' So apart from having a set colour scheme, he also prefers plants that are native to the Wollongong region; anything that fits both criteria is essentially acceptable to him, for cultivation. The only exception in his garden, he said, is a Japanese plant (which he could not name) that he planted as a memento of the time he spent in Japan a few years ago.



Plate 5: Ariana's park-themed front garden.

Eva is also very particular about the colour scheme of her garden and takes great pride in the fact that she has now successfully created her ideal garden, one that is made up of her favourite colours. She describes her garden as 'a gardener's garden... not one of those designer gardens you have these days, where landscapers come in and plant so many of the same things.' In expressing what gardening means to her, it was obvious that aesthetics had always been a driver for the way her garden has now turned out. The moment one enters the space, it becomes immediately apparent that a lot of thought and effort had gone into making the garden look as visually appealing as possible. This was later confirmed when Eva stated that she used to enter a lot of gardening competitions to show off her garden, and had actually won several awards from them.

I go for pinks and whites and mauves and blues but I have a few things that are orange, like the Clivias [*Clivia miniata*], and orange is not one of my favourite colours at all. But they are down in the cooler spot in the garden and therefore they look alright. ... Years ago Wollongong council had a competition which we entered and won a few prizes and we did have our garden open then because it was for charity, but they've stopped now.
(Eva)



Plate 6: Participant leading the way into her garden where there are seats for entertaining visitors.

Creativity is fine in itself but when it comes to the deliberate cultivation of plants that are brightly coloured (red, orange, white etc.), there is the added potential for spread via dispersal agents. Birds and bees, for example, are very easily attracted to colourful plants because of their enhanced vision, so these types of plants are usually the first to get pollinated in a garden. The problem is that during this pollination process, propagules might accidentally become attached to the pollinators, if not eaten by them, and are later deposited at a different site. This is one of the most effective ways by which plants are able to extend their natural range of distribution and, thereby, achieve reproduction in diverse locations. It is also one of the reasons why some garden escapes are such effective invaders because gardeners might cultivate them, only to unwittingly facilitate the process of plant spread.

5.2.2 Adaptation and transformation

Ideals are not always as successfully realised as some of the gardeners described above; there are external influences which can often compel a gardener to change or abandon their original intent. Linda, for example, also started out her gardening journey with the desire for a colour-schemed

garden that would be comprised mostly of whites and blues. However, local conditions and more importantly, deer infestation made it difficult to bring this vision to fruition, thereby causing her to revise her expectations. She now uses a 'trial and error' system whereby she cultivates a variety of plants, determines which ones will survive the deer and prevailing weather conditions, then focuses on cultivating those. As a result, Linda remarked that her garden is now completely different than what she had initially envisioned, given that her plant choice is governed not by personal preference but, rather, external factors.

I tried doing a coloured garden but I found that that didn't work well here. What I planned on doing was plant gardenias that are white and lavenders which are purple-blue. I wanted that around the place. ... and they were doing quite well, until the wind and the rain snapped them off, but then again it could have been the deer as well. So I didn't bother replacing them. ...nothing looked the way I wanted it to ... just didn't work.
(Linda)



Plate 7: Evidence of measures taken to prevent pest animals.

Like Linda, Kate and Caitlin also reported that the conception of their gardens came about as a result of necessity rather than choice. They both have pre-existing medical conditions which needed to be taken into consideration during the planning of their gardens and in their decisions regarding the types of plants they would cultivate. Kate is allergic to most native plants and suffers from skin irritations every time she touches one, so she set out from the very beginning to have a garden comprised exclusively of exotic plant species. As she explained, 'I don't have any natives that touch me. I bought one but I put it over the fence so that I'm not near it, because I come out with dermatitis.' Her garden, as a result, now contains only exotic and flamboyant plants which, she says, are just ideal for her because they also serve as a colourful backdrop for when she entertains friends out there.

We sit, eat, and entertain out there. ... I like bright colours ... different coloured leaves, different shaped leaves. (Kate)

Caitlin only recently retired from the workforce and has not been actively gardening for as long as some of the other gardeners interviewed. Owing to this, her garden is still in its developmental stages: 'it doesn't look like what I'd like, but I've begun'. She explained that what she would like and what she had always wanted is a garden comprised entirely of roses, giving three main reasons for that preference. Firstly, roses were her father's favourite plant while she was growing up. Secondly, they remind her of her husband who had recently passed away (roses were brought to his bedside while he was ill). The third reason is more practical than sentimental; she no longer has a sense of smell, so she is incapable of perceiving the fragrance which flowers emit. For all of these reasons, she is only attracted to 'nicely formed flowers ... and roses do that'. Having got a basic understanding and knowledge about growing roses from watching her father grow them, as a child, she is now in the process of cultivating her own garden of roses.

I do like roses and dad always had roses. And roses are also a nice thing to take when I visit someone. Even just one rose. A lady used to bring roses to my husband when he was sick and I didn't who she was. And I haven't got a sense of smell so I can't smell them but other people can. But I look for a shape and a colour and roses do that. A rose can come in so many shapes and I like the look. (Caitlin)

Being governed by necessity might limit the types of plants that are cultivated by a gardener, but it also means that there may be factors other than invasive potential which they prioritise. In fact, for Linda, invasion was not even a concern at all; she was more interested in whether her plants would survive the persistent deer infestation. Caitlin and Kate were similarly preoccupied with wanting to

overcome the limitations imposed by their medical conditions, and only chose plants that allowed them to do so. If the potential for invasion is not included in plant selection criteria, then there is very little possibility of gardeners making a conscious effort to avoid cultivating such species. This adds another layer of difficulty to the management of garden escapes, given that invasive potential does not appear to be among the factors prioritised by these gardeners.

So following the decision as to the type of garden to be cultivated, gardeners then have to figure out what needs to be done in order to physically realise these mental ideals. If gardens have been inherited from a previous owner, as was the case with some of the participants, then it may require the removal of some or all of the plants already present at the time of arrival. Tom, for example, replaced his father's Buffalo grass with Illawarra native species which is his preferred choice. Other gardeners are not so specific in their preferences and may simply decide to build upon what is already present in the garden, making their own plant additions as Eliza continues to do. The following section explores some of the ways by which participants designed and modified garden spaces, in order to realise their own preconceived expectations.

5.3 Spatial considerations

During the interviews, gardeners described the various decisions they had to make and the steps they had to take in order to get their garden suitably ready for plant cultivation. Space was understood to be the criterion that determines what and how much can be done in a garden, so it was reportedly given significant consideration during the planning of participants' gardens. Factors such as dissatisfaction with existing materials and a desire to cater for the animal inhabitants of the space were also said to have played a significant role in determining garden style and content. From all accounts, it was apparent that the decisions made and actions taken with regards to the garden space were ultimately driven by individual preferences.

5.3.1 (Re)making the space

Some participants, like Kate and Betty, had moved from a house with a large garden to one that was not as big so they had to work out, early on, what they could keep and what they had to get rid of. When asked whether space had been a consideration when she was planning her garden, Kate responded in the affirmative, remarking that she still has to think about it whenever she goes out to buy plants. Explaining why it is such an important factor in her gardening engagement, she made the following comment:

We were in our last house for forty years and we had a beautiful garden, a very big garden. ... This is a small garden and I can't fit a lot of things into it. (Kate)

For Felicity, Mabel and Betty, the decision to clear out the entire content of their gardens had more to do with their own personal preferences rather than necessity, as in Kate's case. They had very set ideas as to the types of plants they wanted to cultivate, so their goal was to create a sort of blank slate upon which they could then develop their own garden ideals. When Felicity first moved into her current property, around forty years ago, 'it was just lawn and one or two plants', which was not at all her idea of what a garden should be: 'I go mostly for colour'. Now her garden is a captivating mix of a variety of colourful plants, which is just how she had apparently imagined it. Mabel also made the following remark in response to questions about the origin of her garden, which she described as being entirely of her own doing:

When I first came here, there were those big succulent things which I hate and a little hedge across the front which I don't like hedges. So I had that all taken out. So I'd say 99.9% of what's there is what I've done myself. ...at the back there, there used to be five of those pine trees. Apparently the previous owner was a fanatic about privacy so he put them there and they were monstrous. I had three of them, at great expense, removed. I've left 2 of them for now. (Mabel)

Betty also did a similar overhaul of the content of her garden. She only moved to Wollongong a couple of years ago, into a house with a fully cultivated garden, although the plants contained in it were apparently not to her liking. As she explained, the trees were 'right next to the house and was lifting the path. All the nuts fall on the roof and the cockatoos peck at them on the roof from about 5am'. So sleep deprivation was undoubtedly a factor as well, in her decision to get rid of the plants. Added to this was the fact that the garden was severely 'overplanted', as she described it. There was also the niggling worry that 'when the grandchildren are over, they might pick up those fallen nuts which are covered in bat poo and pee.' Below she describes the types of plants that were present when she first arrived and the amount of effort it took to clear them out of the garden, to be replaced by her preferred plant species.

At the moment, we've cleared it and are starting to mulch. ... we've taken out two stands of bananas out the front and an enormous golden Robinia [*Robinia pseudoacacia* 'Frisia'] that was taller than the house, a couple of palms, a Japanese maple, and that's only the front bit. Around the side, we've taken out a large conifer, palms ... you've got no idea how overplanted it was. (Betty)



Plate 8: Participant evidently pleased with her garden development.

Taking the time to evacuate a previously occupied garden space is the perfect opportunity to plant only the 'right' species, and would normally be the time to find out what those species should be. However, this was clearly not the motivation for these gardeners; it was more about exercising control over what was planted within the space and ensuring that it all suited their preferences. The respondents gave no indication that they sought any expert advice regarding the types of plants that they eventually introduced into the space. If they had, then they may have gained knowledge that would make them better-informed about their plant choices, whilst also raising their awareness of the problems associated with invasive species.

5.3.2 Accommodating animal visitors

Most participants, similar to Betty, inherited their gardens from a previous owner and had to work with what they had, even if partially. A number of them, who were the initiators of their gardens, stated that they simply proceeded to make it into what they had imagined, developing the space according to their own preferences. There were also some who reported that they have always thought of gardening as being inseparable from an engagement with animals, so gardens had been originally designed to reflect that ideal. Among this group of gardeners were those who described themselves as avid bird watchers and animal lovers, who try to always ensure that local wildlife is welcome and catered for within their gardens. To this end, a number of materials like bird baths and troughs have been incorporated into the garden space, alongside its floral inhabitants.

Molly has been a long time member of a birdwatching group which regularly does bird counting along the Mittagong Creek in the NSW Southern Highlands. Concern for avian biodiversity is what reportedly drives her gardening and the plants she cultivates; her goal is to encourage and attract birds to her garden, even if it means having 'undesirable plants'. One species in particular, the Cootamundra Wattle tree (*Acacia baileyana*), stands tall in the centre of her garden as a sort of beacon for birds flying nearby. This is a species that is regarded as native to the Cootamundra-Wagga Wagga area where it originates, though it is described in the Grow Me Instead booklets (see Section 4.3.1) as invasive outside of this area. When asked about the tree, Molly admitted that she is aware of its invasive potential but does not mind it since the seeds provide food for the black-tailed Cockatoo.

...the only real escapee that I've had is a native [Cootamundra Wattle] and I think the black-tailed cockatoos brought it. But I just thought "oh well, you're welcome" ... I'm all for the birds if they're happy. (Molly)

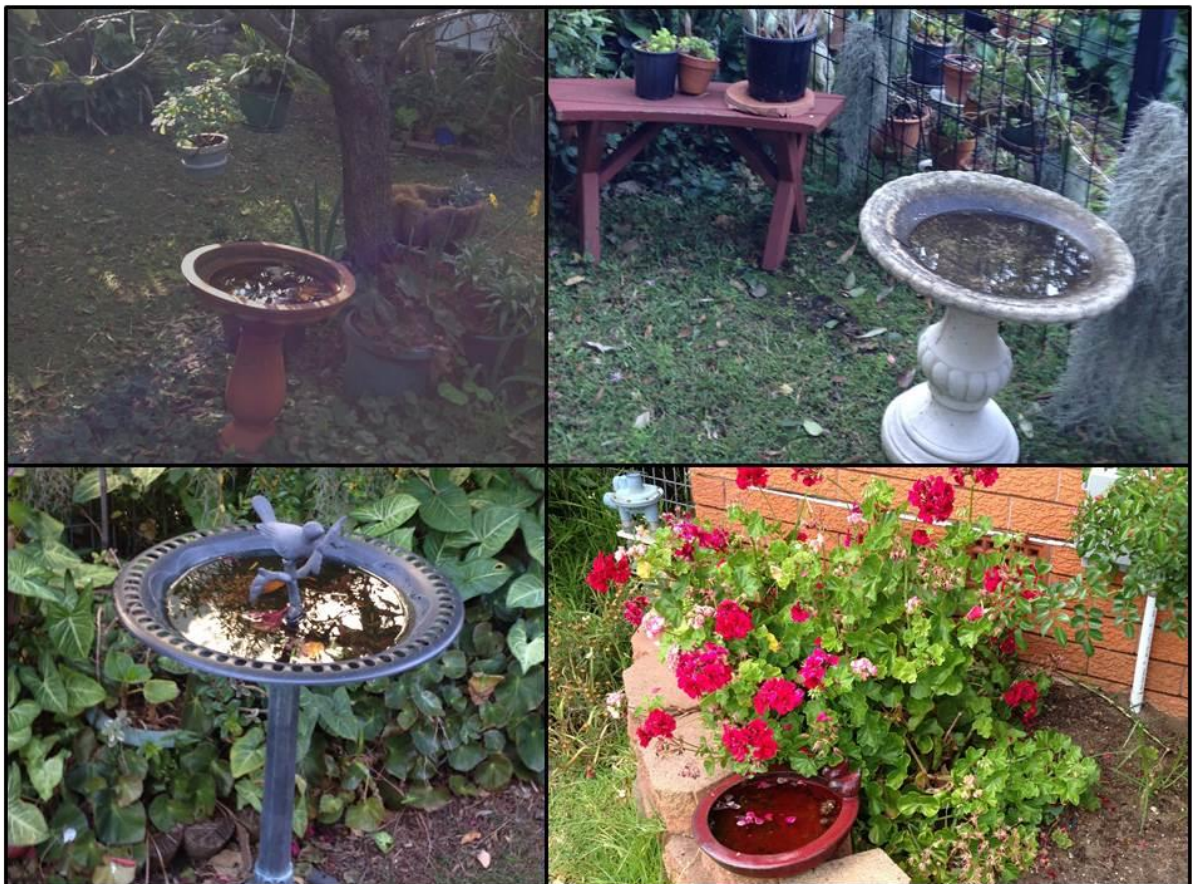


Plate 9: Some of the bird baths used to attract wildlife to participants' gardens.

Eliza is also a passionate animal lover and keeps a water trough for the birds in the centre of her garden so that she can see them when they fly in for a drink or to bathe. In her words, 'each day I try to fill up the water container for the birds. If I'm in the kitchen, I like to see the lorikeets come in and bathe and drink from it. So it gives me a lot of pleasure.' Her property is located in an open area which backs onto bushland, and she explained that her garden has always been a sort of haven where local animals are encouraged to come through and roam freely. This was the driving thought behind the fenceless design of her garden, as she explained that her husband had been an avid animal conservationist prior to his death.

...he wanted to bring the birds back in to the area. We have a lot of birds so that's good and we have a part fence up the side, but we don't have a fence down the bottom so the animals can still come up. (Eliza)

The presence of animals in the garden does undoubtedly bring pleasure to gardeners, but there are also downsides to having them in the garden. An obvious case is that of Linda's garden which is constantly overrun by deer and brush turkeys, thereby limiting what she can do in it and the types of plants she can have. There is also the added potential for these animals to serve as agents of dispersal for plant propagules which, in turn, enables the plants to spread from one place to another, posing a potential problem. A number of plants, like Molly's Wattle tree, are efficient invaders precisely because they attract birds and other animals which then help them to extend their natural range of distribution. So given that the reasons why gardeners cultivate certain plants may also be the factor that facilitates plant spread, the following section explores the decision-making processes that lead to plant choice.

5.4 Plant preferences

When trying to decide which types and species of plants to cultivate, gardeners often refer to a suite of attributes before making a final decision. The desire for 'low maintenance plants' was a common and recurrent sentiment throughout the interviews, as most participants stated that they would prefer to get plants that require the least amount of care. There were other considerations reported, such as aesthetics, practicality and affordability but, above all, the maintenance requirement was reported to be paramount. This was not entirely surprising given that most participants are aged over fifty, and a few of them also had some health problems that, in some ways, restricted their gardening capabilities.

5.4.1 Low maintenance

Ariana is 84 years old and has undergone a number of surgeries over the last few years, which have caused her to re-evaluate the way she gardens and the types of plants she cultivates. The fact that she is now partly dependent on a walking stick means that her plants 'have also gotta be able to look after themselves', since she cannot stand for long periods to tend them. So instead of giving up gardening altogether, as a consequence of her diminished capabilities, she has merely adjusted her approach to the practice, changing the materials (plants) to suit her condition. As she explained,

While my general health is good, my structure is not so good. ... I have a problem standing. I've got a walking stick so I can do the hosing, but I avoid high maintenance plants. (Ariana)

Mabel described herself as a 'plantaholic' who often cannot resist the urge to bring more plants home to her garden, whenever she comes across any she likes. Pleased with her recent restraint, she humorously stated, 'last month was the first time I didn't buy a plant', though her preference is for plants that are both visually appealing and also low maintenance. According to her, these are the two factors she thinks about before making a decision whether or not to cultivate particular plant species. So when choosing plants, she is always on the lookout for,

...something that's attractive to the eye and is resilient and doesn't require too much care. I mean if you've got to water something every single day then... and if you miss one day then it might die... (Mabel)

Faith gave a similar account of her plant selection process, stating that she now cultivates only plants that are 'hardy and healthy and will be alright if you neglect it a bit.' This, she explained, is largely because of her advancing age and associated health issues, which has meant that she is unable to spend as much time gardening as was previously the case. Her description of the garden suggested a certain level of dissatisfaction with its current state, but also frustration at not being able to do more due to her poor health:

I had a beautiful garden 45 years ago. It's deteriorating. ... my whole backyard looks dreadful because I can't do it anymore. Too old. ... I've got a few health problems and being in the garden does help, but I can't do what I used to do. I can't dig much now. (Faith)

Pam's reported preference is for 'very different, very unusual plants' but she only chooses ones that are resilient, due to the fact that 'I've got severe arthritis in my hand, so that restricts me a bit.' Her garden is a lot different than most other participants' because it is comprised almost entirely of numerous little plant pots, so much so that there is barely any room to move in it. The reason she uses pots, she explained, is partly because the soil on her property is very poor and contains a lot of clay, making it unconducive for plant cultivation. She also suffers from 'a sore back' which makes her 'unable to do a lot of heavy gardening any more'; so the pots allow her greater flexibility, different than if she had to bend all the way to the ground. This has not stopped her from continuing to buy more plants though, as she sheepishly conceded that she probably does need to make some space in her 'overcrowded' garden:

As I'm getting older, I find I'm going more for things that are reliable like succulents, than more finicky plants; those that will survive without a lot of watering. ...you've gotta have things (plants) that are hardy and will survive. ... I can't do much in the summer as I feel the heat terribly. But I do get out more in the cooler weather. ... My kids keep saying I've got too much stuff and to get rid of some... I say I'm not going to buy anymore but then I see something I like and I buy it. Haha. (Pam)



Plate 10: Pam's overcrowded garden displaying her preference for succulents.

Like Pam, Daniel also favours succulents and other low maintenance plants but his reason has to do with the fact that his work takes him away from home most days of the week. So he often does not get back to his garden until the weekend, which is why he made the conscious decision to only plant species that would be most likely to survive being neglected for a time. Also related to his desire for a low maintenance garden, Daniel now engages in what he described as ‘companion planting’, a system of gardening where plants are paired symbiotically in a garden. Companion plants, such as certain types of succulents, aid in the growth of neighbouring plants, either by keeping the soil moist, attracting pollinators, or providing useful nutrients for other plants.

I plant a lot of succulents just because it’s easy maintenance. ...it’s all about practicality. Where I live at the moment, I’m not there during the week so I try and have a low maintenance garden. ...it goes back to the way you plant them, like companion planting and things like that. (Daniel)

One thing about low maintenance plants that gardeners do not seem to realise, even though they should, is the fact that if a plant requires minimal care then it will most likely thrive once it escapes. A common characteristic of most garden escapes is their ability to outcompete other plants growing around them, which might require a certain amount of tending if they are to persist. So cultivating this kind of species in a garden is akin to preparing them for life in the outside world; as soon as the plants do manage to get out, they stand a very good chance of surviving without attention. All that is needed, then, is a means of escape and this might be facilitated by agents of dispersal such as wind, rain and pollinating animals.

5.4.2 Other considerations

...something that appeals to me visually. The amount of care doesn’t really bother me because I’m happy to do that. But yeah, the visual matters a lot to me. ... I tend not to go for natives. I can admire them in someone else’s garden, but I prefer exotics. (Stella)

Stella’s garden is quite modest in size, but it is comprised exclusively of colourful exotic plants which are apparently more appealing to her than native species. Like her, Sarah also favours ‘pretty’ plants: ‘I really just love flowers that are pretty and that’ll grow for me.’ It is particularly important for her to have a visually appealing garden because, once a year in springtime, she opens it up to the public in order to raise money for the local Saint Vincent de Paul charity. While showing visitors through the garden, she encourages them to buy cuttings of any plants which they find especially appealing. The proceeds generated from these annual plant sales are then sent off, as a voluntary contribution, to the charity.

I just love being out there. ... I have it open to the public in spring and I do that for the St Vincent de Paul society and I sell plants for them and they make somewhere between \$5 and \$800 every year for them. (Sarah)

Eva similarly prioritises visual appeal over maintenance requirements, stating that she considers 'the appearance at first, its growing habit, but most of all, probably the flowers.' This came as no surprise given that she had earlier stated that aesthetics had always been the driving motivation behind her garden design and her plant choices. Jessica, though, while appreciating the fact that plants can make a space look 'pretty', reported that practicality was a more important consideration for her than anything else. The large size of her garden and its location in bushland area makes it quite vulnerable to fire and wind action, which is why plant choice is so crucial for her. She described her garden as a 'practical native garden', and stated that she only ever chooses plants which 'serve a practical purpose' for her particular location.

Where I've done planting, I need it to be a wind break; I need parts of it to be fire-retardant because we're in a bush situation. Most of what I plant is for its structural properties rather than its pretty flowers. (Jessica)

Betty is at the stage in her gardening where maintenance is not the main consideration; she is quite happy to put in the work required, given that she is still in the process of developing her garden. She did, however, report that price is something she thinks about whenever she is trying to decide which plants to get for the garden. This was unsurprising since she had completely evacuated her garden space when she first assumed ownership, so getting replacement plants cheaply would undoubtedly be a very attractive option. Having come to the realisation that some plants can easily be reproduced from a cutting, she now prefers to get cuttings from other people who have plants that she likes, rather than paying for them. She even brought some cuttings with her from the garden at her previous home, in order to minimise the costs that would be associated with establishing a garden at the new residence. Pointing to a cluster of plants in her backyard, she indicated each one in turn and described how she had acquired them:

I swap bits and take and give bits. I pinched that the other day when we were down south, and I got that from a hotel where we stayed ... and a lot of the things, like the roses and geraniums, I brought with me from Tamworth. ... The things that they (plant retailers) sell are easy to grow and are overpriced. Like the things that I've got there out the back, you can grow them from a leaf, and they'll want \$5 for a little pot. I succumbed once and I bought a kangaroo paw from a market and they tend to die. So

no I don't buy (from markets) very often. They're either overpriced things that are easy as pie to grow, or the ones you buy would tend to die. (Betty)

Kate is one of only a few gardeners interviewed who presented a different view on the issue of affordability in gardening. She shares her love of gardening with her husband who is also an avid gardener and, as she tells it, they have spent a fair amount of money on the garden simply because it is what they love. As she put it, 'we spend a lot on plants. It's our hobby so that's what we spend our money on. ... If it's something you love, then you spend the money.' Eva made a similar remark: 'if I see something (plants) that I love, I usually buy them.' Sandy, on the other hand, always makes a bee-line for the throw-out table in the garden section of Bunnings because they often have plants displayed at a reduced price. With tongue in cheek, she explained why: 'I feel sorry for the poor things, so I bring them home.' Similar stories were recounted by some of the other gardeners who reported always being on the lookout for a bargain so that they could get as many plants as possible, for less or no money at all.

While listing the factors that they consider when deciding which plants to get, not one person reported that they thought about the possibility of the plant becoming invasive and escaping. Rather, maintenance requirements, visual appeal and affordability appeared to be the most important criteria in the decision making process. It also seemed generally agreed that native plants are not as visually appealing as exotic species and, as a result, most of the participants' gardens were dominated by non-native plants. This in itself is not a bad thing but, by definition, anything that is exotic originates from a location other than where it is found, so one would think that it would be worth knowing where a plant hails from. Also worth noting is the fact that exotic species and garden escapes share a similar attribute; both have to be capable of adapting to different conditions, climatic or otherwise, in order to persist. So while not suggesting that all exotic species are invasive, it does bear thinking about because if gardeners took the time to research their plant choices, they would also gain useful knowledge about garden escapes.

5.5 Summary

The main objective of this chapter was to highlight those aspects of gardening which may not be as obvious as some others, in the way that they influence what gardeners currently do. It is the decisions made during this pre-cultivation phase that propel the rest of an individual's gardening performance, which is why it is important to fully apprehend this aspect of gardening. The chapter began by exploring accounts of how and when participants first became interested in gardening, and where they first learnt how to go about performing the practice. Childhood participation in

gardening activities was the most reported way by which gardeners were first introduced to gardening and this was, for some, the impetus for their current engagement. Based on these prior experiences, gardeners formed ideas about the type and style of gardens that they desired and proceeded to create or modify their garden spaces according to those ideals. For some participants, gardens had to first be evacuated in the event that the existing plants did not suit their preferences, while other gardeners simply made their own additions to what was already present.

Of all the factors that were reported to influence plant preferences, maintenance requirements were the most prioritised criterion, with gardeners favouring plants that required minimal attention. The reason for this preference was largely to do with age and health limitations, as some participants stated that they are no longer able to do as much as they used to. Another factor considered during the plant selection process was the amount of time participants had to allocate to gardening. For those who are still employed, this was an important consideration. The other influential factors which determined plant choice had to do with aesthetic ideals and perceptions of affordability; participants often preferred exotic species, and favoured cheaper plant options. The above findings offer insight into aspects of gardening that are not often at the forefront of discussions, such as the origin of interest in the practice and the foundation for current enactments. In the next chapter, investigations move on to actual processes involved in the cultivation and management of plants in the garden, following the successful acquisition of preferred species by gardeners.



Plate 11: A participant's garden in Fern Hill NSW.

CHAPTER 6

CULTIVATION PHASE: Procedures and skills for acquiring and cultivating plants in a garden.

Introduction

Having explored the often latent factors that lead to eventual plant choice, this chapter now turns attention to the aspects of gardening performance that pertain to plant cultivation. It begins by investigating the various avenues through which gardeners obtain plants for their gardens, as well as the thought processes that lead to the preference of one source over another. Following this is an exploration of the particular ways by which gardeners learn how to successfully tend their chosen plants, and how this knowledge is subsequently translated into action in the garden. It was previously demonstrated that knowledge about gardening can often be traced back to childhood, after which it remains mostly dormant until later in life when gardeners draw upon them. So part of the investigations here will be to understand if and how gardeners update their pre-existing knowledge about plant cultivation; that is, where and how they hone their gardening skills. Also of interest, in this chapter, are the types of ideas which underpin particular enactments, since these also play a role in determining what gardeners do and how they do it. By apprehending the development of skills and the mental constructs associated with plant cultivation, this chapter offers insight into the reasoning behind observable enactments of gardening. This will, in turn, highlight some of the factors that actually perpetuate the ongoing cultivation of invasive species, thereby offering a more reliable basis upon which to formulate management strategies.

6.1 Plant acquisition

From the accounts given by participants, nurseries and garden clubs were shown to be the most utilised sources for garden plants, followed by other sources like markets, fetes and the internet. Whenever a source other than nurseries was reported to be the preferred option, it was often because a comparison had been made between the two and nurseries had fallen short in some way. Some did, however, report a preference for nurseries because the plants come with an information tag that provides instructions on how to successfully cultivate the plant in question. There was also the fact that nurseries often have a wider variety of plants in stock than the other nominated sources. Garden clubs were favoured by some participants largely because plants are sold at a cheaper price there than would be the case in nurseries. Other sources like markets and online platforms, though not as popularly utilised as garden clubs and nurseries, were preferred for reasons that not only had to do with affordability but also convenience.

6.1.1 Nurseries

The most recurrent reason why participants nominated nurseries as their preferred source for plants was because they provide useful information that helps with the successful cultivation of the plants. This information, written on little cards and attached to nursery plants, instructs a gardener on the best way to grow the plant, as well as what its size specifications are. This was reported to be very important pre-cultivation information to have, especially for those gardeners who have very set ideas about their garden structure and its plant content. Tom, for example, stated that while he prefers native species, he avoids those that are likely to obstruct his view of the Illawarra escarpment which can be seen through his kitchen window. This is where the plant tags have proven to be useful for him, because they help with the screening process.

I don't want to lose my view to the size of the plant. So I am conscious that I maintain what view I still have because I love the view. ... When you're a single person, you're stuck indoors in the kitchen and stuff like that so... (Tom)

Different than Tom, Lily is not overly selective about the types of plants she grows in her garden, describing it as 'a mix of everything', native and exotic alike. She does, however, check plant tags at nurseries to determine how big the plant will turn out to be before getting them, as she also avoids plants that would grow to obscure her front view. For her, though, it is more about security than aesthetics because she had previously planted a tree in the front garden that grew bigger than she had anticipated. So now she ensures that she checks the tag specifications on the plant before buying and cultivating it.

I don't go for the big ones because we don't want the front of the house blocked. I think it's a safety thing. ... With these things sometimes you learn by trial and error... We've put some trees in which grew too close to the wires. ... I do watch what size it's going to grow to and put it in the appropriate place. (Lily)

A gardener might go into a nursery with an idea of the plants they want to get but these information tags can often lead them to change their minds, depending on its content. This is certainly the case for Eva who earlier expressed a preference for particularly coloured plants, but went on to say that the final decision to buy or not hinges on what she reads on the tags. Her plant purchasing procedure, therefore, follows a set pattern:

If I'm at Bunnings or at a nursery and I see they've got something that's really beautiful, I'll read the tag and decide whether I'll buy them or not. ... and they tell you on the tag what situation it needs and what it will do. (Eva)

So plant labels, for these gardeners, aid both in garden design and also plant selection; the tags enable gardeners to choose the right plants to suit their purpose and the condition of their gardens. Gavin describes his garden as a 'collector's dream' because it is the result of 'a lot of years spent collecting new and unique plants, which no one else can say they have'. So for him, knowing the specifications of the plant he is about to buy is absolutely essential, given his focus on uniqueness and the fact that some plants might take too long to flower. His plant selection process is quite straightforward:

If I go out and buy a plant, I look for the fact that I haven't already got it and the fact that it'll grow, and whether it's attractive. ... Usually the plants have a label on them and as long as I know how big it'll grow and that it won't take a hundred years to flower, I'll buy the plant. (Gavin)

Ever since she became the appointed 'plant propagator' for her local garden club, Susan also buys all her plants from nurseries, for the same reason as the others: the plants have an information tag. After successfully propagating the plants, she takes them in to the garden club where they are then displayed for sale on a trading table, to raise money for the club. So this places her in a unique position when it comes to her plant acquisition, because she buys plants from nurseries but then sells them at her local garden club. According to her, 'people go more for flowering things; the more eye-catching stuff' but, because she finds it hard to memorise all the plant names, the nursery plant tags are a very useful resource.

I visit nurseries regularly because I'm always looking out for something different and new. I just look for anything that I can propagate off easily for the garden club. ... I keep the tags for the plant information, and then I write it on my own label for the garden club. ... I always label my plants at garden clubs because usually that's the first thing people ask is what the name is. (Susan)



Plate 12: The extent of Susan's backyard plant propagation (labelled plants below).

There was a preoccupation, among participants, with knowing the morphological characteristics of plants largely because of a desire to ensure that it fit into previously decided ideas for the garden. Nursery tags, however, rarely tell a gardener whether or not a plant possesses invasive properties and how likely it would be to escape confinement. This relates back to earlier comments made by weed managers that not all 'bad' weeds are listed. As a result, there is no legal obligation for nurseries to provide such information on invasive potential. So unless a gardener actually makes the effort to seek that information, they are unlikely to have it readily provided to them at nurseries, especially because it could affect the sale of those plants. It is, therefore, up to the gardeners to make it a priority to find out about the possibility of plants becoming invasive before acquiring and cultivating those plants.

Despite some participants finding the nursery tags useful for getting them skilled at cultivating the plants in question, majority did report that they considered nursery plants to be overpriced. As a result of this perception, gardeners often looked to other less expensive alternatives, most popular of which was garden clubs where plants are reportedly sold at 'token prices'. Most of the participants interviewed are members of their local garden club, and one of the most reported

benefits they enjoy from their membership is that they can obtain plants at a cheaper rate. There were other membership benefits reported but, in relation to plant acquisition, price affordability was considered to be the most advantageous factor.

6.1.2 Garden clubs

I think people pay big money for plants that a nurseryman has grown for 12 months and you're better off buying something for a quarter of the price. (Betty)

Given that a lot of plants would be needed to replace those that had been removed from Betty's garden, which might be costly, it was unsurprising that she favours garden clubs over nurseries. Most of her plants, apart from those which she brought with her from her previous residence, are sourced through her local garden club which she joined when she first arrived in Wollongong. Amanda belongs to the same club and stated that '...there's a lady there that does all the growing and propagating and then she brings them in and they sell them at a very minimal cost.' Rose similarly stated:

When I first joined the garden club, people just brought in cuttings from their gardens or things they had potted up. So at the end of the trading table, there'd be this mountain of salvias cuttings and germanium cuttings and this and that and you could just take a handful and just pay 10c or something and that's how I got a lot of my things just doing that. (Rose)

So for most gardeners, the nomination of garden clubs as preferred plant source was more about buying plants cheaply than being able to access a wider variety, such as would be available at nurseries. Those who were after particular types of plants recognise, as Caitlin did, that for certain 'things like trees and shrubs and vegetables, you've gotta go to the nursery.' Otherwise, gardeners simply accept the fact that plant choices are more limited at garden clubs and they simply get what they can when they can. Felicity, for example, is not picky about plants and describes her plant purchasing as 'opportunistic', in the sense that she obtains plants from any and everywhere - the cheaper, the better. 'I just pick up anything I like. If I like it, I buy it', she said, going on to explain why she especially prefers to get her plants from the garden club rather than any other source:

Because they're cheap ... very cheap. ... We do pay something for them at garden club as that's one of our main money generators so I like to buy from there for that reason as well. (Felicity)

Giving her view on the issue of preferred plant sources, Faith concurred with the previously expressed sentiment that plants are more expensive at nurseries than they are at garden clubs. She recalled a moment in the past when she went in to a nursery to buy some plants, only to realise that the selling price was a lot higher than she reckoned they should have been. This was apparently one of the factors which led to her resulting preference for sourcing plants from garden club sales, as she explained,

I was appalled when I went down to the local nursery and I said to myself "I'm not paying that much for that when I could get it at garden club for half". ...That's one good thing with garden club. It doesn't cost a lot there. ... Most of my plants I get from garden club. (Faith)

Having retired a long time ago and now being solely dependent on her pension, Pam also stated that affordability is the most influential factor when it comes to where she sources plants from. This was not always the case, though, as it was obvious how much she enjoys buying plants, considering how full her garden currently is. Acknowledging this fact, she sheepishly remarked, 'I am running out of space here but I still come home with more plants.' So, from her point of view, choosing to get plants from garden club minimises the amount of money she spends on plants.

I don't have the money to spend on plants like I did when I was working. I'm only on a pension, so I probably think twice before buying something. I did spend \$25 for a fern plant the other day, but that's probably the most I've spent on a plant in a long time. ... At garden club you pay \$2 or so whereas at the nurseries, they're more expensive at maybe \$15. So these days it's gotta be something I really want before I'll spend that much on it. (Pam)

When it comes to garden escapes management, this preoccupation with affordability which most gardeners showed can turn out to be a hindrance to success. It potentially means that gardeners might be more interested in getting as many plants as they can for as little money as possible, with no concern for whether those plants are suitable for cultivation. Plants that are sold cheaply in garden clubs have reportedly been propagated by a member, like Susan, who produces a large quantity from a single parent plant. This suggests that the plants in question are easily reproduced, which is cause for concern because another problematic feature of garden escapes is the ease with which they reproduce their numbers. So rather than seeing this replicability as singularly a good thing, gardeners need to be cognisant of the fact that if a plant is easily propagated then it will most likely be a successful invader species.

6.1.3 Internet and other sources

Although most gardeners agreed that the internet makes purchasing plants much easier, a number of them admitted that they do not use it because they are not confident with using computers. Pam simply stated that the reason she does not use the internet is because ‘there are people just hacking things’, so she does not consider it safe to purchase anything online. Molly, however, takes issue with the cost of plants at nurseries but for her, it is more to do with the fact that some plants are so easy to propagate that they are not worth the price asked at nurseries. So instead of buying plants from retailers, she prefers to propagate them herself or utilise other less expensive sources, some of which are online. She reported that whenever she has bought plants online, in the past, they have always been positive experiences.

I’m never disappointed, it’s really beautifully packed. I’ve never really had any losses. ... It just depends on if the price looks good. Because things are so easy to propagate and sometimes the nurseries get them in from big companies, and they’re so expensive... So it just depends on if they’re not expensive. (Molly)

Jeff also recalled an occasion, back when he first moved into his current residence and was still in the process of developing his garden, when he decided to buy some roses online. This, for him, had also been a positive experience because he got even more plants than he had initially set out to buy, at no extra expense.

We decided we were going to put standard roses out front and we researched into what was available and selected colours and species etc. Then we contacted them (online store) and they’ve worked out beautifully. Got three extras as well, which was good. (Jeff)

Eva has also bought some plants online but admits that she leaves the sourcing of these plants up to her grandson who is a landscaper: ‘he loves gardens too so he and I are always discussing gardens.’ Stella’s reason for purchasing plants online is simply because, through the internet, she can gain access to species that she would love to have but which can only be found in other states. So by buying her plants over the internet, she is able to expedite the purchasing process while also overcoming both distance and potential sales restrictions.

With some things, if it’s something a bit different, you’ve got to source it on there (internet). I wish I lived in Victoria because all the good places seem to be down there. (Stella)

Kate disavowed the idea that the internet is a better option than other sources like nurseries. She considers online plant purchasing to be too much trouble, preferring instead to walk into an actual nursery because, as she put it, 'I like to see what I'm getting'. So, for her, being able to go into her local nursery, see what is available in stock and make a purchase in person is more appealing than the purported convenience of online shopping. Daniel, however, disagreed, explaining that he prefers to buy plants online because it means that he does not have to go out to a nursery to get what he wants. Being the youngest gardener interviewed, at 27, it was not surprising that he expressed a preference for online plant purchasing. The internet, to his thinking, gives gardeners a greater amount of control over the buying process and enables them to access a wider variety of plants in the one space and time.

For me I think the internet is helpful in that it's targeted. That's the big thing. Maybe it's a generational thing. I mean, you have so much more control over what you want and it saves time rather than faffing around markets where they might have something you want or they might not; basically luck of the draw. (Daniel)

Other gardeners were not particular about where their plants came from and preferred to utilise a variety of sources, as a way of minimising the cost associated with their gardening. When asked where she gets her plants from, Mabel gave the following response:

That's hard to say because I buy anywhere and everywhere. ... I go to fetes and markets and all of that and if I see something that I fancy, I'll bring it home. ... I try to get value for money. (Mabel)

The weed managers rightly referred to the internet as an emerging 'high risk pathway' because it makes it very easy for gardeners to overcome sale bans on particular plant species, should they wish to do so. Though online platforms were not reported by participants to be a well-utilised source for garden plants, it was only due to the fact that majority of them were not confident or comfortable with using it. Those who did use it, however, praised the ease with which they were able to acquire the plants they wanted, without ever having to leave the comfort of their homes. So there is definitely a need to monitor plant purchases being made online, as its popularity may continue to rise and, with it, the potential for more invasive species to be bought and cultivated.

From the above accounts, affordability and convenience appear to be the most important factors that determine where gardeners prefer to source their plants. Only when there was a perceived need for additional guidance regarding cultivation procedures, did participants nominate nurseries as the preferred source because of the information tags they provide. This, however, did not

translate into nurseries being the preferred or even the most utilised source for gardening information, as there was uncertainty about the accuracy of advice received at nurseries. The following section explores the other reported ways by which gardeners develop their gardening knowledge and hone their cultivation skills to become proficient at performing the practice.

6.2 Information sources for honing gardening skills

When it comes to knowing what to do in the garden, most participants reported that they prefer to rely upon their own experiences and learn from those rather than seek external advice. So experience was largely considered to be the best teacher as far as plant cultivation goes, in a system akin to 'trial and error', otherwise known as adaptive learning. Common reactions to the question of whether they seek external gardening advice are largely reflected in Amanda's statement: 'I know a fair bit about plants because I've been doing it for so long.' Like her, most respondents have been gardening for a long time and did not see any point in seeking advice from anyone else, as they did not believe there was much else to be learnt by asking others. Some went on to state that, if they did seek external advice, then peers were more preferable than nurseries. As a result, garden clubs were the second most popular source for gardening advice. Not many participants reported that they actively sought information from official or government sources, such as weeds management publications and websites.

6.2.2 Experiential learning

Gardening is an activity that can often take years to become proficient at and in the process of engaging in it, knowledge is either actively acquired or subconsciously retained from experience. As Ariana stated, 'part of gardening is learning and you learn by experience'; from experience, she said, she has learnt what sorts of plants she can successfully grow in her yard, with its poor soil. She does also have a friend who regularly comes in to help her in the garden so, aside from relying on her own experience, she also learns a fair bit about gardening from working alongside him. In this way, experiential knowledge has been built up over time, for both of them, through their collaborative engagement in the practice.

My friend comes and helps me in the garden and he too is knowledgeable. I have taught him things and he has taught me things ... it's an exchange of experience ... we learn from one another. (Ariana)

There were other similar accounts of experiential learning reported by other participants like Eva, who considers herself a bit of an expert on most things to do with gardens. The reason for this

confidence in her own knowledge and abilities, as she explained it, relates to the fact that her friends often seek her advice on all manner of gardening issues. They trust her knowledge 'because I've been doing it for so long, and I've always been interested'. The fact that she has previously won several prizes from gardening competitions, no doubt, also adds to her credibility as a useful and knowledgeable source among her peers. As to the source of her own knowledge, she relies more often than not on her own past experiences, whilst also drawing inspiration from regular weekly visits to open gardens with her husband:

I have a lot of friends who ask me about plants. They describe something to me in a very vague way and expect me to know what plant it is... I rarely go seeking information. ... After gardening for 57 years, I think I know a fair bit about gardening myself, plus we go looking at open gardens and that's pleasure for us. (Eva)

Eliza similarly commented in response to being asked if she ever seeks advice from external sources, 'no ... well I know a lot about plants so I don't need to'. She did, however, clarify that most of her knowledge relates to native species, which is what she has always had in the garden: 'I'm only learning to get exotics because I don't know anything about exotics.' Since her husband passed away, she has started introducing some exotic species to her front garden to add 'a bit more colour' to the space. So whenever she is unsure about anything to do with her garden, especially as it pertains to exotic species, she turns to her son who is a certified horticulturist.

My son is actually a horticulturist. He was an apprentice at Wollongong University. He actually worked in the gardening department for 20 years. ... Anything I wasn't sure about, because he also does a lot of propagation, and he works for a landscaping firm, he'll say to me 'that'll be no good at your place, mum'. ... He's pretty good. (Eliza)

Having lived 'in the bush' and dealt with invasive plants like Fireweed (*Senecio madagascariensis*) and Blackberry (*Rubus fruticosus*), Betty also has a lot of experience gardening and dealing with weeds. As a teenager, she spent a few years on Norfolk Island where she worked as a bush regenerator, eradicating weeds like Lantana, so this raised her awareness of invasive species. It is largely due to this awareness that she now seeks additional information before planting anything, given the climatic difference between Wollongong and Tamworth where she used to live. Describing the climate in Wollongong, she said, 'it's not dry, it's not as hot or as cold', which apparently makes it difficult to apply the same gardening principles that she would have previously done. Her gardening approach now can be likened to a 'measure twice, cut once' system, whereby she consults multiple information sources before taking any action to do with plant cultivation.

We've only been here 12 months from Tamworth, so it's a whole different ball game... it's just so different a climate down here. ... now my main source for information regarding plants would be the internet, and I get gardening guides from Tressels. ... I'm a bit cautious about the nursery people sometimes because I don't know that they're necessarily as educated as you would expect them to be. (Betty)

Just because a gardener has been involved in the practice for a number of years does not make them an expert at it, nor does it imbue them with knowledge of best (plant) management practice. Very little was reportedly done to ensure that experiential knowledge is augmented by any expert consultation and, as a result, gardeners essentially continue to do what they have always done. The problem here is that information, particularly as it relates to invasive plants, is something that gets regularly updated with the emergence of new evidence on associated impacts. Reliance on experience, therefore, diminishes the possibility of a gardener knowing how best to eradicate and, where possible, prevent invasive species which they might encounter.

6.2.3 Peer learning

By her comments, Betty highlighted a perception that was recurrent across most other interviews; a number of participants were sceptical about the reliability of information sourced from nurseries. This was the reason given as to why garden clubs were considered to be a more reliable source for gardening advice than nurseries, which were largely discounted for being overly focused on sales. Lily's view of nurseries is that 'it's mostly just a sale for them'; this was a sentiment to which a number of other participants agreed. Felicity also remarked that 'nurseries don't have the knowledge that people at the garden clubs have got', which is why she would much rather ask her fellow club members for gardening advice. Others expressed the same level of scepticism regarding the credentials of nursery salespersons, as compared with the depth of knowledge and experience believed to be present in garden clubs:

I'll ask but I'll always take it with a pinch of salt because I've been a shopkeeper too. You want to sell the jolly thing. (Jessica)

Sometimes I might ask at the nursery but I find that the nurseries sometimes tell you a lot of hogwash. They don't really know, so they just tell you stuff. ... You'd think they're knowledgeable because they work in a nursery, but they may not be. (Kate)

I find that nurseries don't necessarily do it well. ... I think there's an enormous amount of knowledge among the people in the club. And I certainly don't utilise it as much as could be done. (Stella)

I've picked up a lot of things over the years through garden clubs, just general knowledge. You talk to people, you learn things. My parents and siblings were all fairly keen gardeners. But I probably learn more through reading and garden clubs. (Pam)

Pam went on to explain that her initial reason for joining the club was frustration with the fact that, despite being introduced to gardening by her parents, her own children showed no interest in it. Recalling a time when she had previously tried to get her daughter interested, she ruefully stated, 'I bought a plant for my daughter, and it was dead within a week.' Her son does occasionally come in to help her with some heavy lifting but that is as far as his interest goes. So finally accepting that no one in her family shared her love of gardening, she made the decision to join the local garden club where there are other people with the same interests.

It's the social side as well. You just learn a lot and enjoy the time with like-minded people who love gardening, whereas my kids... none of my kids have taken after me. (Pam)

Peer learning is also fraught with the same kinds of uncertainties associated with the kind of experiential learning described above. Unless a gardener takes the time to keep abreast of current information regarding the suitability for cultivation of their particular plants, they are also likely to continue with potentially harmful practises. Consider, for example, a gardener who grew up in a house where Pampas grass (*Cortaderia* spp.) was cultivated in the garden and initially this grass showed no signs of causing problems as a garden escape. Such a gardener would have no idea that this garden escape has now become one of the biggest threats to bushland areas, where it competes with desirable native species and prevents their establishment. This detrimental impact has, however, only become apparent with the passage of time, which is why it is so important for gardeners to update their knowledge using expert sources rather than peers.

The interviewees made it quite clear that experiential learning is their preferred way to gain knowledge and hone necessary skills pertaining to their gardening enactments. If not from their own personal experience, then those of other gardeners was reported to be a better source of information than nursery salespeople who were negatively portrayed to be unreliable. As a result of this perception, garden clubs were nominated as the next best source of information partly because they provide a social setting where experiences can be shared among member gardeners. So having

understood the ways by which gardeners learn and where they source information from, in relation to what they do in their gardens, the following section explores actual gardening enactments. It demonstrates how acquired knowledge becomes translated into action and participants describe their approach to the cultivation aspects of gardening.

6.3 Gardening enactments

To understand what is involved in plant cultivation and what gardeners actually do in their garden spaces, participants were asked to describe their gardening procedures. Most reported that they approach gardening in a largely unstructured way, performing it whenever convenient or in the process of doing some other activity. This was largely related to existing perceptions of gardening as a relaxing activity that facilitates recuperation from the stresses imposed by work and other prevailing health concerns. So rather than being overly involved in what happens in their gardens, some participants stated that they adopt a casual approach to gardening, only ever performing associated tasks when necessary.

6.3.1 Frequency and intensity of performance

Gardening duties are sometimes shared between spouses, if they both happen to be keen practitioners. This is the case for Rose and Kate, both of whose husbands perform the more tasking jobs for them. Rose's husband, Jake, does the weeding and the 'heavy work' in their garden since because of her 'fragile health', she is unable to do most of it. Kate's husband, Henry, is also in charge of the labour intensive duties like trimming and mowing their garden while she follows behind him, picking up the debris that gets generated in the process. From her descriptions, they are apparently so meticulous about gardening that they would likely look after neighbouring gardens in the process of tending their own.

Actually, if there was a mess next door, we'd go and do that as well as ours. We lived on a reserve at our last house, and my husband used to do all that, as well as ours. (Kate)

Not every gardener, however, has the support of their spouse, which can often make it more challenging, especially if they have a sizable garden like Linda does. Her husband just does not share her interest in gardening and, as a result, does not take part in her performance of it; that is, unless she is able to convince him to help, which is not always the case. As she ruefully explained, 'My husband can't stand gardening. He'd rather let the plants die.' For this reason, as well as the fact that hers is a very large garden, she has had to hire someone else to come in on a weekly basis to help her with some of the gardening tasks. For other participants, like Eliza and Pam, their spouses

have passed away, meaning that they have no recourse but to perform the practice solo or get someone else to help them like Ariana does.

When asked how often they find themselves out in their garden, participants reported going in to garden at least once a week. Most reported that, while they do try to get out there at least for a few hours every day, they do not always succeed. For Kate, 'it might only be ten minutes, or it could be two hours' but she tries to get out there and do something every single day. Susan similarly stated, 'I'm out in the garden every day. If it's a fine day, some part of my day is spent in the garden. ... I'm out there every day unless something prevents me.' Lily also reported on how often she succeeds in getting out into her garden:

I try and do a bit each day when I'm home, even if it's only half an hour. It's a big garden.
...most days but, more accurately, probably every second day in fine weather. (Lily)

Matt, on the other hand, stated that 'in terms of doing work, it's probably weekly. I sit in it all the time, but once every 3-4 months, I'll mulch and do a big clean.' Gardening for him, as for some others, does not always require a daily physical presence in the garden, doing laborious work. Rather, the more work-like activities, such as weeding and pruning, are performed in a largely unplanned or loosely structured manner, sometimes in the process of doing something else. Betty, for example, gave an account of the way she approaches her gardening duties:

I do (weed) on and off, all the time... I'll go out and hang the washing and you turn around and see a weed, and the next hour you've got a basket full of weeds. I rarely get up and say "oh next Wednesday I'll spend an hour in the garden". It's more "oh it's not a very nice day for the beach, I've done the washing" and I'll go out and spend a bit of time in there. (Betty)

Petra similarly stated that she takes a very relaxed approach to her gardening and prefers to allow the garden to evolve naturally with minimal interference from her. This casual approach apparently enables her to garden at her preferred pace and intensity, without being overly involved in it. So, as she explained, her garden is largely self-reliant:

I'm out in it every day, but I'm not doing stuff in it every day. I'll go out with my secateurs and if the rose needs trimming then I'll do that, or something else. ... Fertilise it if you think about it but I very rarely fertilise the garden. Maybe once a year, I'll throw that little pebbly stuff [fertilizer pellets] around, but it (garden) just does its own thing. ... I just refresh the soil with cow manure sometimes. (Petra)



Plate 13: Petra clearing out some of the debris from her garden.

The approach reported by participants suggests that while they may enjoy gardening, it is not something they take too seriously, hence their casual performance of it. If gardening is not considered to be worth too much time and effort, then this attitude could also translate into gardeners' approach to the prevention and eradication of invasive species. While it is commonly understood that gardening is a recreational activity, the management of garden escapes is something that does require some conscious effort on the part of the gardener. They will need to know how to recognise these plants when encountered in the garden and also how to best eradicate them, as some measures are better suited to some plants than others. Management success, therefore, calls for a (re)examination of the approaches currently adopted by gardeners, so as to make them aware of how important it is to remain vigilant when gardening.

6.3.2 Recuperation from stress

Like some of the gardeners above, there were other participants who reported that they might go into the garden on a daily basis but they did not spend all of the time in there doing work. For them,

being in the garden is a way of relaxing and recuperating from the stresses of daily life, so they view gardening not as a 'chore' but, rather, as a leisurely pursuit. As Jeff succinctly put it, 'gardening is not a chore... I just do it to relax.' He works in an industrial mine, which is both mentally and physically tasking, so he only gets to 'switch off' when he comes home to his garden. With some humour, he described his process of unwinding after a hectic day at work:

I work in a heavily industrial area, always have done. So it's my serenity... to the point where I use a pair of shears to do the lawn. I just sit on my bum with a beer in my hand and ... I'm not very good at it but... (Jeff)

Tom also spends a lot of his down time in his garden, just relaxing and observing the changes that have taken place since the last time he was in there. Being a single dad, he explained, means that most of his days are spent either at work or looking after his three kids who are still quite young. So, during those times when the kids are not around, he steals away to his garden just to wind down and relax.

Quite often, I'll make a cup of tea and when the kids go to the park, I'll just look at what's changed since last weekend. That's a beautiful thing to do. (Tom)

Linda also leads a pretty hectic life which does not give her a lot of time to do household chores though it was clear, from her explanations, that this is an activity she does not particularly enjoy anyway. Indicating clothes strewn all around the living room, she remarked that the sewing of her grandkids clothing is only one of the many items which she has had on her to-do list for a while. She does try, however, to always spend at least an hour every day in her garden doing something or the other because it allows her to 'escape' the daily goings-on and the mess inside the house. As she described it,

For me it's very relaxing. It's my stress relief, my escape. I can't do that in this house. ... Most days I'm out there doing something or another, moving plants, filling the bird water troughs etcetera. That keeps me busy. It's very therapeutic for me. (Linda)



Plate 14: Obvious excitement at being able to spend time in the garden.

Like Linda, Sandy also depends on gardening as a kind of escape though for her, it is from the worries associated with her husband's deteriorating health rather than a messy house. They are both keen gardeners but she explained that he was recently diagnosed with Parkinson's which is a degenerative disease and, as a result, will eventually lose his ability to garden with her. This, among other things, is a source of constant worry for her so gardening enables her to escape that worry, even if it is only for a short while.

I just turn off when I get out there. I love it. And my husband actually has Parkinson's so I think, eventually, he's not going to be able to do a lot. So it'll be my lifesaver. I'll be able to just go out there and switch off. (Sandy)

Eva, in expressing how relaxing she finds gardening, wondered aloud whether the moniker 'garden escapes' referred to 'a holiday where they take you around to look at gardens.' She finds it very

worthwhile to get out of the house, go into the garden and just leave all the stresses and worries behind. This is something which, she says, should be more frequently practised 'instead of people just sitting inside and being miserable.' She does concede that not everyone would be as keen about gardening as she is and remarked, quite humorously, that some of her friends even think her eccentric because of how much she loves it. This is not something that bothers her, though, because she derives a lot of pleasure and relaxation from just being out in her garden.

For me it's the look of things but it's also very relaxing. You might have all the worries in the world but if you get out in the garden and just start digging, it's just great therapy. ... I have friends who wouldn't get out in the garden if you paid them. And I'm sure they think Tom and I are a bit mad and eccentric over our garden. (Eva)



Plate 15: Participant relaxing in her garden while describing its contents.

Susan's reasons for gardening are much the same as Faith's; they both stated that gardening helps them overcome a predisposition to certain health concerns. For Susan, who suffers from anxiety attacks which became worse when she lost her husband, gardening allows her to distract her mind from anxious thoughts and helps to keep her calm. She is the appointed plant curator for her local

garden club and, as a result, is constantly busy visiting nurseries to buy plants which she then propagates for sale at the garden club meetings. In addition to propagating plants for her garden club, she also does the same for the rose society which her husband used to be a member of, prior to his death, as a way of honouring his memory. Keeping busy by gardening, in this almost non-stop way, basically leaves her no time to think or get anxious and she laughingly explained that though it may not seem like it, gardening does relax her.

I'm out in the garden every day. If it's a fine day, some part of my day is spent in the garden ... I love it. And it's relaxing because I've been a nervous person and had a few health issues. So I find it very relaxing. (Susan)

I do it for relaxation and also for health reasons, because I've got a few health problems and being in the garden does help. (Faith)

Approaching the garden as a place for escaping the worries and stresses of daily life also presents a challenge for successfully getting gardeners engaged in the management of garden escapes. Concepts of relaxation involve 'switching off', as Sandy put it; that is, tasks are done almost subconsciously in order for gardeners to achieve a fully relaxed state. This could, however, cause a gardener to become oblivious to the presence of invasive species in their gardens; if they are not looking for such plants, they may not recognise them even when present. So more of an effort needs to be made to target the way that gardeners understand what it means to garden; there needs to be a balance between relaxation and awareness of invasive species.

Notions of relaxation and recuperation are just some of the ideas underpinning the reported approaches to gardening enactments, and explain why it is often performed in a casual manner. The garden was always described as being good for the wellbeing of the gardeners and was either seen as a way of promoting wellbeing or as being important for restoring it once lost through stress and worry. In the following section, some of the other meanings which determine or influence what gardeners do will be explored so as to highlight the role which they play in shaping plant cultivation processes. It will also show how some gardeners might differ in their approach to the practice and, as a result, form their own individual ideas as to what the practice ultimately means to them.

6.4 Meanings which shape gardening enactments

During discussions about their approach to gardening, participants gave accounts of the decision making that goes into various aspects of plant cultivation. The mental machinations which influence decisions were of particular importance because it shed some light on the reasoning behind enacted

performances. All of the ideas mentioned were only recalled by participants upon self-reflection because, as they explained, these meanings are often not consciously thought about in the moment of performance. Similar to earlier reports, some gardeners consider gardening to be a way of relaxing and ridding one's self of daily stresses; alternatively, a few participants described it as a way of keeping fit and active. There were also aesthetic factors highlighted, as some participants reported that they are mostly driven by the need for a visually appealing garden and this was prioritised over other considerations.

6.4.1 Making a home

A garden to some gardeners is simply a necessary part of having a home, with a few of the participants expressing their confusion as to why anybody would choose not to have one. Petra and Eva are both very passionate gardeners and could hardly imagine not having a garden outside their homes. They both emphasised the fact that a beautiful garden is so much better than 'just a front lawn'; it also compliments a house and is, according to them, what transforms a house into a home. Eva commented, 'I can never understand people who have a lovely home and they look outside and there's nothing. To me, it complements the house.' Expressing similar views regarding the need for a garden in a home, Susan and Stephanie made the following remarks:

I go along on my walks and I look at a badly maintained house garden and think, "Gee that house looks miserable". Because I'm so used to having a yard full of things, I just think that's a bit boring that someone else isn't interested in gardening. I just think it brightens up the environment. (Susan)

I think it's a personal thing. These days, people have manicured lawns and manicured shrubs but I don't like that look. (Stephanie)

Caitlin also shared Stephanie's opinion that there appears to be a growing preference for low maintenance gardens, especially among younger gardeners. They both love vibrancy in the garden, however, identifying with Eliza's sentiment that 'I think when you're feeling a bit down, bright colours cheer you up.' For all of them, but particularly Caitlin who has since lost her sense of smell, a colour-filled garden holds more appeal than the increasingly popular monochromatic façade which some people seem to prefer.

I like to drive up my street and just find my garden. I like that it looks good, not just for me but that it looks alright on the street. ... Green is everywhere and when I go out walking, I look out at people's gardens and I think we've got very green gardens because

that's very easy to look after and maybe that's what I should do but I really love colour.

Maybe it takes the place of smell. (Caitlin)

The above comments touched on a recurrent concern expressed by some of the older gardeners, during the interviews. There was a feeling, amongst many, that gardening may no longer be as popular as it once was and that there are not enough young people interested in taking over from the older gardeners. Given that majority of the interviewees are aged well over fifty, this was, perhaps, a valid concern. Linda, who described herself as one of the youngest members of the Corrimal garden club, at 54, expressed the opinion that hers is probably the last generation of real committed gardeners. She opined that 'this new generation doesn't know a garden plant from a weed', suggesting that young people may not know how to go about gardening even if they were so inclined. It was an opinion that Pam shared, as she suggested a possible reason for the waning interest:

I think a lot of people just don't care. ... People also probably don't know enough about it and aren't into gardening as much these days. A lot of the people at garden club are just getting old and you don't get the young ones come because they're all working or looking after kids and things like that. They just don't have the time to look after a garden. I was taking a walk the other day and it's just wall to wall houses. There're no trees or greenery. I get sad when I see that because I think kids should have a garden to run around in. (Pam)

The reported idea of gardens being an essential part of a home was underscored by a perception that it beautifies the outlook of a house, making it appear more liveable. This view, however, often translates into the cultivation of what the participants commonly described as 'pretty' plants, which mostly comprised of the colourful plants previously highlighted. As earlier mentioned, these types of plants are very effective at attracting passing agents of dispersal, which then facilitate their spread, thereby perpetuating the garden escapes problem. If aesthetics is seen to be the most important criteria for plants, other factors like invasive potential might be overlooked and this is one conceivable reason for the ongoing cultivation of garden escapes.

6.4.2 Caring for nature

Probably one of the more obvious meanings which gardening holds for a lot of gardeners is the desire to cultivate plants which will enhance the natural environment. This often refers to aesthetics, where gardeners cultivate plants that give a beautiful outlook, but there are also ecological enhancements which have to do with the cultivation of indigenous species. For some participants,

the latter is their motivation for gardening and they described their gardens as native gardens which contained mostly indigenous plants. Although some of these gardens were not exclusively comprised of native species, the environment was a significant consideration in the gardeners' decision to cultivate the plants they did.

I love my gardening. It's a great pastime. ... I think we should all plant natives because these would all have been natives prior to settlement here. There's a creek at the back here and there are a few things like those tree ferns, they're natives and they're beautiful. I just love them. ... It's nice to see things grow because it enhances the environment. (Mabel)

Much like Mabel, Tom also considers himself a champion of the environment, listing it as one of three things which he lives by, the other two being family and rugby league. He describes his garden as an 'exclusively native garden' in which he only cultivates species that are native to the Illawarra; these are plants which he considers to be good for subsistence and sustainability. Expressing how passionate he is about environmental sustainability and how this influences his approach to and engagement in gardening, he stated,

It means a great deal to me. I can't think of the last time I would have bought a non-native. ... I have three things I live by: first is family, second is sports [rugby league] and the third is the environment. So gardening comes under the environment and my approach to it is that I want to do everything I possibly can to one be sustainable so that I set a good example for my kids and two I think that we are going to reach a point where backyard gardens are going to become necessary and third I think climate change is going to make things really different in the future. (Tom)

Matt's gardening is similar to Tom's, except for the fact that he is a lot more flexible in his preference for native plants. He prefers species that are native to the Illawarra and thinks that everyone else should do same for the sake of local wildlife, but he does concede that native gardens may not appeal to everyone. There is, after all, at least one non-native plant in his garden which he brought with him from Japan and that is why he reckons, 'if it looks good, then some exotic plants are still okay.' So while he agrees that gardeners should consider the local wildlife in their gardening practice, he believes plant choices should still be left up to the gardeners, so long as they do not choose invasive species.

I think people should be encouraged to grow plants that are endemic to the local area and not just Australia, and I do try and tell people that, because of the wildlife here. But

I think if something's not going to be dangerous or invasive, then people should be allowed to buy it. (Matt)

Plant cultivation for the benefit of the environment is not without potential risks, especially if the plant in question has not been previously cultivated within that region. There have been occasions where environmentally-driven gardening has resulted in unforeseen and often unwanted consequences, as previously highlighted by weed managers (Chapter 4). Betty did point out, however, that the 'weed authorities' can sometimes be indirectly responsible for gardeners planting undesirable species, when they do not lead by example. She recounted an experience she had walking with her husband one day when they came across a sign put up by the local council, which sought to deter people from planting *Agapanthus* sp. It had seemed hypocritical to her at the time because a few meters up the road, on the same council land, there were clusters of *Agapanthus* growing unchecked. The reason she brought this up was to make known her long-held belief that councils need to practise what they preach, if they hope to successfully deter gardeners from cultivating invasive plants.

We did a bushwalk one time and there was this big plaque when you walk about a half kilometre from Council Park. The plaque read "are you growing any of these weeds?" and *Agapanthus* was one of the plants they had on there. When you walk back up the bush path to the carpark, what have they got growing there? It wouldn't be half a kilometre from the sign that said "don't grow *Agapanthus*" and council's got two massive rows of them. (Betty)

Cultivating native species might be considered to be one solution to the problem of garden escapes spread, but it is not without controversy. The idea of what is 'native' and what is not is a debate that has been going on for a while, both within and outside academic circles, due to the fact that it is not a universally defined term. So a gardener that decides to avoid cultivating invasive species by planting what they consider to be native might have the right intentions, but there may be problems with the plant choices made. Molly's wattle tree is an example of a native plant that can also be invasive outside of its natural range and there are other similar examples of native but invasive species. The point, then, is for gardeners to ensure that whatever they plant is suitable for their particular location and this is knowledge that only comes following efforts, by gardeners, to make such enquiries.

6.5 Summary

This chapter follows on from preceding explorations of those aspects of gardening that occur long before the introduction of plants to a garden. It began by highlighting the preferred sources for garden plants and showed that nurseries and garden clubs are most frequently utilised, followed by online platforms which were not as popular. The trajectories of knowledge and skills employed during the process of cultivation were then explored, to show how gardeners continue to hone their gardening capabilities. Experience was reported to be the most favoured source of gardening knowledge, as participants largely adopted a 'trial and error' style of gardening, learning in the process of performance. In the event that other sources were consulted, gardeners tended to rely upon the knowledge and experience of other gardeners rather than places like nurseries which were seen as overly sale-oriented. As a result of this perception, garden clubs were the second most nominated source for gardening advice since they also provide a social setting where experiential knowledge can be shared by members.

Gardening was commonly described as an activity that should be performed at a time and pace most convenient for the gardener. Most did report a regular weekly engagement in the practice, though it was often done in conjunction with other activities or as a way of recuperating from daily stresses. This highlighted a common perception that gardening, and the garden, is important for fostering and restoring the wellbeing of practitioners. Other ideas, related to homemaking and nature stewardship, were also highlighted for the role which they play in determining what gardeners do and how they approach their particular enactments. While some gardeners reportedly focused on the aesthetic benefits of gardening, others had a more nature-oriented drive and thought of their gardens as being important for environmental sustainability. The following chapter turns attention to the aspects of gardening that happen after plants have been cultivated. It is especially concerned with issues related to the management of cultivated plants, and shows how particular enactments in the garden can facilitate the spread of invasive species.



Plate 16: A participant's garden in West Wollongong NSW.

CHAPTER 7

POST-CULTIVATION PHASE: Aspects of gardening which facilitate the spread of garden plants.

Introduction

The main purpose of this chapter is to demonstrate what it is that gardeners do, while gardening, that potentially facilitates the spread of invasive plants, whether intentionally or otherwise. It begins by exploring the ways by which gardeners handle the desirable products of their gardening performance; that is, what they do with the plants they have cultivated. The ideas associated with these actions are also highlighted to provide the rationale behind reported enactments. Following this, investigations move on to the unwanted products generated during gardening and how gardeners dispose of what they do not find useful. This is an important aspect to apprehend because of how often it was mentioned, during interviews with weed managers, as one of the ways by which invasive species spread beyond gardens. In the final section, weed management approaches are explored to create an understanding of the existing awareness of plant invasion and whether gardeners take steps to prevent such incursions. This will highlight the ideas which gardeners hold in relation to what belongs in the garden and what does not, as it is based on these perceptions that they would then proceed to rid the space of invaders. The preceding two chapters demonstrated the processes leading up to and including the cultivation of garden plants, whereas this one provides a final link between plant cultivation and eventual spread.

7.1 Making use of desirable materials

Most participants reported that they had, at one time or another, given their plants away to other people either as an exchange or simply as a gift. This was largely attributable to a common perception that gardening is an activity that fosters friendship among practitioners and exchanging plants was understood to be a friendly gesture. Most of these exchanges occur quite regularly at garden clubs, through the use of a trading table as well as other measures which facilitate the exchange process and make it easier for plants to be obtained. So whenever there was a surplus of plants, gardeners simply took them in to the garden clubs or gave them away to anyone who expressed an interest in having them. Exchanges were also common among participants who do not belong to garden clubs except that, for them, it was less organised and plants were simply swapped with neighbours, family and friends.

7.1.1 Plant exchanges

A love of gardening is not all that gardeners share; plants were often described as a kind of exchange commodity, especially among garden club members. For them, plant sales are the main source of revenue for club activities and members are often encouraged to bring in any plant excesses from their gardens, to be sold during monthly club meetings. Whenever she has a surplus of plants, Rose also likes to leave them by the front gate for people to take: 'if there's a huge glut of plants, I just stick them on the ground outside for people to take them.' This, she said, has fostered a great camaraderie between her and the neighbours who she tells to 'just take what they want'. Molly also stated that she often swaps her excess plants with friends and neighbours, exchanging the plants she has for those she does not have. She sees these exchanges almost as a necessity in gardening, so that she does not end up with too many of the same types of plants:

I exchange with... my neighbours and friends. I say "oh I see you haven't got such and such, would you like...?" and I don't mind because some plants propagate themselves like irises, you put in one and the next year, you've got three and it keeps multiplying so we need to pull them out and give them to people. (Molly)

To make it easier to exchange plants with other gardeners, Rose initiated a system at the Corrimal garden club which she called 'the wish book'. She described it as a book in which club members can write the names of any plant they want and if another member has it, the latter brings it in to the club meetings and offers it to them. Pleased with its adoption, Rose explained the reason behind the wish book: 'the nurseries are cutting out all the old varieties of plants... (they) only sell what's easy to grow and what they know will sell.' So it was apparently frustration with the increasingly limited plant varieties at nurseries that led her to conceive of the idea of this plant exchange system. She described how useful it has been for facilitating exchanges among several members of her garden club:

With the wish book you don't have to pay. The other day, Frances said she wanted some white geraniums [*Pelargonium* spp.] and I had plenty so I took her some and then Joanne brought me some white Valerian [*Valeriana officinalis*]. And it's lovely. Most people know what you're looking for and they say "oh I've got that" and they bring it to you. (Rose)

Lily is also an advocate of garden club exchanges: 'you know we share cuttings and we'll pot plants if we've got too many and take them along to share with our fellow members.' The process, Stephanie explained, is quite simple: 'you usually just bring it in and put it on the table and whoever wants it

can take it. First in best dressed.’ This pleasure in giving plants to others is what Felicity described as being the hallmark of a ‘true gardener’ but, as she put it, ‘true gardeners don’t really want an exchange. It’s more about give.’ So, for these gardeners, sharing really is caring and they regularly give their plants away to anyone who wants them. It was simply understood to be a way by which friendship is demonstrated in the gardening arena, so it was something that everyone engaged in without hesitation.

Don’t sell or exchange, I just give away... garden club members, anybody that comes to my garden and says they want a piece of something, they’re welcome. ... if anyone comes to my garden and they say “oh gee I’d love that plant”, the next minute, you’ve got it. (Felicity)

I give away a lot. Don’t sell any. ... just to friends, people from the garden club, and other friends. ... it’s also good to get things from friends because you can look at it and say “I got that from so and so friend” (Stella)

If I’ve brought something home that I’ve bought from markets and realised it doesn’t fit in my garden, then I’ll give it to Susan [garden club plant curator] and somebody else will buy it. (Eliza)

... people that come here and say “oh that’s really nice” and I’ll give them a cutting and there’s always cuttings and things going at the garden club. (Betty)

I give away. ... just friends or garden club or anyone that just says “oh I like that...” I’ll just give them and they might give me something in return and we exchange. (Sandy)

These plant exchanges were not limited to garden club members alone, as non-members also reported a similar tendency to swap or give their plants away to other gardeners. Ariana, for example, remarked that ‘there have been people who have wanted to take things (plants) and yes I give them.’ Matt also takes some cuttings from his garden in to his work place, to exchange with friends: ‘So my neighbours have a few and some friends. I swap orchids with a few people as well here at work.’ Jeff similarly shares his plants with his friends and family, especially when there is a surplus, as has previously been the case with Moroccan glory vine (*Convolvulus sabatius*), a ground cover plant. Despite not initially knowing what the plant was when he first encountered it in his yard, he went ahead to share it among his friends and family since it looked visually appealing and was also quite prolific.

It was in the garden when we moved in and it has spread, which I like because it cascades down the wall and softens up the wall. I've chopped pieces of that and given to friends and they've loved it. ... we dig up excess bulbs and share that way. (Jeff)

7.1.2 Sharing is caring

As has been demonstrated by the ongoing plant exchanges, gardening is often thought to be a fundamentally social practice which allows practitioners to connect with other like-minded people. This was certainly the most reported reason why participants joined garden clubs; there was an expressed desire to be in the midst of people who share a similar interest in and love of gardening. For Caitlin, though, it is more than that; she has a deep appreciation for the sentiments which plants can evoke and considers them to be more significant as gifts than store-bought presents. So, as she explained, part of her reason for growing roses is the fact that they make such meaningful gifts to take to her friends:

I love it looking good but mostly because I do want to take it to people... I had a friend in hospital and it was so nice to be able to just go out the front and cut half a dozen roses and just take them to her. It's like giving a present, like giving something that you've made. ... and that was my desire to start with was to be able to give people flowers without having to buy presents. (Caitlin)

Garden clubs, despite some participants reporting otherwise, are more inclined towards social than educational activities, with regularly organised member picnics and bus trips to open gardens. The club motto - 'Friendship through gardens' - also gives a good indication of how much of a focal point friendship plays within these organisations. Susan confirmed as much, stating: 'I've made some wonderful friends through garden club. ...it's just a group of people who are interested in the same thing - gardening.' She earnestly described gardening as being synonymous with friendship and social connectedness and it was this desire for social connection that Lily gave as her reason for joining her local club. As she stated: 'there's a great fellowship with the garden club members', which is apparently why Kate also decided to join the club, when she first moved to Wollongong a few years ago. It was her way of meeting people and making new friends when she did not yet know anyone in the area:

We've all got a common interest with the garden but it's more a friendship thing because we're new to the area. ... We've only been in Wollongong for 2 years. ... It's been a good source of social connection. And I think you'd find a lot of the ladies would say the same; it's the friendship side of it that they like. (Kate)

Eliza only made the decision to join a garden club following the passing of her husband, as her children were all grown up and had moved out of home. So the garden club, as she described it, offered her an avenue for companionship and friendship at a time when she might otherwise have felt lonely and isolated. Below she reflects on her initial reason for joining the Corrimal garden club, and why continues to stay even though certain aspects do not appeal to her:

I only joined this year when my husband died... The girls made me feel welcome, although I find their meetings boring. But they usually in a month go somewhere to look at someone else's garden or something like that... That is lovely. (Eliza)

All of Petra's children have also moved out of home, so she is left with her husband whose health is apparently deteriorating. As a consequence of that, she is no longer able to do a lot of the other social activities which she used to be engaged in, such as tennis, because she has to stay home to look after him. Her garden, however, has proven to be a kind of conversation starter which gets her engaging with passers-by because they often stop to admire and enquire about the different plants she has growing in there. When asked what gardening means to her, she explained how her garden catches the attention of people walking by on the street, who then stop to have a chat with her. Since she does not belong to a garden club, this has been her way of demonstrating friendliness through gardening because she also offers them cuttings of her garden plants:

Something I love and something that I like to make look nice, you know? People walk by and stop and talk to me and it's nice. They say "oh that's nice. What is it?" and I'm like "umm umm umm, would you like a cutting?" (Petra)

So it is clear that the ongoing exchange of plant materials is based on a commonly held notion that gardening fosters friendships; this was, in fact, considered to be the true meaning of the practice. This indiscriminate sharing of plants, however, is one obvious way by which gardeners can facilitate plant spread, especially without having any knowledge about the invasive potential of these species. There was no evidence given to suggest that the likelihood of invasion is something that is consciously thought about during the process of plant exchanges. Rather, in that moment of enactment, plants are merely seen as a gesture of friendliness and, therefore, harmless. To further explore ways by which gardeners potentially aid the spread of their garden plants into the wider environment, the following section examines plant disposal techniques. The main issue of interest is the dumping of garden waste, which has previously been highlighted as one of the most insidious ways by which invasive species spread from one location to another.

7.2 Disposing of unwanted materials

During the interviews, gardeners were asked to describe how they rid their gardens of the debris generated through their enactments. Most reported that they use the green bins provided by local councils but, when this was insufficient for the amount of waste generated, compost bins were utilised as a supplementary measure. These compost bins served two main purposes: they helped gardeners reduce the amount of debris that had to be disposed at the waste depot and also provided useful fertiliser for the garden. Both of these objectives were thought to be important for minimising the expenses associated with the garden, in the form of tip fees and the purchase of commercial fertilisers and mulch. In line with this aim to minimise expenditure, some gardeners also reuse most, if not all, of the debris generated from their gardens, spreading it as mulch over the garden beds. When asked what they thought of the illegal dumping of garden waste, most gardeners stated that sorting and separating the waste, using compost bins, was a more effective way of minimising cost. Some did, however, state that while they would never engage in dumping activities themselves, they could empathise with those who did because they also believed that tip fees are overly expensive.

7.2.1 Mulching and composting

The most popular means by which participants deal with debris generated as a result of their gardening enactments is to separate them into different types of bins, also using some as mulch. This was so that not everything generated in the garden is put in the green bin, thereby reserving the limited space for more hardy plant materials which would take a long time to break down. Another reason for performing this sorting procedure, prior to disposing of garden debris, is so that invasive plant propagules are not recycled at the depot and later sold to the gardener as mulch. So this was one of the reported ways by which participants avoid the reintroduction, into their gardens, of undesirable plants that they would prefer to keep out of it. As Betty explained, the fact that Wollongong gardeners pay to take their green waste to the tip increases the likelihood for weed spread, different than in Tamworth where disposal is free.

The tip down here is very different to the one in Tamworth. There you took your garden waste for free, and you bought the mulch... Down here, we took ours to the tip and they charge you to take your green waste but the mulch is free. But the mulch they have at the tip here, you wouldn't want. ... It's garbage mulch. The other one was good mulch because it was free. But here because people are charged for it... I'd like to see what

they do in Tamworth; because you can dump your green waste free, there's nowhere near as big a problem with runaway weeds. (Betty)

Betty also tries to make her gardening activities correspond with the week when the green bin is collected, so that any debris generated is put straight into it and is taken right away for disposal. Her years on Norfolk Island as a bush regenerator have made her very alert to the impacts which invasive plants pose and, as a result, she is careful to avoid knowingly contributing to their spread. Having previously lived on a bushland property that was prone to weed infestations, it appears that invasive plants have always been somewhat of a concern for her:

We've always lived in the bush until we moved here and, over the years, there've been a lot of trouble with things that are invasive: weeds and non-native things ... so I'm always conscious of what's invasive. ... We compost as much as we can. The only time we don't is... we don't put palm fronds in there because they just take forever to break down. (Betty)

Rose similarly does a lot of composting on her property, and she was quite proud of that fact: 'We compost. My husband's the compost king and he's very good. He does his rotations and all that.' In this way she reduces, quite considerably, the amount of debris that comes out of her garden and is rewarded with home-made fertiliser for her efforts. Ariana buys mulch from the local waste depot and, as a result, is careful to avoid putting anything invasive into the green bin which could then be processed and returned to her. She keeps a very watchful eye on her friend who is her gardening partner, to ensure that plant materials are put into the appropriate bins:

When he does the mowing then that goes in the compost heap. The fronds from the palms, they don't go in the compost heap, they go in the green bin and whatever excess there is goes in the green bin. (Ariana)



Plate 17: Rose's compost heap which her husband rotates on a regular basis.

So composting is another way by which gardeners avoid depending solely on the green bin for the disposal of their garden debris. It was a commonly reported way by which gardeners recycle, rather than dispose of, their green waste and doing so also enabled them to make their own home-made fertiliser for use in the garden. For some, composting was almost inseparable from gardening itself because only when the compost bin is full, do they put things in the green bin. Sandy, like Ariana, is also careful to sort her green waste in order to avoid re-invasion by Onion weed (*Nothoscordum inodorum*), a commonly reported problem plant for most participants. She explained how she deals with the unwanted plant materials generated from her garden:

It goes into my worm farm and I've got 5 compost bins. Certain things like my onion weed and anything biggish don't go into my green bin. (Sandy)

Other gardeners stated that they rarely find it necessary to use the green bin at all, instead making every effort to reuse whatever they can either as mulch or for some other purpose. For some of them, this was based upon environmental sustainability ideals but others, like Eliza, simply do it for practical reasons as well as to save cost. Her garden is quite a large one and could be described as recyclable because, as she explained, most of the debris generated from it is reused in one way or another, in the garden or inside her home. For this reason, she has reportedly made very little or no use of her green bins:

I have a massive compost bin down the back and I use the fallen twigs and things for leaf litter. So I don't buy mulch at all.... I use the wood for fire as well. ... and when it rains, I collect water in the garbage bins because I know I use a lot of water. (Eliza)

Tom also strives to reuse everything that comes out of his garden. Rather than disposing of his garden waste in the green bins provided by his local council, he proudly stated: 'I lay it on the grass in the back and break it up with shears then spread it around.' This did not make for the most aesthetically pleasing space to be in but, then again, previous descriptions of his gardening approach suggest that visual appeal has never really been a significant driver. So in line with his environmental focus, any debris generated from his garden gets recycled as mulch, in addition to providing a kind of rough bed on which his chickens lay their eggs. During the interview, the chickens could be seen running in and out of their wooden coop which was located in the back section of the garden, again tying in with his theme of environmental sustainability.

That section in the back garden, I call my rainforest because it's wetter and I use it for my dumping ground because it breaks down quicker and you want to return it back to its source. ... I've got chooks as well as you can hear and they love it. I get eggs every day. (Tom)

7.2.2 Perceptions of dumping

Given how much thought and effort reportedly goes into sorting and separating garden debris, it stood to reason that waste minimisation would be of considerable importance to most gardeners. To test this, they were asked to give their views on the issue of the illegal dumping of garden waste and whether they would ever condone it. Most participants condemned the practice as lazy on the part of the perpetrators, and stated that it was an activity they would never engage in. Eliza, for instance, gave a very pragmatic and to-the-point response about illegal dumping, using the example of a common garden escape, Wandering Jew (*Tradescantia fluminensis*). Her comment below expresses

her view on the matter and why she does consider it to be any kind of solution for dealing with excess garden waste:

if you go through the trouble of pulling Wandering Jew from your garden and dump it in the bush, the birds are gonna pull it up and from there and drop the seeds in your garden again. (Eliza)

Other gardeners were not so pragmatic in their responses, and expressed mixed feelings about the underlying reasons why some people might be compelled to illegally dispose of their garden debris. These participants went on to state that while they would never dump themselves, they could empathise with those who did because they are also of the opinion that tip fees are often too expensive. Jessica, for example, gave an estimate on how much it costs to take garden waste to the tip and her thoughts as to why people might see dumping as their only recourse. Using the example of Cotoneaster (*Cotoneaster glaucophyllus*), an environmental weed commonly dispersed by birds, she remarked,

The cost of taking it to the tip is something like \$13 per vehicle, more for a trailer. So by the time you've loaded up and driven there and then you pay a fee when you get there, depending how far away you are, it can cost you a lot and make you hesitate. Because if you take out Cotoneaster, you've got a lot of debris and I can easily see why people do. (Jessica)

Linda also shared a similar view of the costs associated with taking excess garden debris to the local waste tip, stating that she has previously had to pay the exorbitant fees. As a result, she came right out to say that she does not see a problem with dumping; that is, so long as it is done on one's own property and no one else's. She has a relatively large garden that produces a lot of green waste, more than she can fit into the two green bins which she has. So she simply heaps the excess in a pile over her back fence, on what she acknowledges as 'escarpment land', with the expectation that the heaped material will break down over time. She humorously gave the following response when asked what she thought about dumping:

Shhh ... So long as it's in your own backyard... I don't have a trailer to take it to the tip so it sits there and mulches down. The neighbours haven't complained, put it that way. (Linda)



Plate 18: Linda's backyard dumpsite where she heaps her garden debris.

Like Linda, Sandy also showed ambivalence regarding the appropriateness of people dumping their garden waste in bushland areas. For her, it comes down to the reasons behind the action; she supports it if it serves a greater purpose than just a desire to avoid tip fees. Expressing her thoughts on the issue, she cited an example of a time when she came across a dumpsite that was not entirely abhorrent to her:

It depends where you're doing it and what they're doing there. If they do it responsibly then it's ok. We did a walk up around the harbour in Sydney and some people had gone over the road and put some plants in, a lot of bromeliads and things, and it looked lovely. ... This was so that the bush wasn't looking at them all the time. ... it's gotta be done right... to get the birds or the animals in. (Sandy)

So despite the publicity surrounding the illegality of garden waste dumping, opinions still varied with regards to whether or not it was an acceptable way to dispose of unwanted garden materials. Most participants agreed that it was not appropriate, but some could think of scenarios where it might be justifiable. In relation to their own garden waste, participants expressed a desire to minimise the

amount of waste generated from their gardens and they often took steps to this effect. Compost bins were a particularly favoured means of reusing plant materials and served the dual purposes of reducing waste and making fertiliser which would be subsequently used in the garden. Some participants also reuse their garden debris as mulch, first sorting it so as to avoid the re-introduction of undesirable plants; this was one reported way by which gardeners avoid invasive species. The following section more closely investigates existing awareness of, and approaches to the prevention and eradication of invasive plants and also explores notions about what belongs in the garden.

7.3 Dealing with encroachments

Previously reported accounts have shown that gardens are not always considered to be the exclusive domain of plants alone; the desire to cater for animal inhabitants was also a common motivation. Earlier, some participants reported adopting a casual approach to their gardening enactments, often allowing the garden to evolve with minimal intervention from them. In these gardens, plants transported in by dispersal agents were simply allowed to grow where they may, with the gardeners viewing these incursions as 'free plants' and, therefore, welcome. To this end, animals were also considered to be an accepted presence in the garden and steps were often taken to make the space more conducive for these avian and terrestrial visitors. As a final effort to apprehend their gardening enactments, participants were asked to describe their approach to plant incursions and whether they take any steps to prevent transboundary invasion. The responses given reflect a common perception that when it comes to weed management practices, gardening is a private practice that should be left up to the gardener in question.

7.3.1 Response to plant invasion

The transboundary nature of garden escapes is an issue that would normally be expected to draw on the collaborative efforts of the members of a particular community or neighbourhood. One might be led to think that neighbours would want to keep the invasive plants, present on adjacent properties, from spreading to and invading their own gardens. To test the accuracy of this assumption, gardeners were asked if they would approach a neighbour about an invasive plant on their property which could potentially invade their own gardens. The response to this question was almost unanimously negative; most gardeners viewed this as a breach of etiquette which could potentially strain the relationship between neighbours. Kate's comment below gives a good representation of the general perception, among the respondents, regarding collaborative weed management.

Well that's their garden isn't it? I don't want to be a nosy parker ... if it was a really bad weed and it was coming into my garden then I might say something. But if it wasn't affecting me then I wouldn't say anything. (Kate)

For Ariana, 'a weed is simply something that's growing in the wrong place... maybe this is where they are supposed to grow.' She said this in reference to the less than conducive soil on her property which limits the types of plants she can successfully grow in her garden. As she explained it, 'a lot of the plants I have in the yard are what some people might call weeds, but they do the best.' Hers was an opinion that was shared by a number of other gardeners who stated that a plant that is a weed to one gardener might not necessarily be seen as such by another gardener. Gavin for example, described a hypothetical scenario where he might notice plants which he deems invasive in a neighbour's garden, and whether he would broach the subject with them:

It's not my business and he might like weeds. A weed to me is something that shouldn't be there. Now I'll pull out a tomato plant that's growing in amongst my plants because that tomato plant's a weed. But next door, he grows tomato plants so he might pull out my plant because he wants a tomato. But that's what a weed is: a plant that's growing where it shouldn't be. (Gavin)



Plate 19: Gavin in the process of cultivating some recently acquired plants.

Lily did initially state that she would be unlikely to broach the subject of weeds with her neighbours, saying, 'not really. I think that's a bit personal. They've got their problems.' This was, however, not counting the fact that she is currently engaged in an ongoing battle with some of the plants in her neighbour's garden, and has been for a while. One plant in particular, English Ivy (*Hedera helix*), appears to be her main concern because it creeps over the shared fence, causing bouts of nasal allergies whenever she or her husband goes near it. Talking to the neighbour in question does not seem to have helped the situation as, according to her, he is determined to keep the plant in his garden despite her many complaints. So now she just sprays her side of the fence, in the hopes of getting rid of the plant.

The back neighbour does have ivy that we battle to get rid of because it takes a lot of maintenance and makes us sneeze for 2-3 days but he's totally obsessed with having ivy on the fence. It's a bit of a nuisance. ... I was looking for advice in the garden section of Bunnings. I wanted something environmentally friendly and they suggested a mite spray and I'm yet to try it so we'll see. (Lily)

Other responses to the question of approaching a neighbour about weeds on their property had to do with gardeners not wanting to appear hypocritical in the eyes of their neighbours. The general feeling was that there are bound to be weeds in every garden so no one gardener has the right to complain about another person's weeds, when the former might have some of their own. As the following comments indicate, participants were quite hesitant about raising the issue of invasive plants with neighbours, especially if they did not have an existing cordial relationship with them.

A whole lot of weeds grow right next to our place and I often say how I would really love to just be able to just pull those up but I don't, because it might be rude. (Stephanie)

Not really. It's their garden, they might like it. Haha. No it doesn't worry me. I've got weeds in my garden so I can't complain about anybody else's. (Felicity)

Probably not because I'd think, "well it's not really my business". It's someone else's yard. Besides I think I've got enough weeds in my yard without worrying about someone else's. There's always weeds. (Susan)

The only problem I can think of, with that, is that they might think I was mental if I just like went up to their house and said "hey there's a weed in your lawn". That's probably the reason why I wouldn't do it. Otherwise, I might just sneakily go and get it, but I definitely wouldn't go and tell them. (Daniel)

There were some exceptions like Betty and Molly, who stated that they probably would feel comfortable approaching their neighbour about the weeds on their property. This was, however, because they had already established a good rapport with their neighbours and, therefore, had no concerns that the relationship might be ruined. Betty is very friendly with her neighbours and often weeds their garden for them because, as she put it, 'the people next door don't garden'; so she simply goes in and sprays their weeds for them. Molly's property, on the other hand, is surrounded by nine others and she confessed, 'I sometimes feel sorry because they're my weeds. So I deal with them by leaning over and pulling them out.' In this way, she tries to take responsibility for the plants which might have escaped from her garden onto the properties of her neighbours who she says keep very pristine gardens. As for preventing weeds in her own garden, she mostly relies on suppression rather than eradication, as she explained:

When you have arthritis as I do, it really hard to pull out little weeds unless they're a bit bigger and you can sort of grab hold of them. ...I lay down newspaper and put mulch over and that suppress them. But you could wake up in the morning and a little animal has dug it out. So as much as I can, I put newspaper down. (Molly)

Rose, on the other hand, considers weeds to be an inevitable consequence of gardening and does not see any point in trying to eradicate them from her garden or talking to anyone else about them. She expressed the opinion that weeds are so ubiquitous in the landscape that 'if I get rid of mine, it's not going to make the slightest difference', so she simply does not worry about them. Since she does not attempt to eradicate hers, the neighbours' are also of no concern to her: 'It's their business. And they can say "well what about yours?" Unless it was something really terrible, no I wouldn't.' So despite admitting, 'I have got this lingering guilt that I'm not being completely environmentally aware', she does not engage in any preventive or counteractive measures to avoid plant invasion.

I've got pure horrible weeds that drive us mad. ... It's really hard to eradicate ...I pull them out and they just come again... they're all over the escarpment. ... I just think in the grand scheme of things, if I try and keep them out of my garden, it's just a little drop in the ocean. (Rose)

Being away so often from his garden, Daniel reported that he has taken steps to minimise the amount of weeds he has to deal with in his garden. By this, he was referring to the raised garden beds which apparently keep his plants 'contained' and separate from other neighbouring plants, thereby minimising the potential for weed invasion. Like Molly, he also uses mulch to suppress any

persistent weeds that might come up through the soil but admits that this does nothing to prevent aerial spread which is often facilitated by birds and insects.

I have raised plant beds so it's not a huge issue. If something does run out of control in my beds, then they're contained. So it's not a huge problem. ...there's a few things that come and go but for me, I'm quite on top of it. I mean, I mulch quite heavily. Again being away quite often, it just makes it easier to keep the weeds down. (Daniel)

So despite previously reporting a perception among participants of gardening as a social practice, it appears that when it comes to preventing invasive species, it becomes understood as a private one. Individually cited, but generally accepted, ideas about what it means to be a good neighbour was reported to be the main reason behind aversions to any sort of collaborative weed management. Added to this was the widely shared perception that plants are only 'weeds' if they are not wanted in the space where they appear, so invasion was considered to be subject to interpretation. There was, however, some evidence to suggest that gardeners understand that garden plants can often be introduced by animals, even though very little was done to counteract or prevent this. Rather, these introductions were often perceived to be an inescapable aspect of gardening and, therefore, accepted as such, regardless of invasive potential. The animals were, themselves, frequently described as deserving their own place in the garden alongside the plants.

7.3.2 Animal presence in the garden

One of the commonly reported reasons why gardeners continue to engage in the practice is a desire to cater for the local wildlife. Some participants reported that they were either active bird watchers, conservationists or just loved seeing animals come into their gardens. Lily, for example, is not overly selective about what she cultivates in the garden, describing her garden as 'a mix of everything'. The only requirement she has is that the plants do not grow so tall in front of the house such that the front aspect becomes obscured. She is, however, a great lover of birds and explained that this is the reason why her front garden is comprised mainly of native plants; they were deliberately planted to attract avian wildlife into the garden. Watching the little animals frolic in the garden, while having breakfast, is one of her favourite pastimes and is something which she indulges in daily.

We like the natives up the front because it brings the birds in. ... I put a feeder and some water (in the trough) and we sit out here and have our meals and watch the birds. It's lovely. (Lily)



Plate 20: Lily's dining table adjacent to her garden where birds regularly visit.

Molly is also a very passionate birdwatcher; it is an activity which she got interested in because of the dwindling numbers of bird species in her local area of Bowral, in the Southern Highlands of NSW. She goes out regularly with her local birdwatching group to the Mittagong creek and remarked that the local council is always encouraging residents to plant native species 'for the birds'. Her gardening practice and the plants she cultivates are, therefore, very much in sync with her desire to create more habitable spaces for birdlife so she described her garden as a kind of 'bird haven'. One of the deciding factors, she says, which determines whether she keeps a bird-introduced plant in her garden, is whether or not the plant is utilised by the birds in some way or another.

I know that the black-tailed cockatoo adores it so I'm happy about that ... a lot of the birds really like the introduced plants so it doesn't worry me too much, but as to plants coming, if I find them pleasant then... (Molly)

Caitlin, who probably expressed the most specific preference when it comes to her garden plants, also reportedly recognised a pressing need to create as many havens for local wildlife as possible. Despite only ever wanting a rose garden, she stated that she also has some native plants in the back section of the garden, mainly to create a space which birds can make use of. She does not think very

highly of native plants because they 'don't have the colour and that's a bit disappointing' and she laughingly threatened to take them out if they 'don't come good with colour'. It was quite obvious that she prefers a colourful garden, which is why the few natives present are hidden away in the back section of the garden where they do not intrude on her aesthetic ideal.

I've got enough natives I think and I've put them all together because they don't have to be looked after as much and they're all along the back and the birds come to those and that's part of why we've got them too. (Caitlin)

Jessica, like Caitlin, also has specific selection criteria for the plants which she cultivates, but unlike aesthetic attributes like colour and shape, she requires her plants to serve a practical purpose. She is, however, a volunteer with the local Landcare group and, as a result, is very conscious of the need for wildlife habitats and bird sanctuaries. So, apart from her practical plants, she also cultivates some other plants which would be of some benefit to the local wildlife. Describing her garden and the plants in it, she said,

I'd call it a practical native garden. There are a few exotics though. Most of the exotics that I grow are for habitat. The birds like the nectar, so I like to provide all year round food. (Jessica)

Not every participant was as fixated on birdlife; others had a broader spectrum of animals which they try to cater for in their gardens. Mabel, for example, refuses to even contemplate using any sort of chemical herbicide in her garden because, according to her, she worries that it might harm some of the little animals living in there. She loves the animals just as much as she does her plants and, for that reason, tries different alternative and sometimes unconventional methods for getting rid of invasive plants. One of these methods, which she swears by, is the pouring of boiling water over the plant that is to be eradicated, though she admits that this may not work on every plant. She, however, considers this to be a more palatable option than harmful chemicals which might harm other creatures as well as the targeted plant.

The best thing I've found for killing off a plant is boiling water, it kills it straight away. ... I won't even use the snail bait because we have the most beautiful water dragon because I think if I use that, the lizards might get it and I wouldn't like to think that I've harmed any of those. So I just don't use it. (Mabel)

Rose and Felicity similarly reported that much of their gardening and the plants they cultivate is motivated by a desire to cater for the little animals that also make use of the space. They appear to

derive a lot of pleasure from seeing little animals in the garden, but there was also an undertone of biodiversity conservation in their comments:

I'm really gardening for birds, bees, butterflies, lizards, kids and beauty but I'm very pleased when I see bees around my plants because we've got a bee problem in Australia. ... we love to sit and be in the garden as well and I'm fascinated with the birds so as soon as I hear a bird calling, I'm out there to see who's there today. Even the lizards and others. (Rose)

I try to encourage the lizards and native animals as well. I don't grow many veggies, I do grow some for the lizards. ... most of my gardening is for the birds and other animals. (Felicity)



Plate 21: Felicity showing off her wildlife garden (left), with a pond for its aquatic residents (right).

The pertinent issue regarding the presence of animals in the garden, which these gardeners do not often think about, is the fact that they often serve as agents of dispersal for plant propagules. This, in turn, enables the plants to spread from one place to another. A number of garden escapes are

very efficient invaders precisely because they attract birds and other animals which then help them to extend their natural range of distribution. Part of the problem, here, is that some gardeners understand and even celebrate these plant transfers. Ariana, for example, credits the birds with a number of the plants in her garden. She emphasised that though she had never deliberately planted any of the palms, she is not displeased with their presence in the garden since she sees these sorts of introductions as 'gifts from the birds.'

The birds come, they do their thing and then all of a sudden, I'll find that I've got a palm here and a palm there. ... I do not agree that these plants [garden escapes] shouldn't be planted. Why would you do anything against such beautiful growth? (Ariana)

While walking through her garden, she pointed out several plants which she believes must have been brought in by birds, wind, or through other means of dispersal. These included the Mickey Mouse plant (*Ochna serrulata*), Jasmine (*Jasminum polyanthum*) and Japanese Honeysuckle (*Lonicera japonica*), all of which are well known garden escapes. Ariana was not alone in her views about bird-introduced plants, as Petra also stated that most of her plants have simply turned up in the garden over the years and had not been planted by her. She takes a very relaxed approach when it comes to her garden:

My garden does what it wants. I can't even see the soil. Things grow that I've never planted and, next door, nobody's lived there in ages and so we get weeds over from there. (Petra)

For both Ariana and Petra, having plants unexpectedly show up in the garden was simply something they understood to be part of what it means to be a gardener and was even a source of pleasure for them. Jeff also sees a certain level of inevitability to the issue of plant introductions via dispersal agents and remarked:

Other than banning plants, it'll be pretty hard to stop people planting these plants and you can't stop the wind blowing them, that's the design of nature. You can't get rid of birds to stop the spread, so I don't know. (Jeff)

This understanding of gardens as being the domain of animals as much as plants is one underlying reason why gardeners do very little to prevent potential or actual plant invasion. In fact, there was a general perception that because the term 'weeds' varies in meaning from one individual to another, there was hardly any need to discuss or be concerned about it. As a result of this view, the issue of weed encroachment from neighbouring properties was not something that was often contemplated

or even guarded against. Exceptions were only deemed necessary when the evidence and resultant impacts of invasion could no longer be ignored, such as in the case of Lily who suffers allergies induced by the neighbouring ivy plant.

7.4 Summary

This chapter has highlighted the various ways by which gardening enactments lead to the spread of invasive species, sometimes inadvertently. Investigations began by focusing on how gardeners handle and make use of the material products of their gardening enactments which they consider to be desirable. This revealed that gardening is commonly understood to be a social practice that brings people together, which is why plants are regularly exchanged among gardeners as a sign of friendliness. Sharing plants with other gardeners, especially in garden clubs, was also a way by which gardeners dealt with their plant excesses, with some also giving plants away to friends, family and neighbours. The second aspect of post-cultivation explorations relates to the disposal of unwanted materials produced during the process of gardening. Findings revealed that gardeners often strive to find alternative uses for their garden debris, and often utilise composting and mulching techniques as a way of minimising the waste generated. To this end, there were also reports of regular sorting and separation of garden debris in order to avoid the re-introduction of undesirable plant materials through recycled mulch.

In the final section, weed management approaches were investigated to understand the existing level of awareness around plant invasion and what steps gardeners take to prevent encroachments. This revealed that contrary to earlier views of gardening as a social practice, when it comes to weed management, it is believed to be a private practice that should be left up to the individual gardener. So even though there was a general knowledge about the impacts associated with invasive species, very little was done to avoid or counteract the possibility of these plants entering the garden space. The reason for this inaction relates not only to the fact that weeds are considered to be ubiquitous and subjective, but also because animal presence in the garden was viewed as normal and accepted. As a result of this perception, plants brought in by animal dispersal were commonly described as being inevitable and, therefore, not worth eradicating since they would only be re-introduced at a later time.

This chapter, along with the preceding two, gives a detailed account of the findings derived from interviews conducted with gardeners located within the Sydney Basin Bioregion. The pathways through which elements of materials, competences and meanings travel, during gardening, have also been investigated to illustrate how the practice comes to be performed the way it is. In the

following chapter, the major research findings will be analysed and situated within broader research literature to demonstrate its relevance to the future management of garden escapes. To this end, ensuing discussions will highlight potential avenues through which efforts can be better directed to curtail the ongoing cultivation and spread of invasive garden plants.



Plate 22: A participant's garden in Wollongong NSW.

CHAPTER 8

DISCUSSION

Introduction

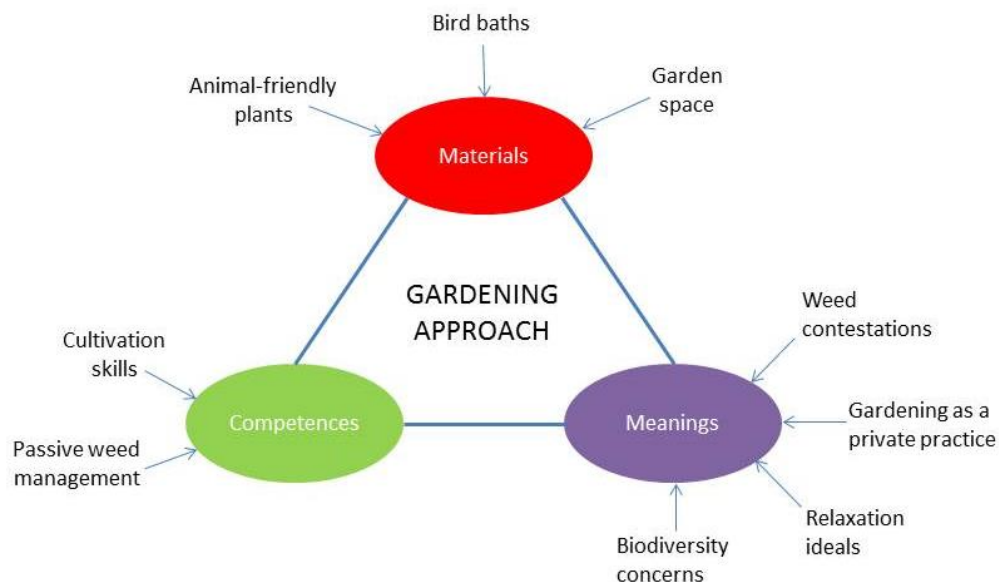
As described in chapter 1, the aim of this research is two-fold. It explores gardening enactments so as to identify potential points for intervention with regards to the management of garden escapes. Explorations revolve around the interrelated elements of materials, competences and meanings, all of which work together to shape the way gardening is performed. The findings from these investigations have been presented in preceding chapters and will form the basis for discussions here, where they will be assessed against relevant studies¹ conducted elsewhere. This chapter is, therefore, specifically geared towards understanding the interconnections between practice elements and how they relate to the management of garden escapes. To this end, the discussions are organised according to four main findings, each of which addresses an aspect of gardening that has some implication for future efforts to control the spread of garden escapes.

The analyses begin with an examination of gardeners' reported approach to gardening and how this influences their management of invasive plants. Also discussed are the existing ideas about what belongs in the garden space and what gardeners consider to be 'invasive', as this has been shown to vary from one individual to another. Following this is an exploration of the link between plant choices and eventual plant spread, especially given that some of the attributes favoured by gardeners are those which make a plant invasive. The preferred sources for gardening information will also be addressed since it gives an indication as to why there continues to be lack of awareness regarding plant invasion matters. Finally, the focus turns to one of the more obvious ways by which gardeners facilitate the spread of garden escapes - plant exchanges. These informal plant swaps have been previously described by the gardeners as a normal part of gardening so understanding how they occur will highlight potential points for management intervention. All of the aspects of gardening addressed in this chapter have some relevance for curtailing the ongoing cultivation and spread of garden escapes; they are part of the problem, but can also help to resolve it.

¹ The studies deemed relevant here are those that have investigated some aspect of gardening, or gardeners, and can offer some insight into possible reasons behind the various findings reported in this thesis. As was stated earlier (in section 2.3), research into gardening enactments tends to be narrowly and exclusively focused on aspects related to the human gardeners, to non-human actors, or to the broader implications of gardening. This, unfortunately, has resulted in a dearth of research that explores gardening as a practice with underlying elements. Nevertheless, there is much to be gained by drawing on existing knowledge around the various aspects of gardening performance. The referenced studies, therefore, though not practice-oriented, provide a useful way to make comparative sense of the present research findings.

8.1 Approach to gardening

The way gardeners view and approach their gardening has been shown in the preceding chapters to have implications for their attempts, or lack thereof, to prevent the spread of garden escapes. Given that what comes to mind when thinking about gardens is that they are spaces within which plants are cultivated, animal presence could be perceived as secondary to that purpose. However, the reverse is the case for the gardeners in this study, most of who stated that the main reason why they garden is to attend to animal inhabitants of the space whilst also enjoying the plants. So there was a widely-shared perception of the garden as a place for both plants and animals and this resulted in the purposeful encouragement of the latter into the garden, using various materials. This, however, presents a problem for management efforts given that these animals are also agents of plant dispersal which facilitate the spread of garden escapes. The outcome of their gardening approach is that practitioners rarely concern themselves with plant invasion matters, instead preferring to let plants grow where they may. Petra, one of the gardeners, summed it up in the following statement: 'so long as it's neat and tidy and it's not taking over like a weed, it's alright. If it's going to take over the ones I put in, then it's out'. So as long as the introduced plants do not interfere with those that had been purposely planted, gardeners do not mind their presence in the garden. Figure 8.1 gives a diagrammatic representation of how relevant practice elements interact to result in the reported casual approach to gardening enactments and weed management.



Note: This figure is only meant to be an overview of the main factors that influence gardening approach and does not show the individual differences among the gardeners. These are rather discussed in the text.

Figure 8.1: Elemental configuration shaping gardening and weed management approaches.

8.1.1 Nature stewardship

In the present study, gardeners may have reported a casual-like approach to their gardening enactments but they cannot strictly be referred to as casual gardeners, at least not according to Cheng (2010). She described this group of gardeners as people who make little or no effort to improve their gardening knowledge and skills, as compared to others who take their gardening more seriously. The present findings, however, show that there is some extent of ongoing knowledge acquisition among the gardeners, though the source of that knowledge varies according to existing perceptions. In practice terms (Shove *et al.*, 2012), the element of competences (knowledge acquired) was developed by the gardeners according to the ideas (meanings) they associate with their particular practice performance. So while the participants do not wholly fit the label of ‘casual gardeners’, it was clear that they approach the practice casually and see it as a relaxing activity that relieves stress and restores wellbeing (meaning).



Plate 23: Ariana's favourite alcove in her garden where she goes to relax.

This link between gardening and wellbeing is consistent with the findings of other research which show that health restoration is a commonly reported motivation for engagement in gardening activities (Clayton, 2007; Gross and Lane, 2007; Freeman *et al.*, 2012). In the study by Clayton (2007), gardeners revealed that the reason why they think of gardening as a stress relief is because the garden is itself valued for being a peaceful and quiet space. This was a feature recurrently expressed by the gardeners here, who referred to their gardens as a place that they could retreat to in order to escape existing worries and calm anxieties. The notion of gardening for relaxation was a meaning shared by all the participants, though there were different ideas as to which aspect of the practice evoked feelings of relaxation. For some gardeners, it is the actual process of gardening that calms them; thereby linking demonstrations of competence with the meanings associated with the practice. Others simply enjoy relaxing in the space, finding it to be a good place for winding down after a stressful day. This highlights the co-constitutive relationship between materials (garden space and the plants therein) and meanings (relaxation) which, along with enacted competences, shape the practice performance.

Freeman *et al.* (2012) found similar attitudes among her gardeners, adding that gardening not only relieves stress but also keeps older people from becoming bored and gives them a much-needed sense of purpose. This is, perhaps, one possible reason why older gardeners seem to be overrepresented in the present study; the reported benefits appear to hold more relevance for them than a younger cohort. In line with this, Park *et al.* (2008) suggested that the reason why older gardeners continue to garden is because it sparks and sustains their interest in the seasonal changes that take place within the garden. So as animatedly described by Hitchings (2003), plants have a way of capturing the interest of gardeners who then feel compelled to keep tending them while eagerly anticipating the reward of a bloom.

Among the gardeners in the present study, this anticipation also extended to the presence of animals within the space and deliberate steps were taken to make the garden more habitable for local wildlife. This reflects what Wakkary *et al.* (2013) revealed about their Green-DIY practitioners who tended to appropriate materials based on existing meanings, which mainly had to do with the pursuit of a greener lifestyle. For the gardeners here, there were underlying meanings relating to a concern for local biodiversity which resulted in their choice of gardening materials, including things like bird baths and wildlife ponds. Cammack *et al.* (2011) reported a similar motivation among their gardeners, some of who also self-identified as keen birdwatchers. Their findings revealed that gardens were in fact designed to maximise interactions with visiting wildlife and, like the gardeners here, there was an underlying concern for the local biodiversity. Unlike the present study, however,

where wildlife gardening was an acknowledged goal, for the gardeners interviewed by Cammack *et al.* (2011), it only became apparent upon self-reflection.

Domestic gardens have been repeatedly hailed to be a potential solution to the declining rates of biodiversity, which has been largely attributed to increasing rates of urbanisation (OEH, 2011; Cameron *et al.*, 2012; Goddard *et al.*, 2013; Doody *et al.*, 2014). Gardeners are also commonly encouraged to take up wildlife gardening in order to contribute to the provision of habitable spaces for local biota (Smith *et al.*, 2006; Davies *et al.*, 2009; Goddard *et al.*, 2013). So it is no wonder that at least in this study, gardeners appear to have heeded the call; there was a definite overtone of biodiversity conservation in the approach reported by the research participants. However, the desire for animals within the garden was not solely driven by environmental altruism; these creatures also contribute to the earlier reported idea of gardening as a calming activity. This is the reason why there were recurrent reports of gardeners having their meals, entertaining friends and just generally relaxing in the garden, while watching the animals frolic in the background. As Wakkary *et al.* (2013) put it, “meanings are often entangled with each other but can lead to complementary benefits” (p. 17). For the interviewees here, shared meanings of relaxation and concern for biodiversity led to the appropriation of necessary materials and useful skills which would ultimately attract wildlife to the garden.

What gardeners do not consider in their endeavours to have animals in the garden is the fact that these wandering animals are some of the most effective dispersers of plant propagules (Randall and Marinelli, 1996). This means that invasive plants can easily be transported across great distances and deposited in gardens whenever the animals drop by for a visit, thereby perpetuating the garden escapes problem. In this study, however, the transboundary introduction of unsolicited plants was commonly understood to be an ineluctable aspect of gardening and was not considered to be worth guarding against. This gives a clear illustration of the interrelationship between competences (weed prevention), meanings (relaxation ideals and biodiversity concern) and materials (things that bring animals into the garden). The outcome of this relationship is that little is done to eradicate invasive plants from gardens since the gardeners believe that the plants will simply be reintroduced, at a later time, by animal visitors. So gardeners are not only casual in their gardening enactments but also in their weed management approach and as will now be discussed, not everyone agrees that all garden escapes should be avoided.

8.1.2 Passive weed management

The idea of what constitutes a weed is something that was shown to vary among the respondents in this study. It was generally agreed that the term ‘weeds’ does not have a universal meaning and this made it difficult for the gardeners to see any point in taking action against such species. This inaction was also driven by the shared idea that a plant that is a weed to one person may be useful to another person, in some other way. So based on this belief that weeds can be useful (meaning), gardeners often allow invasive plants (materials) to remain in their gardens, seeing no need to employ eradication skills (competences). Doody *et al.* (2014) found similar ambiguities in perception among the gardeners they interviewed in New Zealand, who expressed varying opinions regarding which plant species they consider to be a weed. The authors came to the realisation that gardeners consider weeds to be subject to interpretation, and this often hinged on the personal encounters between an individual and the plant in question. If a plant behaves in a way that is construed as unacceptable (such as excessively producing seeds and spreading beyond its cultivation limit), then it was seen as a weed but “if it looks good it isn’t a weed” (*ibid.*, p. 131).

Other studies have also demonstrated how a particular invasive species, whether plant or animal, might be both reviled by some people and favoured by others (Head and Muir, 2006; Kull and Rangan, 2008; Trigger *et al.*, 2008; Trigger *et al.*, 2010). Cane toads (*Bufo marinus*), for example, are notorious for the damaging ecological impacts they have on biodiversity, yet some call for them to be bludgeoned on sight while others treat them as pets (Trigger *et al.*, 2008). *Lantana* spp., equally notorious for its debilitating impacts on biodiversity, is nationally condemned on the WoNS list but to some people, it “isn’t necessarily totally bad because it’s bird habitat” (Head and Muir, 2006, p. 518). Similar contestation around what a weed is was evident throughout the present study; participants identified several invasive plants in their gardens which they did not believe should be classed as such. The gardeners could always justify, in their own way, the presence of these plants and opined that as long as animals find the plants useful for food or habitat then it should be okay to cultivate them. In this way, they unwittingly link the three practice elements which lead to their plant choices; plant cultivation (competence) is tied to ideas of gardens as animal spaces (meaning) and plants (materials) are chosen accordingly.

These contextual understandings of what an invasive species is, and the casual approach adopted by most gardeners, has led to a reduced and often non-existent vigilance regarding garden escapes. This was made evident by the overwhelming majority of participants who stated that they did not concern themselves with plant invasion matters but simply accept any plant they find in the garden. It is, perhaps, the reason why so many studies have highlighted the need for greater community

awareness regarding the detrimental consequences of ongoing garden escapes cultivation (Williams and West, 2000; Timmins and Blood, 2003; Zagorski *et al.*, 2004). Gardeners may be aware of the recommendation to avoid certain garden plants that are clearly invasive, but it appears that they are yet to fully appreciate the severity of the situation. They do not appear to see much of a role for themselves in relation to this issue. This certainly seemed to be the case for the participants in this study; only one gardener (Betty) expressed any concern about invasive plants and this was because of her past experience with *Lantana* spp.

Also consistent with the present findings, Prinbeck *et al.* (2011) reported an attitude among gardeners that invasive species are so ubiquitous that any attempts, on their part, to prevent them would be futile. These gardeners felt that they did not have adequate knowledge to distinguish invasive from non-invasive plant species and, as a result, were unsure about the best way to dispose of such plants. This largely reflects the findings here, which show that gardeners are not only casual in their approach to gardening enactments but they also tend to be passive in their weed management. There was very little evidence of any conscious effort to prevent or eradicate garden escapes, mainly because of a perception that there was no point to it since the plants would just reinvade the space. This idea (meaning) led to a sense of resignation that was shared by all the interviewees. Some were especially frustrated with the ever present onion weed (*Nothoscordum inodorum*) which is hard to get rid of because of its prolific seeding characteristic and its deep root system. According to the gardeners, the only effective ways of eradicating this plant are by using the herbicide, Roundup, or by covering the area with a black plastic sheet, neither of which they find appealing. For this reason, gardeners resort to manually pulling out the plant which inevitably leaves some root bulbs behind and enables it to persist in the garden, hence their frustration with its presence.

Different than the Prinbeck *et al.* (2011) study above, participants in this study revealed some awareness about invasion matters despite the fact that little was done to counteract it. The gardeners could identify plants in their gardens that are known garden escapes, and could also describe ways by which these plants spread from one location to another. Most of these introductions were attributed to the animal visitors but were considered to be welcome additions to the garden and, therefore, not worth eradicating. This confirms what Bartiaux (2008) found in relation to energy consumption, that individuals do not just assimilate environmental information and behave accordingly but are also influenced by other factors. Those factors, here, are meanings related to gardeners' desire for animal encounters in the garden and the perception that weeds are an unavoidable consequence of that interaction. These are the ideas that result in materials being

utilised to draw animals into the garden and the lack of competence regarding weed prevention and eradication. Kelley *et al.* (2006) also revealed, from their survey of gardening enthusiasts, that knowledge about plant invasion does not always translate into actions being taken to prevent the introduction of such species.

The other interesting reason given for this passivity in weed management was a desire to avoid meddling in the (gardening) affairs of other people, particularly neighbours. Widely shared ideals of neighbourly etiquette (meaning) resulted in the noticeable lack of weed management skills (competence), thereby aiding the unfettered movement of plant materials. This was a view expressed by every participant and was the main reason why they would not even contemplate talking to neighbours about invasive plants that could potentially invade their gardens. Neighbourly dialogues of this sort were only deemed necessary when there was an obvious need for action; that is, when the detrimental impacts of that invasion could no longer be ignored. It was interesting to note that when it comes to weed management, gardening was described as a private practice that should be left up to the individual gardener. This is in stark contrast to the other most dominant meaning associated with gardening, in which participants framed it as a social practice that brings people together (see section 8.4).

A similar reluctance among neighbours to openly collaborate in the transboundary control of invasive species has been reported elsewhere (Ravnborg and Westermann, 2002; Graham, 2013). Although neither study was particularly focused on urban domestic gardens, they do offer insight, as the present research does, into the often latent factors that hinder successful weed management. Graham (2013), especially, revealed that the reason why people are so hesitant to talk to neighbours about weeds is because of the fear of ruining social relationships and this was the same reason given by gardeners here. Only those participants who already have a friendly relationship with their neighbours stated that they would not hesitate to approach the latter about any concerning plant invasions.

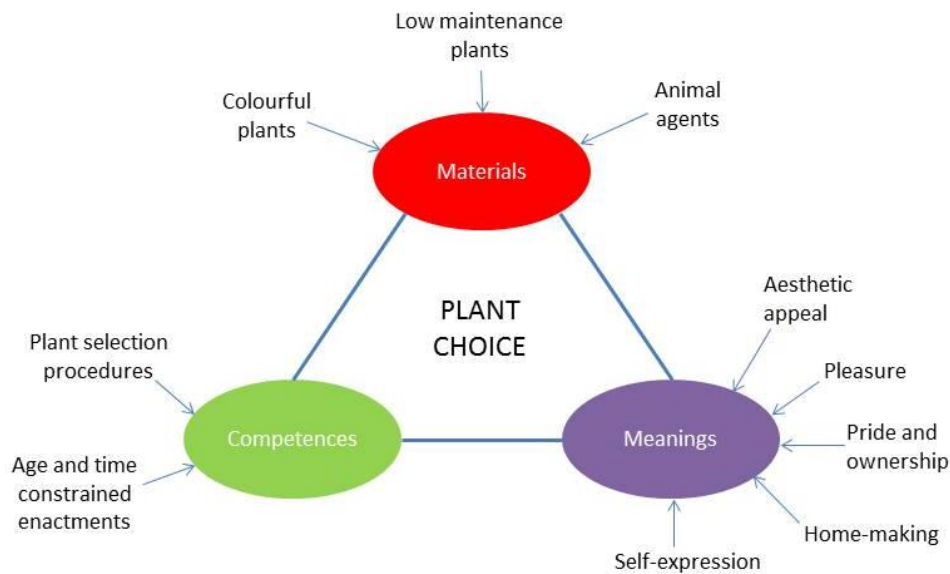
The empirical evidence presented in this study regarding the reasons why gardeners adopt a casual engagement in gardening activities has been supported by relevant studies elsewhere. All demonstrate that gardeners are often motivated by their perceptions of the garden and their ideas about how gardening should be done (meanings). They subsequently act in accordance with those ideals (competences) and appropriate the materials necessary for their particular enactments, which include plants as well as other inanimate objects. The findings also show that gardeners have some knowledge about plant invasion but do very little about it, suggesting a need for greater awareness about the impacts associated with garden escapes. Then maybe it would become clear that weed

prevention needs to be a collaborative effort, as Dominic (weed manager) put it, and not something to be ignored or discounted as being of little concern. The following section discusses issues relating to plant preferences and shows how choices made by gardeners can contribute to the spread of garden escapes, thereby affecting management outcomes.

8.2 Plant choices

One of the most confounding aspects of the garden escapes issue is that the very features which gardeners find desirable, in their garden plants, are often the same ones that make plants invasive (Kelley *et al.*, 2006). Aesthetic attributes like brightly coloured flowers and low maintenance were two of the main factors highlighted by gardeners as being most important in their plant selection process. The third factor relates to the cost of plants, as gardeners reported that they always aim to get the most value for their money; in other words, cheaper plants are favoured over more expensive ones. This price factor will, however, be discussed later in this chapter because it has resulted in what is a common propensity to exchange plants among gardeners, thereby leading to further plant spread.

Existing potential for invasiveness did not feature as a selection criteria in this study. Rather, the garden was often described as a means of self-expression and plants were chosen accordingly. Gardeners often sought flamboyant plants that would improve the visual appearance of their gardens and, in turn, their homes. This highlighted a perception of the garden as a source of pride and ownership. These gardens, however, are most likely to contain or lead to garden escapes because the plants are most attractive to dispersal agents like birds, which then transport the plant propagules elsewhere. Low maintenance requirement was the other plant attribute favoured by gardeners. This was largely to do with age and time constraints, which was often an unavoidable limitation for some. The gardeners failed to realise, however, that plants which require minimal attention may very successfully invade spaces beyond the garden boundary where there is no gardener to tend them. As Figure 8.2 shows, reported preferences and the composition of gardens are a consequence of multiple interconnected factors which inform decision making and lead to eventual plant choices.



Note: This figure is only meant to be an overview of the main factors that influence plant choices and does not show the individual differences among the gardeners. These are rather discussed in the text.

Figure 8.2: Elemental configuration influencing decision making and eventual plant choice.

8.2.1 Desirable features, undesirable consequences

While expressing their preference for particular garden plants, participants nominated aesthetic features as being the main selection criteria they consider in their decision making. The favoured attributes include colour of petals and foliage, as well as how the plants fit in with the predetermined design of the garden. Of course aesthetic ideals, which come under the element of meaning, vary from one individual to another and, as a result, the plant materials cultivated would also differ based on individual preferences. It is factors like this that contribute to the dynamic nature of individual practice performance (Shove *et al.*, 2012); in this case, different preferences lead to varied plant selections and associated skills. What was common to all participants was the pursuit of certain aesthetic ideals that evoked in them a sense of satisfaction with the outcome of their gardening endeavours; that is, a ‘beautiful’ garden.

These findings are consistent with those of other studies which show that aesthetics is a common motivation for gardening engagement (Head and Muir, 2006; Cheng, 2010; Kortright and Wakefield, 2011; Kendal *et al.*, 2012a). In the study by Kortright and Wakefield (2011), aesthetics was found to be one of five principal determinants of garden type; others were, *inter alia*, a desire to grow one’s own produce, and practice environmental sustainability. Both of these motivations were also reported by some of the gardeners in the present study, who tend to cultivate plants that celebrate these ideals. Head and Muir (2006), similarly, categorised gardeners according to the types of plants which they cultivated: committed native gardeners, general native gardeners and non-native

gardeners. For all three categories of gardeners, aesthetics always featured as one of the three most important factors that the gardeners considered when selecting plants for cultivation.

In the present study, gardeners used terms like 'beautiful', 'favourite colours' and 'nice to look at' in reference to their garden plants, and only cultivated plants which they believed to suit those labels. Cheng (2010, p. 148) also reported a similar language among her casual gardeners who used phrases like '*make surroundings look beautiful*', '*have some colour through the garden*' and '*seeing the loveliness all year round*'. This shows that for the gardeners in both studies, the desire for visual appeal (meaning) was an especially important driver that influenced their plant selection process (competence) and the materials used. Kelley *et al.* (2006), however, make an interesting note that some of the features which gardeners desire when making plant choices can imbue those plants with a greater potential for invasiveness. Luken and Thieret (1996) also make the point that invasive plants continue to be introduced by gardeners because they offer some value, often aesthetic, that the gardeners desire for their gardens. Translated into practice terms, invasive plants (materials) continue to be cultivated (competence) because gardeners seek certain abstract ideals (meanings) which the plants are believed to embody.

Aesthetic traits such as bright colour and flamboyance, which were commonly favoured in the present study, are especially concerning because they easily attract agents of dispersal like birds. This, in turn, facilitates the escape of those plants from the garden when propagules become attached to the birds and are accidentally transported, or the seeds are eaten and later deposited elsewhere. As Mack (2005, p. 1169) put it, "choosing species and cultivars with large numbers of showy, fertile flowers or seeds ... increase the propagule pressure of the species", thereby increasing the likelihood of bird dispersal. There have been yet other studies which demonstrate the correlation between brightly coloured plant propagules and increased potential for spread, via dispersal agents.

Groves *et al.* (2005), for example, highlights the case of Bridal creeper (*Asparagus asparagoides*) which produces a lot of bright red berries that are eaten by birds and subsequently translocated. This is what makes this species such a successful garden escape; it is now listed as a weed of national significance (WoNS) because of its damaging environmental impacts and prolific seeding habit. Kern (2006) also identifies a number of brightly coloured garden escapes, including red cestrum (*Cestrum elegans*), boneseed (*Chrysanthemoides monilifera*) and cotoneaster (*Cotoneaster* spp.). All three plants are known environmental weeds that are dispersed across great distances through the action of birds and other animals, as a result of the bright colours of their flowers and seeds. Based on this

evidence, there can be little doubt as to how challenging this fixation on aesthetics can be, especially because some of the above plants were also present in the gardens visited in this study.

The desire for particularly coloured plants was not only indicative of gardeners' preferences, but it also highlighted an aspiration to create a space that is a reflection of their individual personalities. This was the reason why participants tended to choose plants that flowered in their favourite colours, so that in full bloom they would feel a sense of pride in their gardening accomplishments. It is a clear illustration of how gardening enactments (competence) and plant selections (materials) are influenced by aspirations of satisfaction and pride (meaning). Such pride, Parry *et al.* (2005) explains, relates to the fact that a visually appealing garden improves the overall neighbourhood aesthetics which, in turn, imbues the gardener with feelings of self-admiration and self-confidence.

Burgess (1989, p. 55) also stated in agreement that gardening "can contribute to feelings of not only control and independence, but also pride in their residence". He was referring specifically to older gardeners. These views align with suggestions, made by gardeners in the present study, that having a beautiful garden transforms a house into a home and the absence of one detracts from the appeal of such a house. In this way the participants introduce a new meaning for the practice, home-making, and tie it in with already existing ideals of pride and aesthetic desire. All three meanings then come together to result in plant selections they make. This is another one of those entanglements earlier mentioned by Wakkary *et al.* (2013) whereby meanings merge together to produce the same outcome, herein of the selected and cultivated plants.

Bhatti (2006), however, suggests that the reason why older gardeners might view their gardens as a source of pride is because it offers a conspicuous demonstration and evidence of their mental acuity. In other words, having a nice garden makes it known to observers that the gardener is still fully competent. Conversely, a dilapidated garden would also be seen as a negative reflection of its owner. Though this link was not explicitly investigated in the present study, it does bear consideration given that most participants are aged over 65 and could, therefore, be classified as 'older gardeners'. In any case, the gardeners were expressly proud whenever they had managed to successfully realise their aesthetic desires for their gardens, and disappointed when they could not do so. Their garden plants were always selected according to those ideals.

8.2.2 Low maintenance, high invasion

Being largely comprised of older practitioners, the present findings perhaps unsurprisingly revealed that low maintenance is a most important criterion for gardeners in their plant selection process. This is consistent with the findings of Palma *et al.* (2011), who revealed that gardeners consider

maintenance requirements to be one of the three most influential factors that determines their plant selections. The other two factors identified were price and vibrant colours, both of which also featured in the three most frequently nominated factors in the present study (price will be discussed later in section 8.4). For now, it is important to note that the desire for low maintenance plants was reported by older and younger gardeners alike. This showed it to not just be a consequence of age but also time constraints, as those who are still in the workforce expressed the same preference for plants that would only ever require minimal care. So plant materials were clearly selected on the basis of the gardeners' own assessment of their competences, which was subject to health and time constraints. This inevitably (re)shaped the meaning they associate with the practice; the older gardeners now view it as a low intensity activity while the younger ones are governed by time constraints.

Other studies have also reported a similar preference among gardeners for plants that do not require a lot of maintenance effort (Burt *et al.*, 2007; Chappells *et al.*, 2011; Crochetiere, 2012; Kendal *et al.*, 2012a). Kendal *et al.* (2012a), for instance, carried out an exploration of the types of attributes that gardeners value in their choice of garden plants and whether this is directly reflected in their garden composition. Their findings revealed that next to aesthetic factors, low maintenance is the most sought after plant trait and this was indeed reflected in the types of plants found in the gardens visited. Other less popular attributes reported by those gardeners had to do with functional roles like screening and filling a space. Similarly, certain functional features like fire-resistance and sturdiness were also desired by gardeners in the present study but these were only important to people who are located in bushland areas. For them, plant materials were dictated by external climatic factors and their knowledge of suitable species (competence), both of which led to a view of gardening as a functional endeavour (meaning). Other participants simply favoured low maintenance plants for the very reason that they require minimal tending, so that the gardeners did not have to spend too much time looking after the plants.

Chappells *et al.* (2011) usefully described four categories of gardeners, according to reported perceptions of what the garden is for and the kinds of activities that are done within the space. One of these categories comprised gardeners who base their gardening around the need for convenience and, as a result, reported a preference for hardy species that would survive being neglected. Unlike these convenience gardeners, however, who came to view their gardens as a burden rather than a source of pleasure, there was no suggestion of any such displeasure in the present study. If anything, the decision to cultivate low maintenance plants was often described as a way for gardeners to continue doing what they enjoy, whilst overcoming limitations imposed by age and other factors. In

addition, these types of plants enable a gardener to spend less time working in their garden so that they can have more time to appreciate the outcome of their gardening efforts.

Burgess (1989) suggests that it is important for gardeners to feel satisfied with the effort they put into gardening, otherwise it may eventually lead them to lose interest in the practice altogether. This loss of interest is the defection which Shove *et al.* (2012) highlights as one of the ways by which practices fade and become obsolete, when practitioners no longer enact regular performances. It also explains why so many participants stated that while they may strive to regularly go out into their gardens, they do not spend all of the time in there doing work. There was a common understanding that gardening should also be a pleasurable activity (meaning), and this was enough to keep the gardeners interested and engaged in ongoing performance.

It is clear that there are many possible reasons why gardeners prefer low maintenance plants, including the fact that it allows them to keep on gardening in spite of unavoidable constraints. This plant preference, however, presents a challenging conundrum for the management of invasive species because plants that require little or no attention often turn out to be the most successful invaders (Bell *et al.*, 2003; Drew *et al.*, 2010; Crochetiere, 2012). So by planting these species, gardeners are essentially making it so that whenever these plants transcend the garden boundary, they are able to outlast other species that require more tending than they do. It is quite unfortunate that gardeners do not make this connection between low maintenance trait and invasive potential because the latter rarely featured in this study as a plant selection criterion. Low maintenance, though, has been shown to be a good indicator of gardeners' plant purchasing preference; resilient plants are the most likely ones to be repeatedly bought by gardeners (Palma *et al.*, 2011; Crochetiere, 2012).

Despite earlier reports of existing knowledge regarding invasive plants, the above findings show that when it comes to plant selections, invasion potential does not feature in the selection process. The prioritisation of criteria like aesthetic appeal and low maintenance requirements, over invasiveness, suggests that there is a gap between professed knowledge and gardening performance. So there are at least two possible scenarios: either gardeners are not quite as knowledgeable as they make out to be or they are simply not concerned about plant invasion. The following section discusses both of these possibilities, and shows how knowledge translates into action in gardening. It also highlights where gardeners tend to seek information from and why. Understanding the preferred sources for gardening knowledge will prove to be important for future efforts to disseminate relevant information to gardeners, in order to change their performance.

8.3 Knowledge sources

Present findings indicate that there are two main avenues through which gardeners learn what to do in their gardens and how to go about doing it. Above all else, experience was the most preferred way by which gardeners gain knowledge; not just personal experience but interpersonal as well, in the form of advice sought from friends and family. To this end, garden clubs were an especially favoured source of external knowledge because members were believed to have accumulated years of gardening experience which they could then share. Sources like nurseries and the internet were also occasionally utilised, though not to the extent that gardeners appear to rely on their own personal experience and the experiences of garden club members.

Nurseries were considered to be useful for information that related specifically to morphological characteristics, but they were not believed to be a reliable source for other gardening information. The respondents expressed the opinion that nursery staff are mostly hired to sell plants and may, therefore, not have the knowledge needed to deal with particular gardening issues. Online platforms were also not a popular source of gardening information, and were mostly used by younger gardeners to acquire plants rather than to seek advice. Notwithstanding, the internet does present an opportunity for the dissemination of gardening and weed management information that is specifically targeted at a younger demographic. This, along with all the other sources mentioned in this study, will prove to be important for future management efforts to stem the ongoing cultivation and spread of garden escapes. Each one highlights the avenues through which gardeners can be more effectively educated about matters relating to the avoidance and eradication of invasive garden plants. The factors which determine the most utilised sources of gardening information are presented in Figure 8.3 which shows how each element relates with others to influence reported preferences.

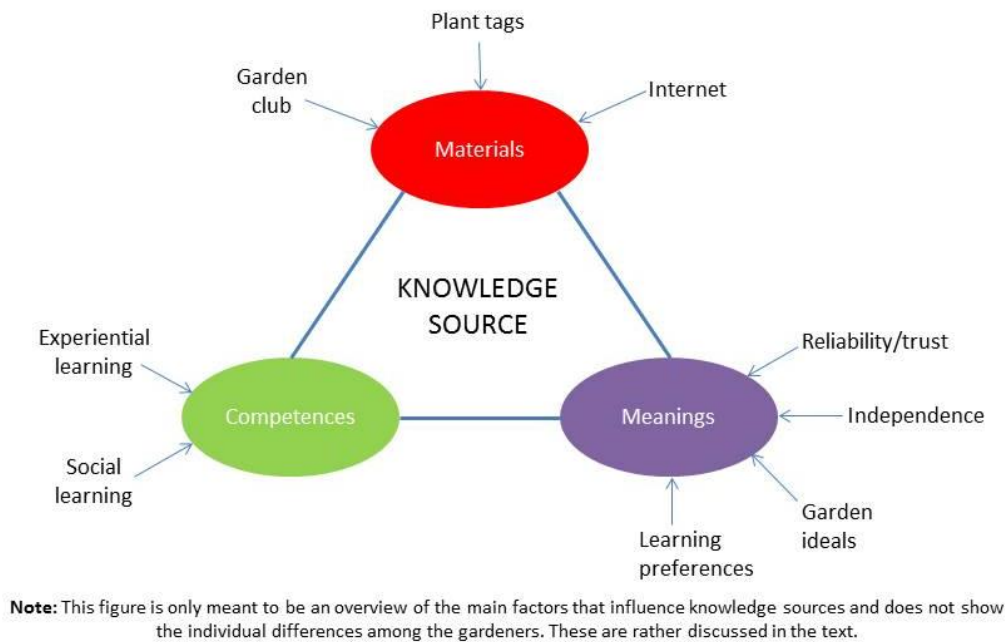


Figure 8.3: Elemental configuration showing preferred sources of gardening information.

8.3.1 (Inter)personal experience

Like the everyday repairers described in the study by Wakkary *et al.* (2013), gardeners in the present study also tended to rely on their existing knowledge and rarely felt the need to augment it. Experiential learning, which Armitage *et al.* (2008, p. 88) simply describes as “learning-by-doing”, was reported here to be the preferred way by which gardeners learn about gardening. This is, however, not a commonly investigated source of gardening knowledge as most gardening research tends to focus on other sources external to the gardener’s person. These frequently explored sources include friends, neighbours, family, nurseries, internet, garden clubs, books, magazines, media broadcasts, among others. In the present research, however, all of the afore-mentioned sources were identified to varying degrees but experience was, by far, the most utilised source for gardening information. It was nominated and discussed so often by the participants as the preferred option for learning that it could well be described as the single most influential source of their gardening knowledge and skills. The practice element of competences is, in this way, shaped by gardeners’ preference for independent learning and the shared notion that experiential knowledge is sufficient (meaning).

Kortright and Wakefield (2011) give an indication of just how experience can shape gardening performance, though their focus was on food growing rather than ornamental gardening. The aim of their study was to determine how much food growing in individual households contributes to community food security, but the findings revealed more than just a significant contribution. Their

explorations showed that there exists an important relationship between early experiences of gardening and eventual gardening performances. It was revealed that gardeners who grew up in a gardening family tend to also become gardeners themselves, often emulating their childhood gardening experiences. The present findings show a similar tendency for gardeners to draw from childhood experiences in their gardening enactments. It was during this introduction to gardening that practitioners first formed meanings, developed competences and learned which materials to use. Of course some of these elements did change over time.

What is seldom considered in this experiential learning process is whether previous experiences are currently applicable given that factors like climatic change can often alter plant responses. The interviewees shared the opinion that knowledge accumulated over years spent gardening is enough to make a gardener adequately skilled to handle any gardening issue. This meaning translated into a lack of weed management skills (competences) and is also entangled with another meaning that so-called 'weeds' are too ubiquitous to be worth the eradication effort. However, as research has shown, plant invasiveness is a dynamic concept that can take years to manifest in a particular species or it may only become apparent in certain locations with favourable conditions (Rotherham, 2005; Pyšek and Richardson, 2010; Crossman *et al.*, 2011). So a reliance on previous gardening experience, as the preferred source of knowledge, could lead gardeners to fallaciously believe that plants that used to be unproblematic continue to be so. In actual fact, these plants may have only become recently invasive due to factors like climatic change but gardeners would not know this unless they update their knowledge with current information.

The other popular source of experiential knowledge was the advice acquired through friends, family and other social connections, often at garden clubs. This is the sort of knowledge acquisition that is often referred to as social learning, and occurs when people seek information from social networks rather than external sources (Lave, 1991; Hodson, 2001; Faiers *et al.*, 2007). In this way, preference for social learning (meaning) leads gardeners to actively seek advice from places like garden clubs (materials) and this influences what they actually do in their gardens (competence). Other studies have also reported a similar preference among gardeners for personal sources of gardening advice, rather than non-personal sources like nurseries (Varlamoff *et al.*, 2002; Kelley and Wehry, 2006; Clayton, 2007; Meyer and Foord, 2008). The point of difference between these studies and the present one lies in the fact that garden clubs were not included as part of their investigations, whereas here they featured quite prominently. This organisation, therefore, presents one useful avenue through which gardening information and weeds management recommendations can be effectively disseminated to gardeners.

Although their focus was on domestic energy consumption, Faiers *et al.* (2007) inadvertently offer a possible explanation as to why gardeners might favour personal contacts over non-personal ones. As the authors explained it, “individuals usually favour information that confirms their beliefs and so will seek that information out” thereby exhibiting “‘confirmatory’ bias” (ibid., p. 4385). This could be translated here to mean that gardeners might be seeking to validate what they believe to be ‘right’ based on their experience, by seeking out others who are likely to share similar views. It is, however, not clear whether this perceived predilection was the case for the gardeners in the present study but it does merit further investigation to determine its transferability and accuracy. If the reported preference for personal sources of information is, indeed, because of the so-called ‘confirmatory bias’ then this could have some relevance for the management of garden escapes. It would explain why weed managers are finding it so difficult to get their message out to gardeners (see Chapter 4). Gardeners may simply not be interested in such ‘unwelcome’ information.

8.3.2 Non-personal sources

Despite suggestions to the contrary (Kerrigan, 1993; Dempster, 2002), nurseries were shown in the present study to be a much less utilised source of gardening knowledge than personal connections like those in garden clubs. This was largely due to gardeners’ shared belief (meaning) that friends and family would be more likely to give reliable advice that is based on firsthand experience. Nurseries, on the other hand, being a commercial enterprise, were seen to only be interested in sales and as a result, interviewees did not believe that staff had the proper knowledge about gardening matters. In this way, the element of meaning can be seen to determine which materials gardeners use (garden clubs) or prefer not to use (nurseries) as a source of gardening information. This finding highlights the importance of garden clubs, and differs from other research which shows that nurseries are the preferred source for gardening-related information among gardeners.

Brand and Leonard (2001), for example, conducted a survey of single-family residences in New England to determine their gardening habits and preferences for seeking information. The respondents revealed an overwhelming preference for nurseries (65%) over garden clubs (4%), which is in direct contradiction to what has been reported here. Crochetiere (2012) also found that nurseries were the second most popular source behind media sources, while Hu and Gill (2015) reported that 62.3% of their respondents preferred to seek gardening advice from nurseries. The study by Hu and Gill (2015), however, also showed that friends and family (59.4%) were the second most utilised source of gardening information, thereby indicating the significance of personal sources of information. The above studies suggest that information targeted at gardeners may be better communicated through nurseries but present findings show that personal sources, like

garden clubs, are equally important. It is not that nurseries were not used at all here but, rather, that gardeners were uncertain about the credentials of nursery staff and, as a result, tended to avoid relying on them. So while the preference for garden clubs seen here may relate to the fact that most participants are club members, the point remains that gardeners favour personal sources of gardening information.

What was considered to be useful knowledge obtained from nurseries is that which is printed on the information tags attached to the plants sold. This information was considered to be important for ensuring that gardeners have adequate knowledge about plant growth features, so that they do not cultivate species that may be turn out to be unsuitable. So the plant tags (materials) contained information that shaped cultivation skills (competences), but there were also underlying meanings which led gardeners to consult the tags in the first place. Participants who had very specific ideas about aspects like garden style (Gavin and Tom) and flower colour (Eva and Matt) use the tags to ensure that plants conformed to those ideals (meanings). This demonstrates how meanings can determine the materials utilised in the performance of a practice like gardening, and how competences derive from both elements.

Plant tags may, therefore, present a potential opportunity for effecting the necessary change in gardening performance as it relates to garden escapes management, since gardeners do read them. Yue *et al.* (2011) sought to test just such a possibility, and discover whether labelling plants as invasive would in any way deter gardeners from purchasing such species. Their findings revealed that invasive labels did deter some but not all gardeners from buying such plants; some people were still willing to pay for them. The authors concluded that even though there was not a uniform disinclination to purchase plants labelled as invasive, it is still a measure worth considering as a way to prevent future introductions. This suggestion is supported by the present findings because it is clear that gardeners do, in fact, consult the plant tags whenever they buy plants from nurseries. However, it must be noted that nurseries were also not the preferred source for plants reported by the gardeners (see section 8.4), which might hamper the efficacy of this labelling strategy. If gardeners do not often buy plants from nurseries then they are less likely to access the information on plant tags. Other measures will, therefore, be needed to back up this plant labelling strategy.

Online platforms may offer another avenue through which gardeners can be educated about gardening and plant invasion matters, especially those gardeners who do not frequent nurseries. The internet has already been highlighted here (chapter 4) and elsewhere (Australian Weeds Committee, 2007; Humair *et al.*, 2015) as a high risk pathway for plant invasion but it may also offer a way to resolve the problem. In the present study, the internet was cited by a few gardeners as

being an occasional source for gardening information, though it was more commonly utilised by younger than older gardeners. Computers, in this way, are a material element that both require and shape competences; operational skills are required in order to access online information which, in turn, influences gardening enactments. The use of online sources by younger gardeners is consistent with the findings of Meyer and Foord (2008), who revealed that this demographic is more likely to use the internet than their older counterparts. In spite of this, there are other studies which support the viability of the internet as a useful platform for educating gardeners; a sizable proportion of the respondents nominated it as their information source (Clayton, 2007; Behe *et al.*, 2008; Crochetiere, 2012).

This section has highlighted what Wakkary *et al.* (2013) revealed about Green-DIY practitioners; that is the fact that meanings can often be the most influential element in particular aspects of practice performance. In relation to gardeners' preference for seeking information, competences (knowledge acquired) and materials (garden clubs, nurseries etc.) always derived from associated meanings (gardeners' perceptions). In this way, all three elements remain interconnected and each one constitutes the others but meanings appear to be the starting point that leads to the incorporation of the other two elements. Watson (2012, p. 490) also describes, using the example of courier cycling, how meanings can be "sources of dynamism" when they initiate the observable adoption of relevant competences and materials.

The sources of gardening advice identified here offer the empirical evidence needed for weed managers to better tailor education strategies to suit the preferences of target gardening audiences. Gardeners have been shown to exhibit a preference for personal rather than external information sources, so this tendency will need to be accommodated if greater awareness is to be achieved. The following section gives a further demonstration of how shared meanings can result in enacted gardening performances. It unpacks the social aspects of gardening and shows how the perception of gardening as a social activity has resulted in actions which perpetuate the garden escapes problem. What this highlights is some of the more obvious ways by which gardeners aid in plant movement and, by doing so, add to the difficulties associated with curtailing the spread of garden escapes. So these discussions will enable weed managers to make the necessary adjustments to their management approach. This is especially important given that gardeners tend not to overly concern themselves with plant invasion matters and may, therefore, be unaware of how much they are contributing to the problem.

8.4 Social connections

Gardeners may differ in their ideas about gardening and their performance of it but one thing they appear to agree on is the perception that gardening is essentially a social practice. The pursuit of social connection was a common and recurrent motivation among the participants in this study, and it was the main reason why so many decided to join their local garden club. These organisations, however, did not merely serve as a place where gardeners could interact and share their experiences (see section 8.3). Garden clubs also provided an alternative and cheaper avenue for sourcing plants, which gardeners take full advantage of. So for most participants, the garden club was their main source for plants. These plants are often bought from a nursery, propagated by one club member and then sold to others at a cheaper rate. In this way, gardeners are able to get a lot of plants at low cost.

Plants were also described as being a kind of exchange commodity, such that cuttings are frequently exchanged or gifted from one person to another. This was reported to be a very common practice in garden clubs where members would share their plant surplus with others and it was seen by the interviewees a sign of friendship and goodwill amongst gardeners. In other words, since gardening is perceived to be synonymous with friendship, plant exchanges are the physical demonstration of those shared friendship ideals. The problem with this process, however, which gardeners do not consider, is that plant exchanges are one of the more obvious ways by which plants spread as a direct result of human facilitation. If the exchanged plants turn out to be invasive, then it becomes all the more challenging for weed managers to achieve much success in their efforts given that these swaps happen quite informally. A visual illustration of the complexities surrounding plant exchanges is presented below (Figure 8.4), and shows how widely shared friendship ideals can inevitably aid the spread of garden escapes.

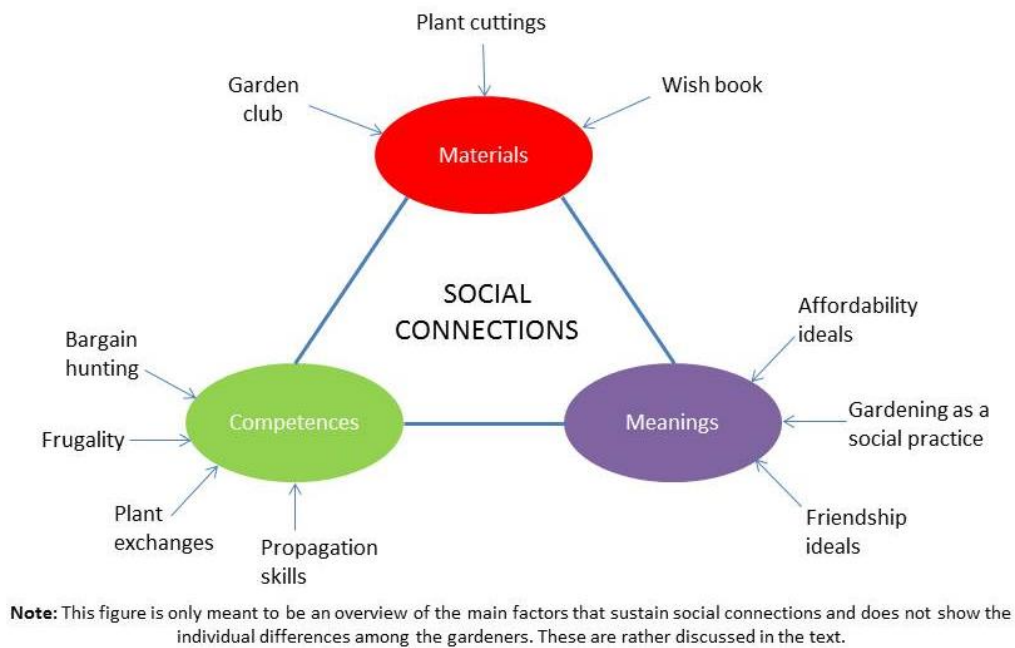


Figure 8.4: Elemental configuration showing the network surrounding plant exchanges.

8.4.1 Friendship ideals

The motivations for engaging in the practice of gardening are many and differ from one gardener to another (Ashton-Shaeffer and Constant, 2006; Gross and Lane, 2007; Cheng, 2010). However, recurrent in all these studies as in the present one are the social benefits which gardeners say they get out of the practice, most notably the building of friendships among gardeners. This friendship ideal is the meaning behind gardeners' engagement in the gardening practice and is what leads to their enactment of gardening skills (competences), using various gardening materials. Interestingly, the study by Ashton-Shaeffer and Constant (2006) found friendship to be one of the least important motivations reported by gardeners as compared to fitness, creativity and intellectual factors. This is in stark contrast to the views expressed by the gardeners in the present study, who reported that the desire for social connection (meaning) is a major driver in their gardening engagement. Its importance was made all the more evident by the frequency with which friendship was mentioned during the interviews, when gardeners were asked to describe what gardening means to them.

Given that majority of the participants in the present study are aged over 65 and retired, perhaps it is no wonder that they value social connection; a younger sample might prioritise different values. Nevertheless, gardening was always described by the participants as a practice that has enabled them to make new friends and also strengthen existing friendships. This is in line with the point which Burgess (1989) made about how engagement in horticultural activities like gardening fosters social interaction, particularly among older adults. In his words, "people enjoy sharing gardening

secrets and helping others of lesser experience. Through such informal interactions, friendships can be begun or strengthened” (ibid., p. 55). This is, perhaps, the reason why informal social networks were reported to be the preferred source of external gardening advice. It makes sense that friends would be seen as more reliable than strangers. So perceptions of trust and reliability (meaning), in this way, lead gardeners to seek gardening advice (competence) from social networks like garden clubs (materials). It does bear noting, however, that these networks may not have the correct information, especially as it relates to garden escapes, unless they update their knowledge with expert information.

In a New Zealand study of domestic gardening practices, gardeners also reported placing a high value on social connectedness as part of their practice (Freeman *et al.*, 2012). Some of the social activities they reported performing in their gardens mirror the findings presented here, and include recreational activities and entertaining friends and family within the garden space. Relating back to previously reported ideas of the garden as a place to escape and recuperate from the stresses of life, Gross and Lane (2007) suggest that this might be attributed to the friendship aspects of gardening. By engaging in an activity like gardening, which is situated within a natural setting, gardeners are apparently buffered against the impacts of stressors, thereby allowing them to remain calm and relaxed. This explanation is definitely plausible, and might account for the majority of participants who utilise the space for countering otherwise stressful thoughts and avoiding other less appealing activities.

The pursuit of social connection (meaning) was also the most reported reason why gardeners decided to join local garden clubs (material) and this illustrates a direct link between both elements. A majority of the interviewees (20 out of 27) identified as garden club members. These organisations were favoured because they provide gardeners with the opportunity to meet and interact with other like-minded people who share their love of gardening. Kingsley *et al.* (2009) also found the same motivation among community gardeners who reported that belonging to a garden group provides them with a means of building social connections. The reasons given also reflect the responses of the gardeners interviewed here, and include a desire to avert isolation, become more familiar with the local community and make new friends. All of these were also mentioned in the present study and garden clubs were especially important in instances where an individual had only recently moved into the area or their spouse had passed away. The club and its members enabled these gardeners to expand their social circles, thereby averting any negative feelings of solitude or loneliness which they may otherwise have felt.

Despite the seemingly influential role which they play in gardening enactments, garden clubs remain largely overlooked in accounts of gardening performances and plant invasion studies. Previous research investigating the avenues through which weeds spread have looked at plant retailers (Oele *et al.*; Coats *et al.*, 2011), botanic gardens (Dawson *et al.*, 2008), climate change factors (Kriticos *et al.*, 2003) and online pathways (Humair *et al.*, 2015). However, little attention has been focused on the significance of garden clubs as a high risk pathway for the ongoing spread of garden escapes. This is one reason why the present study is so important because the findings reported here indicate that garden clubs do, indeed, play a pivotal role in shaping people's gardening performances. Apart from the link between meanings and material highlighted above, competences are developed when club members seek advice from and exchange information with one another.

In addition, garden clubs were also identified as the most favoured source for plants because the plants are sold at a much cheaper rate than would be the case at other retailers like nurseries. This introduces another link into the elemental relationships and demonstrates that materials (garden clubs and the plants they provide) can be just as entangled as meanings (Wakkary *et al.*, 2013). By sourcing cheaper plants from garden clubs, gardeners are able to minimise the amount of money they spend on plant purchases. This was especially important for participants who are solely reliant on their retirement incomes and pensions. For these gardeners, plant selections (materials) were determined by ideas around affordability (meaning), in addition to earlier reported preferences for low maintenance and aesthetic appeal (see section 8.2).

Another point in favour of garden clubs, which the participants were very appreciative of, is the fact that they can simply exchange cuttings with other gardeners who might have a plant they like. This extends the material link beyond just meanings associated with affordability, but it also connects back to the friendship ideals mentioned earlier (discussed below). These plant exchanges, however, are most concerning because they are an obvious form of anthropogenic plant dispersal which enables species to spread beyond the area where they otherwise would. So given that gardeners rarely make any effort to find out whether plants are invasive prior to cultivating them (see section 8.2), invasive species may be exchanged just as easily as non-invasive ones.

8.4.2 Plant exchanges

Every participant in this study stated that they had, at one time or another, given or received plant cuttings from friends and family; most garden plants were said to have been acquired by this means. This is consistent with the findings of Qvenild *et al.* (2014) who described how plant exchanges were reported to be steeped in Norwegian history and, therefore, seen as acceptable and normal. Kendal

et al. (2012a) similarly found that plant exchanges make up a significant proportion of the contents of most gardens; 53% of the plants present in the gardens visited had been received from friends and family. So by exchanging their plant materials with one another, gardeners are essentially facilitating the spread of these plants which may or may not be invasive. As Baskin (2002, p. 467) rightly points out, these exchanged materials are rarely scrutinised for “weedy potential” and, as a result, they may perpetuate the ongoing spread of invasive plant species.

Elsewhere, plant exchanges have been shown to be a way for enthusiastic gardeners to demonstrate their proficiency at gardening as they tend to pick their best performing plants and share them with others (Drew *et al.*, 2010). Here, however, the biggest driver for plant exchanges (materials) was reported to be affordability and the widely shared perception that plants sold at nurseries are often overpriced (meaning). Palma *et al.* (2011) similarly found that gardeners are less likely to purchase plants if they think that the price is too expensive; frequency of purchase was negatively affected by the purchase price. Exchanging plants is, therefore, one way by which gardeners overcome this problem. By being frugal they are able to still acquire plants, which they obviously enjoy doing, without spending too much money.

In an attempt to profile a frugal consumer, Todd and Lawson (2003) described them among other things as older retired individuals who spend time working in their gardens. This description largely reflects the characteristics of participants involved in the present study, most of who could be referred to as ‘older gardeners that happen to be retired’. It is no wonder, then, that they pay such close attention to price and affordability, hence the tendency to favour less expensive options which in this case happens to be plant swaps. Time and health constraints are not the only factors that determine gardeners’ competences and their plant selections (materials); monetary limitations also play a part. Frugality was, however, not always the result of diminished income as some gardeners simply like getting a bargain in their plant purchases (meaning) and free exchanges are an extension of that attitude.

Another driver for these exchanges relates to the earlier mentioned idea that gardening is a social practice; giving plants was described as a way by which gardeners show friendliness toward others. This is an example of the bundles and complexes which practices tend to form with other practices (Shove *et al.*, 2012; Wakkary *et al.*, 2013; Blue *et al.*, 2016), such that both “hang together” (Shove and Walker, 2014, p. 47). Typical examples of practice bundling are cycling and driving which bundle with routine shopping (Watson, 2012), or cigarette smoking which bundles with routine workplace and socialisation practices (Blue *et al.*, 2016). In the present discussion, the practices in question are gardening and gift giving and each one constitutes practice-as-entity (see section 2.2.1) but they

form a bundle through the act of plant exchanges. This bundling is one reason why gardeners consider plant exchanges to be such a normal aspect of their gardening performance. There was also the reported sentiment attached to seeing plants in gardens which had been received from friends, and recalling with fondness the person who had given the plant.

Similar findings were reported by Coomes and Ban (2004) who described how plant exchanges were not only undertaken as a way to enhance plant diversity, but also served to build and strengthen social connections. The gardeners were always able to link the plants in their gardens with the person who had initially given it to them but they were less able to remember all the people that they had given their own plants to. This goes to show just how eager gardeners can be to give away their plants to other people, regardless of any expectations of reciprocation because it is simply understood to be a normal part of gardening. The participants repeatedly expressed the opinion that a 'true gardener' would prefer to give their plants freely, rather than expecting an exchange. To these gardeners, the latter reduces what should be a friendly gesture to a trade by barter, though it was quite obvious that they would not turn down any plant offered to them by another gardener. Similar to the reported preference for seeking knowledge about gardening, meanings also feature as the most influential element when it comes to the social aspects of the practice. Shared ideals of friendliness (meaning) are what determine the types of plants cultivated (materials) and the manner in which those plants are obtained, through exchanges (competences).

Most exchanges occur informally through neighbourly or familial plant sharing, but there are other materials which facilitate the process and make it easier for gardeners to distribute their plants. At garden clubs, there are things like the 'wish book' where members write down plants that they desire to have and other members who have those plants growing in their gardens offer it to them. In this way, one material (wish book) enables the availability of another material (plants) and lead to enacted cultivation skills (competences). The internet is also another increasingly concerning way by which plants are shared between people who may live far apart from one another, thereby posing a challenge for weed managers (Williams and West, 2000). Being an online material element, it is more difficult to police and is also challenging because a plant that is unproblematic in one region may not be so benign in another and vice versa. So by sending plants beyond an area where they have previously shown no signs of invasion, gardeners may inadvertently introduce a plant that becomes invasive in its new location.

Kay and Hoyle (2001) also give an indication of how significantly the internet can exacerbate the ongoing introduction of invasive species, given the ease with which plants can be obtained from various locations. Their study revealed that most of the aquatic weeds listed as noxious in the United

States could be found on various websites where the plants were advertised for sale or exchange. The situation is no different here in Australia because the participants all agreed that the internet does expedite the process of plant acquisition and this could increase its appeal as a source for plants. If this happens, then online exchanges may rise in popularity as gardeners begin to recognise and take advantage of the convenience it offers in plant acquisition. As a consequence, weed management success may come to largely rely on online interventions, especially given that gardeners do not seem overly concerned about plant invasion (see section 8.1).

It is now clear that one of the most significant drivers for gardening engagement is the widely shared perception that the practice is, fundamentally, a social endeavour. There was unanimous agreement among the respondents that gardening brings people together and also strengthens existing social and familial relationships. These ideals (meanings) have resulted in what is now a routine and deliberate sharing of plant materials among gardeners. The plants, in this way, are a symbolic representation of friendship. Very few gardeners reported giving any thought to the notion of invasiveness, during the exchange of plant cuttings; the only ones who did were those who had previous experiences with such plants. Gardeners more commonly stated that they tend to find out about plant invasion after it has already happened rather than taking any sort of precautionary step to prevent it from happening.

So competences, as far as weed management is concerned, were quite rare among the respondents because invasive potential was simply not something that was at the forefront of their minds. This lack of concern was also the result of a common perception (meaning) that plants only become problematic if they are allowed to. The consensus, in other words, was that regardless of any existing potential for invasiveness, any plant can be cultivated as long as the gardener keeps an eye on them to prevent spread. However, this suggests that there is an inclination on the part of the gardener to put in the management effort but as earlier discussed, there is very little evidence of such a tendency among gardeners.

8.5 Summary

The purpose of this chapter was to synthesise the main research findings and situate them in the context of studies conducted elsewhere, while highlighting the links between practice elements. It began by discussing gardeners' approach to the practice and showed how this has resulted in a passive outlook on weed management. Meanings pertaining to biodiversity concerns were shown to result in the deliberate utilisation of plants and other materials that would bring animals into the garden, and make the space a suitable habitat. This led to a distinct lack of competence regarding

the avoidance of garden escapes and participants tended to view this aspect of gardening as a private one that should be left up to the gardener in question. Plant materials brought in by animals were simply understood to be an inevitable by-product of gardening (meaning) and, therefore, not considered to be worth the effort it would take to eradicate them. Contested notions of what constitutes a weed also contributed to the lack of enacted weed management competences, with gardeners often disagreeing with the classification of certain plants as weeds.

The next aspect of gardening discussed relates to plant preferences and the selection criteria which gardeners take into consideration, before making a final decision on which plants to cultivate. This showed that meanings relating to aesthetic appeal often resulted in the selection and cultivation of visually appealing plants (materials) that served as an expression of gardeners' personalities. Low maintenance plants, on the other hand, were selected on the basis of gardeners' assessment of their own competences which were often subject to external constraints. These attributes, however, are known indicators of invasive potential; flamboyant plants easily attract dispersal agents while low maintenance species are quite resilient. So by deciding to cultivate these plants, gardeners are basically ensuring that once they get out, for example via animal dispersal, the species are able to survive and successfully invade spaces occupied by other plants.

The next point of focus was the various avenues through which gardeners obtain information pertaining to gardening and weed management. In this aspect of the practice, meanings were shown to be the most influential element that determined where gardeners seek advice and hone their gardening skills (competences). Experiential learning was the most utilised source of knowledge, followed by a preference for social learning from places like garden clubs; nurseries were not overly popular due to perceptions of reliability. To this end, garden clubs were shown to be a favoured source for gardening advice and offer an avenue through which to raise gardeners' awareness about the impacts of plant invasion. These clubs are also a cheap source for plant materials, as compared with nurseries where prices are perceived to be higher. So based on existing perceptions of affordability (meaning) and a demonstration of frugality (competence), garden clubs were revealed to be a favoured source for garden plants (materials).

The final section highlighted the frequency with which plants are exchanged between gardeners, and how this enables the translocation of plant materials from one place to another. Underpinning these exchanges are widely shared friendship ideals (meanings) which gardeners consider to be the true essence of gardening. Here also, meanings were shown to be the most influential practice element which prompted the adoption of other relevant elements of materials and competences. For example, friendship ideals and the shared perception of gardening as a social practice led to

enacted processes of exchange (competences) which, in turn, determined the materials cultivated. An interesting contradiction in meanings exists here as gardening was dually described as social and also private; social in plant exchanges, but private when it relates to weed management. Having presented the findings of the research (chapter 4-7) and discussed them in relation to the broader academic literature (chapter 8), the next chapter outlines the various implications of the study.



Plate 24: A couple in their garden in Keiraville NSW.

CHAPTER 9

CONCLUSION

Introduction

What this thesis has done is highlight the three phases of gardening to which intervention strategies might be targeted, in order to better manage the ongoing cultivation and spread of garden escapes. These are the pre-cultivation, cultivation and post-cultivation phases of gardening enactments which correspond to the stages of plant invasion, as described in chapter 1 (section 1.2). The materials, competences and meanings which constitute each phase have also been identified to demonstrate how all three elements work together to shape the overall performance of gardening. This chapter, therefore, serves to illustrate how the earlier stated research objectives have been satisfied; that is, it shows the usefulness of practice theory for influencing gardening performance. It begins by reiterating the core research arguments that were made in the introductory chapters of this thesis, and then explains the extent to which the findings have corroborated or refuted them. The purpose of this analytical exercise is to establish the validity of the claims upon which this research is based and by doing so, demonstrate the significance of the study.

In what follows, recommendations are made in relation to future management efforts to curtail the spread of garden escapes. These are practicable suggestions that weed managers can strategically implement with a greater chance of success. By drawing upon the research findings, potential intervention points will be identified so as to highlight ways by which practice theory can inform practical application in management strategies. A brief reflection on the usefulness of practice theory in the present research is then given to contribute to ongoing discussions about its utility. Other implications will also be highlighted; specifically, the theoretical contributions which this research makes to advance the use of practice theory in the area of natural resource management. The use of interviews as a data collection instrument also contributes to debates around its suitability for this type of phenomenological research, and this will be mentioned. Finally, the limitations of the study will be outlined with explanations given as to how they were addressed during the study, and suggestions will be made regarding future research directions.

9.1 Addressing the research objectives

Several statements were made in the introduction and literature review chapters of this thesis pertaining to the significance and rationale for this research. Having established the existence and severity of the garden escapes problem, these provided the justification for proceeding with the

investigations. Also justified was the efficacy of the adopted practice approach in apprehending the reported links between gardening enactments and garden escapes, over more conventional behavioural approaches. This will also be scrutinised here, to ascertain whether or not the assertions made earlier remain valid when considered in light of the research findings. So the tenets of practice theory will again be contrasted with those of behavioural theories, in order to reaffirm the inadequacy of the latter in thoroughly dealing with the garden escapes problem.

9.1.1 Refuting the ABC model of gardening behaviour

It was previously stated (section 2.4.1) that conventional understandings of gardening enactments tend to assume that behaviour is a direct result of attitude, and that it leads to eventual choice. In other words, attitude (the feeling people have about certain actions) is believed to result in particular behaviours (the actions taken) which determine the choices made by individuals. From the present research findings, however, it is clear that gardening enactments do not always follow such a linear ABC model. In fact, rarely does it ever do so. Rather, interview accounts indicate that there are a number of influential factors which affect and lead to the performance enacted by gardeners, especially in relation to their plant preferences. For example, some gardeners stated that they like native plants and think that people should cultivate such species for the sake of local wildlife but these same people see native plants as unattractive. As a result, they might profess an attitude that favours the cultivation of native plant species but they choose not to cultivate such plants because of the perceived lack of aesthetic appeal.

So there is not so much a value-action gap as Pickett-Baker and Ozaki (2008) suggest, as there are multiple values that are often in conflict and this makes it difficult for gardeners to pick one over others. One of the biggest indications of this, in the present study, was the profession of concern for local biodiversity by some gardeners who also felt justified in having invasive plants in their gardens. The plants in question are known weeds but because they provide useful materials for local wildlife, including food and shelter, gardeners deemed them to be acceptable. For these gardeners, concern for the environment was pitted against the desire to preserve local wildlife and the animals almost always won that contest over plants. Given that plant invasion of the wider environment is partly to blame for the loss of wildlife habitat, this rationale for having garden escapes in gardens could be said at first glance to be quite irrational.

Rationality, however, has been shown in this study to be a subjective term that might hold different connotations for gardeners than they do for other stakeholders like weed managers. What the latter perceive to be quite irrational (such as non-conformance to disseminated weed information) may be

seen by gardeners to be the outcome of a rational thought process. Gardeners are not completely unaware of the existence of such information or the need to adhere to the recommendations; it is just that they often prioritise other criteria over invasion potential. They are operating based on what they see as the most important considerations. Unfortunately, this leaves invasive potential at the lower end of the scale of priorities, thereby resulting in the observed preference for factors like aesthetic appeal and low maintenance traits.

The task then is for weed managers to find ways to emphasise ideals that are associated with environmental awareness so that the impacts of plant invasion are brought to the fore. In this way, gardeners will become more aware of the part they play in perpetuating the problem and perhaps invasive potential will begin to feature more prominently in their plant selection criteria. Reaching this state of heightened awareness will likely involve a combination of factors such as education, regulation and/or legislation, and stringency will undoubtedly be a necessary part of success. The above suggestions reaffirm the points made earlier regarding the merits of a practice approach over a behavioural one; the former more effectively overcomes the shortfalls of the latter. By focusing on the practice elements rather than the gardeners, practice theory attends to underlying contributory factors which behavioural theories tend to overlook.

9.1.2 Upholding the utility of a practice approach to garden escapes management

The fundamental precept of practice theory, as explained in this thesis, is the understanding that there are three underlying elements which interact to shape the performance of any practice. It is these elements of materials, competences and meanings that give rise to what can be observed as a physical enactment of that practice. This principle is corroborated by the evidence presented in the research findings, which shows that perceptions of gardening lead gardeners to select certain plants and also learn the necessary skills. Some of the meanings associated with gardening include friendship ideals, ideas of relaxation and escape, biodiversity conservation and, of course, aesthetic pursuits. These were related to various types of plants which were believed to suit the particular ideal, from native species to more flamboyant plants. The plant materials, in turn, necessitated particular cultivation skills. This also demonstrates that gardeners are, indeed, 'carriers' of the practice rather than being fully autonomous (Shove *et al.*, 2012); they act in response to and utilise associated elements of materials, competences and meanings.

Another principle of practice theory is the fact that practices are only stable as long as they are being repeatedly performed, and altering any one of the elements changes the performance. This dynamic nature of gardening was evident in the way by which gardeners modified their plant selections and

gardening approach, in response to unavoidable and often external constraints. These constraints relate to factors like time, health and physical limitations which compelled gardeners to initiate the necessary adjustments to their practice elements. Some gardeners took to cultivating low maintenance plants or stuck to growing only natives, while others incorporated materials like plant pots in order to minimise the frequency and intensity of their gardening. This is a good indication that targeting the availability of, and links between, elements is likely to result in gardeners adjusting their particular enactments. It would appear that they are already so inclined.

Applying practice theory the way that this study does has identified what could be at the centre of challenges experienced by weed managers, in their attempts to resolve the garden escapes issue. The research findings have revealed the fact that management outlook on the problem is in stark contrast to the perceptions of gardeners. Management approaches tend to target individual behaviour as a way of engendering change. For example, information is given to individuals in the hopes that they will act on it. Gardeners, on the other hand, see gardening as a social practice and prefer to obtain information from their own personal experience or from their social circles, which includes friends and family. This preference for social learning among gardeners is at odds with the individual educational model currently employed by weed managers. As a result, weed managers will need to revise their outlook and start targeting gardening groups like garden clubs, instead of being so focused on educating the gardener as an individual.

Also related to the disparity in outlook between weed managers and gardeners is the fact that both groups approach weed management very differently and, therefore, assume contrasting stances. The message promoted by weed managers, as a way to engender community action in weed control, tends to frame weed management as a collaborative endeavour that requires communal effort (see section 4.4). In this way, they attempt to appeal to feelings of environmental awareness or concern among the gardening public who the managers presume to be amenable to such ideals. However, the present findings revealed that while gardeners do hold some environmental concerns, it had more to do with the provision of wildlife habitat than the prevention of weed invasion. So although gardeners describe gardening as a social practice that connects people, their perceptions change when it comes to weed management and gardening becomes a private and individual practice. There was very little concern shown by gardeners about plant invasion and this was partly why most interviewees considered neighbourly collaboration for weed control to be unnecessary. This view will need to be changed if there is to be any hope of achieving the desired change in gardening performance. To achieve this change, weed managers will need to reframe the message around

weed management so that it recognises the fact that environmental concern means something different to gardeners.

The findings from this research have made it clear that gardeners have a great love and passion for gardening and for this reason, will likely do whatever they can to continue their engagement in it. They have, after all, been shown to adjust their enactments in response to the availability of relevant practice elements and constraints imposed by external factors, changing their performance accordingly. So it is theoretically possible that once an appropriate management strategy has been formulated that takes the elements into account, gardeners will likely modify their performance, though it may take a while. This is the reason why management strategies will need to include more stringent measures along with the voluntary ones currently being utilised, in order to achieve greater efficacy. The following section presents some suggestions as to the kinds of intervention strategies that might be developed in response to the findings of this research.

9.2 Recommendations for future management of garden escapes

From existing accounts of practice theory and the outcome of its application here, several avenues exist to which management interventions might be targeted to prevent further garden escapes. These interventions can be grouped into three main categories, based on the principles of practice theory: elemental interventions, practitioner interventions and bundle interventions. Elemental interventions have to do with targeting the availability and configuration of relevant materials, competences and meanings which shape the way gardening is performed. Practitioner interventions stem from the fact that practices, in this case gardening, need to be repeatedly performed in a particular way for them to persist. So by causing practitioners to defect or, alternatively, recruiting a new breed of practitioners who will do it differently, the practice can be altered though this understandably takes longer to achieve. Bundle interventions target the bundles and complexes which practices form with other nearby practices. Here, for example, gardening bundles with the practice of gift-giving to result in plant exchanges. This third category of interventions is even harder to accomplish due to the fact that the both practices come with their own set of elements which has inevitable implications for the outcome of intervention. Notwithstanding this complication, bundle interventions are worth considering here in the interest of comprehensiveness.

9.2.1 Elemental interventions

One of the main ways by which practice performances change is through the making and breaking of links between its associated elements of materials, competences and meanings (Shove *et al.*, 2012). A change in any one element causes an inevitable change in other elements that are connected to it

and removing one element without introducing a replacement renders the practice impracticable. For this reason, attempts to engender a change in gardening enactments are best achieved by targeting the links between the elements which shape the way the practice is currently performed. The relevant links are highlighted below and show how intervention strategies might be directed at reconfiguring them, in order to alleviate the garden escapes problem.

- **Using Meanings to change Materials:** Design and promote plants that align with the meanings valued by gardeners, such as visual appeal, low maintenance etc., but which are non-invasive. This has already been implemented to some extent in the form of Grow Me Instead publications, but the fact that few interviewees knew of its existence suggests that it is not well publicised. So rather than expecting gardeners to actively seek these publications, as is the case now, a better option may be to deliver the booklets to homes alongside things like rate notices. This way, weed managers can be assured that gardeners will at the very least see the booklets even though it is no guarantee that they will act on the information. It is, however, a step in that direction.
- **Using Meanings to change Materials:** Weed managers need to be more visible at markets and fetes, in order to dissuade people from selling undesirable plant species that they may have taken out of their home gardens. Although these venues were not reported to be popular sources of plants, they do sell plants at a cheaper rate than nurseries which appeals to gardeners' preference for affordability. This tendency towards cheaper sources of plants was quite recurrent and common to the gardeners interviewed, so such an intervention would be quite timely. Rather than the ad hoc approach currently employed (section 4.3.3), there needs to be a more targeted effort to have weed managers present at every local market within their jurisdiction. Doing this would minimise the risk of unauthorised and informal sales of garden escapes, thereby preventing further spread.
- **Using Competences to change Materials:** One of the biggest hindrances to management success, as correctly highlighted by the weed managers (section 4.4), is the fact that not all garden escapes are listed as noxious. As a result, some garden escapes remain available for sale in nurseries and continue to be planted since there is no legislation expressly prohibiting the cultivation of such species. Sales restrictions, therefore, need to be stricter so as to make it more difficult for gardeners to purchase invasive plants from nurseries and subsequently cultivate them. There are already some restrictions in place, such as the legislative prohibition of noxious weeds, but this needs to be expanded to include other invasive plant species of concern.

- **Using Materials to change Competences:** Instead of stopping gardeners from exchanging plants, which is such an ingrained notion and is tied with positive social aspects, the process may be built upon so that invasive plants can be exchanged for non-invasive ones. Facilities could be installed where gardeners can bring in invasive plants from their gardens and, in return, have their choice of non-invasive alternatives. This intervention will serve two purposes, one of which is that it removes invasive plants from circulation. Secondly, it may be an incentive for gardeners to learn about invasive plants so as to benefit from the exchanges. In this way, they gain another access to free plants which they love.
- **Using Meanings to change Competences:** Similar to the above, existing propensity for learning from social networks could be built upon to ensure that the information circulated conforms to management recommendations. Weed managers might regularly visit places like community gardens and garden clubs where social learning occurs, to disseminate relevant gardening and weed management advice. By educating gardeners in these kinds of clusters, weed managers accommodate gardeners learning preferences which would, in turn, increase the potential for management success.
- **Using Meanings to change Competences:** Another form of education could be achieved by establishing new social networks between garden clubs (and their members) and local Landcare or bushcare organisations. This would be building upon current club activities where members go on bus trips to visit open gardens but instead of a simple outing, it could be made into an avenue for learning. By showing gardeners through areas where work is being done to repair the impacts of weed invasion, they may make more concrete links between gardening and garden escapes. Gardeners would also be in a position to learn the skills needed to properly identify and eradicate garden escapes from their gardens.

The above recommendations are specifically targeted at the links between gardening elements but there is one more intervention that would improve the acceptance of weed management advice. This relates to the need to improve the weeds risk assessment (WRA) process so that it more definitively identifies invasive species as such. At the moment, there seems to be a lot of confusion and frustration regarding what is prohibited from sale partly because weeds behave differently in different locations. This was one of the factors highlighted by the interviewed weed managers as being an impediment to gaining the compliance of both gardeners and nurseries. So creating a more comprehensive and definitive list of prohibited plants would make it clearer to both gardeners and retailers that it is illegal to sell or cultivate those particular plant species. Below are other recommendations that relate to the second category of management interventions to change gardening performance.

9.2.2 Practitioner interventions

Although practitioners are not autonomous performers of practice, they are a necessary component that ensures its continuity and persistence (Shove *et al.*, 2012). Gardening would not be done or even recognised as such unless there are people (gardeners) who consistently and repeatedly perform the practice. Affecting the availability of practitioners, therefore, is one way by which change can be effected in the practice performance; this is done through the processes of recruitment and defection. For gardening, defection is perhaps not the ideal focus for management efforts since the goal is not to cause gardeners to abandon the practice but, rather, to engender more sustainable enactments of it.

Interventions, therefore, would be better directed towards recruiting a new breed of gardening practitioners - gardeners who will enact the desired performance. This objective is best achieved through education of practitioners-in-the-making; that is, children who are still at an age where their ideas about gardening are not yet as fixed as adults' might be. The downside of this tactic is that the outcome of interventions will not become apparent for years after implementation, when the children are grown and engaged in their own gardening performances. Nevertheless, incorporating weed education into school curriculums will serve to lay the foundation for future awareness about plant invasion matters. This may be an effective way to shape the meanings that these children come to associate with gardening later in life. It would also give them the necessary skills to recognise and prevent plant invasion. Interventions of this kind are what Watson (2012) refers to as "small interventions (that) initiate or give momentum to positive feedback effects in desirable processes of recruitment and defection..." (p. 494). In other words, even though the impacts may not be immediately observable, they do have potential for resulting in significant cumulative benefits over time.

Despite the fact that they may already be set in their (gardening) ways, adults will also need to be educated in order to break some of the problematic associations that they make with gardening. Most notable of these is the belief that garden green waste serves as good compost for bushland; this was one of the most frustrating contributors identified by the interviewed weed managers. Interventions, therefore, need to be directed towards changing this perception, or at least providing incentives like tip vouchers to engender proper disposal of garden waste at waste disposal facilities. Weed managers could also consider implementing the sort of reciprocal disposal framework described by Betty, one of the interviewees, where green waste is disposed free and sold as mulch. Other existing associations which gardeners make between gardening and other practices are described below and show how practices bundle together to form complexes.

9.2.3 Bundle interventions

There are two practices to which gardening forms bundles and which influence the availability and distribution of potentially invasive plant materials. These are shopping and socialising/gift-giving. Each one of these comes with their own associated elements that will need to be taken into consideration during attempts to undo the links they form with the gardening practice. Teasing apart or “weakening” the links between practice bundles is one of the main ways by which practice theory leads to desired changes within a target practice, herein of gardening (Blue *et al.*, 2016, p. 43). While there is no doubt that successfully engendering change in gardening performance by targeting practice bundles will be a difficult task to accomplish, it does need to be considered for the potential it offers. The two practice bundles relevant to the present research are highlighted below to show how interventions might be targeted at them, so as to undo some of the problematic links they form with gardening.

- **Shopping:** Gardeners tend to buy plants wherever they find them cheaply, which is usually at places like markets, fetes and supermarkets or hardware stores (Kmart, Bunnings etc.). One possible intervention would be to remove plants from sale altogether at these places, so that gardeners no longer associate routine shopping with plant purchases. Another would be to more closely monitor the plants so that invasive species are not sold and this could be achieved either through self-regulation or inspections by weed managers. This intervention serves the dual purpose of targeting meanings when gardeners dissociate gardening from shopping and also material elements when invasive plants are removed from sale. It will, however, require the commitment of multiple stakeholders like retailers, nursery industry, government etc. which makes it a difficult intervention to implement and sustain.
- **Socialising/gift-giving:** The propensity for gardeners to exchange plants amongst themselves stems from the shared idea that it is a sign of friendliness and sociability. The idea that plant exchanges, like gift-giving, are a physical demonstration of goodwill is a very ingrained mental association which gardeners make between both practices. Attempts to reconfigure the links will, therefore, need to be multifaceted. The first target must be locations where these exchanges take place (often garden clubs) and secondly, gardeners need to be made aware of how to scrutinise the plants that they exchange. In this way, all three elements of materials (garden clubs), competences (knowledge) and meanings (perceptions of exchanges as a sign of friendship) would be targeted. However, this intervention is complicated by the fact that most exchanges occur in private spaces and quite informally so, as already stated, it needs to be multifaceted in its implementation.

9.3 Reflections on practice theory in the present research

As I have shown throughout the presentation and discussion of my empirical findings, practice theory is a very useful tool by which to comprehensively explore gardening enactments. The tri-elemental framework was especially valuable because it allowed me to investigate both human and non-human gardening components, including both tangible materials and abstract elements. I did, however, face some challenges and come to certain realisations during the deployment of practice theory in my particular research which I would now like to reflect upon. These reflections show how the application of practice theory in gardening research differs from its deployment in other research areas, particularly in consumption studies where it is most often used.

It was initially difficult to decide which particular factors under the three elements of materials, competences and meanings should be focused upon because there seemed to be so many. If materials, as per practice theory, include every single thing that is utilised during gardening, then the list would have been quite extensive and included things like soil, pots, water, fertilizer, tools etc. It was unclear to me just how the inclusion of all these things into the research investigation would result in a coherent and intelligent analysis. I had to remind myself that the exploration of gardening enactments done here is not an end goal but, rather, a means by which to understand ongoing cultivation of garden escapes. Only then did I reach the decision that plants should be the main material in focus, and other materials were only included if they had some relevance for potentially aiding garden escapes. A similar decision was also made with regards to competences and meanings, which were also numerous.

Despite coming to the decision to focus on only factors that relate to the spread of garden escapes, I did wonder if practice theory would be equally useful for other types of gardening research. In other words, had my research not been centrally focused on invasive plants as the main material, would the theory have proven as useful? This is a question that can only be answered through the adoption of practice theory in other gardening research that does not have weed management as its core focus. It does, however, highlight the points made earlier (in section 2.4.2) about the apparent neatness of this tri-elemental version of practice theory which risks overlooking other important factors. This is a critique which other researchers have also articulated in their attempts to scrutinise its applicability (Watson, 2012; Pink *et al.*, 2013; Batel *et al.*, 2016).

The other challenge I faced with the adoption of practice theory relates to the intervention strategies that can be developed based upon its analysis (as outlined in section 9.2). This is an aspect of its application which other researchers have also struggled with (Mellick Lopes *et al.*, 2015;

Pettersen, 2015) but where they question its usefulness, I only take issue with certain aspects as it relates to my research. In particular, I do not agree with the suggestion that causing the defection of practitioners is an effective way to foster a change in the practice performance, at least not where gardening is concerned. It simply does not suit the present research agenda because, as was earlier stated, the goal here is to change gardening enactments that lead to garden escapes and not to cause the practice to be abandoned. So while defection may suit, for example, attempts to change mobility preferences from cars to bicycles (Watson, 2012), such a step would be detrimental for the gardening practice. Therefore, as described in the recommendations section, education of existing practitioners is a better approach to changing gardeners' performance than causing them to defect from the practice.

When it comes to bundle interventions in gardening, the goal cannot also not be to 'weaken' the links, as other practice theorists might suggest but rather to tease them apart gently. Blue *et al.* (2016), for example, describe how smoking used to be bundled with other practices like prayer and healing, the links of which were eventually weakened so that it lost those associations. In gardening, however, this would be disadvantageous because it is a practice that is often performed by older people who may not be equipped to handle any drastic changes imposed on them. For some people, the only time they can buy plants might be when they are out shopping or exchanging plants may be the only source of socialisation for them so taking those away is not ideal.

The reciprocity and social connections embodied in gardening are not only socially valuable but they are also potential assets in management attempts to influence the practice performance. Therefore, as suggested above, these links need to be gently teased apart by providing alternative means by which gardeners can still derive the pleasure they do from their gardening, without undue pressures. By reflecting on all these aspects of practice theory and its applicability in gardening research, I hope that I can in some way contribute to its advancement for this and other types of research. Below, I highlight more broadly some of the implications which this research has for theory, methodology and practice as regards garden escapes management.

9.4 Research implications

This research follows the path set by practice theorists who call for the investigation of underlying practice elements, as a way of understanding the complexity of routine practices (Reckwitz, 2002; Shove *et al.*, 2012). In line with this, the present study contributes to current scientific and social debates in three main ways. Firstly, this study has implications for future gardening research because it allows this popular activity to be studied as a 'practice' and broken down into its

constituting elements, to enhance understanding. This shift in approach involves the exploration of elements of material, competences and meaning, rather than the more common examination of garden types and gardener attributes. The practice approach adopted here, therefore, expands the analytical focus to include aspects of gardening enactments which other research orientations may have overlooked.

The second contribution is methodological and has to do with the adoption of interviews as the main tool for data collection. This is despite suggestions that interviews might not be a useful way of eliciting accounts of everyday practice, which is what the present research is all about. The detailed accounts obtained from everyday gardeners, through the conduct of interviews, supports the argument made by Hitchings (2012) that people can indeed talk about their routine practices. He explained that while it may be initially awkward or uncomfortable to ask about seemingly banal issues, interviews can be a good way to gain an understanding of how people embody practices. This was certainly the case in the present research where some conversations began somewhat stiltedly, but then proceeded to become more informative. So while it may not appear to some that interviews are a suitable tool for accessing phenomenological accounts of routine practices, the results of this study demonstrate that they can be.

Following the proposed rethink of approaches to garden studies, the third contribution which this research makes is to engender the much-needed shift in the management of invasive garden plants. Approaches to invasive plant management have, hitherto, proceeded on the assumption that the continued cultivation of invasive plants in home gardens is due to an information deficit. The present findings, however, negate this claim and highlight the fact that lack of information is only a partial and not entirely accurate depiction of the real issue and there are other causative factors. Education of gardeners, therefore, has to be implemented in conjunction with other strategies, such as those described above, which target aspects relating to materials, competences and meanings. It is, after all, these elements which shape the way people go about gardening in their domestic spaces, from where these problematic plants escape. So drawing upon the present research findings will potentially lead to greater success in preventing further cultivation and spread of garden escapes, from domestic gardens to the wider environment.

9.5 Future research directions

Most of the participants interviewed for this study were aged over 50 and mostly retired, which does have some implications for the reported findings. It could merely be an indication of the fact that older adults are, indeed, the representative age group of the gardening practice, as has been

suggested elsewhere (Ashton-Shaeffer and Constant, 2006; Criley, 2007). This group of people, being mostly retired, are commonly understood to have more free time than younger people who may have work and family commitments that require their attention. On the other hand, in the interest of comprehensiveness, future gardening research may benefit from purposively recruiting younger people under the age of 50 who are also keen gardeners. This would allow the gardening enactments and reported practice elements of both groups to be compared, in order to determine whether any significant points of disparity exist.

Participants recruited for this study were limited only to gardeners and weed managers located within the study region, which is the Sydney Basin Bioregion. This choice of study participants does not account for the actions and decision-making processes of other relevant stakeholders who might exert some influence over actual gardening performances. Horticultural industry regulators and policy makers, for example, establish rules that govern the sale and pricing of garden plants in nurseries which partly determines the plant selections made by gardeners. As already discussed, the price of garden plants plays an important role in determining whether or not a gardener purchases and cultivates that plant, especially since a lot of gardeners are retirees. So understanding the processes that go into these governing decisions could potentially hold some relevance for the formulation of weed management strategies moving forward.

Although this study was not intended to be representational of all gardeners, there could be some merit to exploring the enactments of a different and possibly larger sample of gardeners. Increasing the sample size might reveal some other underlying practice elements not mentioned by the group of participants interviewed for the present research. A further revelation of underlying factors, rather than being an indictment on the accomplishments of this study, would serve to lend credence to its assertions about the multiplicity of determinant factors. The broader the range of underlying elements factored into the decision making surrounding invasive plants management, the more effective resultant strategies will be.

The non-predictive but, rather, exploratory nature of this study also prevent its findings from being directly translated into implementable management strategies for invasive plants control. Rather than giving a ready-made solution to the garden escapes problem, this research offers the means and principles by which a long-term resolution might be achieved, based on analysis of gardeners' practices. The practice approach proposed here presents managers and policy makers with an alternative yet potentially more effective framing of the garden escapes issue. This will, in turn, allow for the consideration and incorporation of previously overlooked factors into the planning and implementation of subsequent management strategies. So while this research may not offer the

immediacy of a ready-made solution to the garden escapes problem, it increases the likelihood of success for any management strategies developed from it.

9.6 Concluding statement

With the rising popularity of gardening among older adults and the reported links which it has with ongoing cultivation of garden escapes, this research is a timely contribution to management efforts. It offers a more targeted way of influencing those gardening enactments which aid the spread of invasive plants, by examining factors that may previously have gone unexplored. The research findings support the fact that there are certain materials, skills, and meanings which gardeners rely upon for their gardening and which constitute an observable performance of it. Taking these elements, then, as points for management intervention has opened up a suite of possibilities for engendering the much needed change in gardening performance among everyday gardeners.



Plate 25: A participant relaxing in her garden at the end of the interview.

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APPENDICES

Appendix A: Description of research participants (gardeners)

NAME	GENDER	AGE	LOCATION	MARITAL STATUS	EMPLOYMENT STATUS	GARDEN CLUB MEMBER?
AMANDA	FEMALE	68	EAST CORRIMAL	MARRIED	EMPLOYED	YES
ARIANA	FEMALE	83	WOLLONGONG	WIDOWED	RETIRED	NO
BETTY	FEMALE	59	FAIRY MEADOW	MARRIED	SEMI-RETIRED	YES
CAITLIN	FEMALE	68	WERRI BEACH	WIDOWED	RETIRED	YES
DANIEL	MALE	27	SYDNEY	SINGLE	EMPLOYED	NO
ELIZA	FEMALE	75	CORRIMAL	WIDOWED	RETIRED	YES
EVA	FEMALE	78	BALGOWNIE	MARRIED	RETIRED	NO
FAITH	FEMALE	74	BULLI	WIDOWED	RETIRED	YES
FELICITY	FEMALE	74	WOONONA HEIGHTS	WIDOWED	RETIRED	YES
GAVIN	MALE	72	DAPTO	MARRIED	RETIRED	YES
JEFF	MALE	43	ALBION PARK	MARRIED	EMPLOYED	NO
JESSICA	FEMALE	74	BOWRAL	MARRIED	VOLUNTEER	YES
KATE	FEMALE	68	CORRIMAL	MARRIED	RETIRED	YES
LILY	FEMALE	71	ALBION PARK	MARRIED	RETIRED	YES
LINDA	FEMALE	54	KEIRAVILLE	MARRIED	EMPLOYED	YES
MABEL	FEMALE	74	THIRROUL	WIDOWED	RETIRED	YES
MATT	MALE	41	CONISTON	MARRIED	EMPLOYED	NO

MOLLY	FEMALE	79	BURRADOO	WIDOWED	RETIRED	YES
PAM	FEMALE	70	BELLAMBI	WIDOWED	RETIRED	YES
PETRA	FEMALE	79	WEST WOLLONGONG	MARRIED	RETIRED	NO
ROSE	FEMALE	73	FERN HILL	MARRIED	RETIRED	YES
SANDY	FEMALE	69	DAPTO	MARRIED	RETIRED	YES
SARAH	FEMALE	71	WEST WOLLONGONG	WIDOWED	RETIRED	YES
STELLA	FEMALE	72	AUSTINMER	WIDOWED	RETIRED	YES
STEPHANIE	FEMALE	66	GERRINGONG	MARRIED	RETIRED	YES
SUSAN	FEMALE	68	TARRAWANNA	WIDOWED	RETIRED	YES
TOM	MALE	46	MOUNT WARRIGAL	DIVORCED	EMPLOYED	NO

Appendix B: Description of research participants (weed managers)

NAME	OCCUPATION	AFFILIATION	LOCATION	EXPERIENCE
ALEX	NATURAL AREAS OFFICER	SCHOALHAVEN CITY COUNCIL	VINCENTIA	12 YEARS
CAM	HORTICULTURIST	WOLLONGONG CITY COUNCIL	WOLLONGONG	30 YEARS
DAVE	WEEDS PROGRAM LEADER	OFFICE OF ENVIRONMENT AND HERITAGE	HURSTVILLE	7 YEARS
DOMINIC	WEEDS OFFICER	NOXIOUS WEEDS AUTHORITY	KIAMA	20 YEARS
DORIS	HORTICULTURAL CONSULTANT	NATIONAL GROW ME INSTEAD PROGRAM	NORTH COAST, NSW	20 YEARS
GRANT	HORTICULTURAL CONSULTANT	FREELANCE	WOLLONGONG	25 YEARS
JANE	NATURAL RESOURCE OFFICER	WOLLONGONG CITY COUNCIL	WOLLONGONG	8 YEARS
KELLY	BUSH REGENERATOR	SHELLHARBOUR CITY COUNCIL	SHELLHARBOUR	6 YEARS
LARRY	BUSH REGENERATOR	FREELANCE	WOLLONGONG	43 YEARS
MARTHA	LOCAL LAND SERVICES OFFICER	CONSERVATION VOLUNTEERS AUSTRALIA	ILLAWARRA REGION	5 YEARS
MELVIN	SENIOR LAND SERVICES OFFICER	SOUTH-EAST LOCAL LAND SERVICES	WOLLONGONG	4 YEARS
MICK	BUSH REGENERATOR	OFFICE OF ENVIRONMENT AND	LANE COVE	20 YEARS

		HERITAGE	NATIONAL PARK	
NED	WEEDS ECOLOGIST	DEPARTMENT OF PRIMARY INDUSTRY	NEW SOUTH WALES	9 YEARS
PATRICK	NATURAL AREAS COORDINATOR	WOLLONGONG CITY COUNCIL	WOLLONGONG	21 YEARS
TONY	NATURAL AREAS MANAGER	NOXIOUS WEEDS AUTHORITY	KIAMA	9 YEARS

Appendix C: Invitation to participate in the research

INVITATION TO PARTICIPATE

A phenomenological study of gardening practices and invasive plant management in the Sydney Basin.

Dear [Insert Name]

I am writing in regard to a research project being undertaken by the Australian Centre for Cultural Environmental Research (AUSCCER), at the University of Wollongong.

The project aims to examine the issue of garden plants becoming weeds and the underlying networks and interactions which may contribute to or reduce the perpetuation of garden escapes in gardens, nurseries and in the wild. We will investigate how the decisions and actions of various actors within horticultural networks determine the effectiveness of garden escapes management. The study will be conducted within the Sydney Basin bioregion (SBB) which contains numerous nurseries and gardens (private and public) and includes parts of Sydney and the Illawarra.

Stage two of the research project involves interviewing gardeners, nursery managers, market day/fete stall managers and industry representatives, such as from the Nursery and Garden Industry Association (NGIA). The aim is to gain insight into the way these groups of people view and approach the issue of garden escapes management and into responses to the issue by government, industry, and gardeners. This phase also follows on from earlier explorations into the way weed managers view and approach the issue.

The attached information statement provides details concerning the content of the interview topics. Interviews will be audio recorded and will take approximately 1 hour in length. Participation is voluntary.

The attached consent form outlines the conditions upon consent to participate in the research interview. Should you wish to participate the consent form can be completed on the day of the interview or emailed to the address above.

I will contact you in the next week or so to give you the opportunity for clarification and to ask questions regarding the project.

Yours sincerely,

Victoria U. Ikutegbe

PhD Candidate

Australian Centre for Cultural Environmental Research (AUSCCER)

University of Wollongong NSW 2522

Mobile: 04 5255 2514

Email: viciku@uow.edu.au

Web: <http://socialsciences.uow.edu.au/ausccer/people/UOW161563.html>

RESEARCH PARTICIPANT INFORMATION SHEET

TITLE: A phenomenological study of gardening practices and invasive plant management in the Sydney Basin.

PURPOSE OF THE RESEARCH

This project aims to examine the networks and interactions which contribute to or reduce the perpetuation of garden escapes in gardens, nurseries and in the wild. Whilst horticultural and ornamental plants have been reported to be a major cause of wide ranging impacts in Australia and overseas, there have also been attempts made to alleviate the issue. The aim of this project is to examine the decision-making process, actions and views of various actors within horticultural networks so as to determine how they influence management efforts. The project involves social science researchers from the Australian Centre for Cultural Environmental Research (AUSCCER) based at the University of Wollongong.

Project researchers will investigate the extent to which garden clubs, plant exchanges, nursery promotions, weed and natural resource management organisations and groups, and the character of plants themselves affect garden escapes management. These issues will be explored in study areas within the Sydney Basin Bioregion (SBB) which comprises a diverse range of gardening groups and invasive garden plant species.

INVESTIGATORS

Dr Nicholas Gill	Victoria Ikutegbe
Associate Professor	PhD Candidate
Australian Centre for Cultural Environmental Research	Australian Centre for Cultural Environmental Research
University of Wollongong	University of Wollongong
Tel: (02) 4221 4165	Tel: 04 5255 2514
Email: ngill@uow.edu.au	Email: viciku@uow.edu.au

SAMPLE QUESTIONS

1. What comes to mind when you think about weeds?
2. What comes to mind when you think about the ways weeds are introduced to an area?

3. What comes to mind when you think about the different ways in which people can manage weeds?

METHOD AND DEMANDS ON PARTICIPANTS

The research involves exploratory interviews with gardeners, nursery managers, market day/fete stall managers and industry representatives, such as from the Nursery and Garden Industry Association (NGIA). The aim is to gain insight into the way these groups of people view and approach the issue of garden escapes management. Interviews are likely to take 1-2 hours of your time. It will involve an interview with up to two researchers at your location of preference. This interview will include a discussion about sources of introduction, reason for spread, impacts and what invasive garden plants are of concern to you because of their continued propagation.

If you agree to participate in the study, it will involve the following steps:

1. Indicate to us that you agree to participate by completing and signing the 'Participant Consent Form'.
2. If you have not already been provided with a 'Participant Consent Form' please call or send an email to Victoria Ikutegbe (contact details above) so she can provide them by email or in hard copy depending on your preference.
3. Once you have completed the 'Participant Consent Form', keep it and return it to us at the time of the interview or return it by email to viciku@uow.edu.au.
4. We will confirm a suitable time for our researchers to come to your preferred location and conduct an interview with you.
5. During the interview, we will ask you some questions about sources of introduction, reason for spread, impacts and what invasive garden plants are of concern to you.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS

Apart from your time for the interviews we can foresee no risks for you. Your involvement in the study is voluntary and you may withdraw your participation from the study at any time and withdraw any data that you have provided to that point. Refusal to participate in the study will not affect your relationship with the University of Wollongong.

FUNDING AND BENEFITS OF THE RESEARCH

This project is not being funded by any funding agency but is being carried out for the achievement of a Doctoral degree at the University of Wollongong. This research will provide a basis for future

decisions on the management of garden escapes and weeds in general. Findings from the study will be published in a PhD thesis, presented at conferences and published in journals, and other publications.

ETHICS REVIEW AND COMPLAINTS

This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioural Science) of the University of Wollongong. If you have any concerns or complaints regarding the way this research has been conducted, you can contact the UoW Ethics Officer on (02) 4221 3386 or email rso-ethics@uow.edu.au.

Thank you for your interest in this study

Appendix E: Radio broadcast message

PARTICIPANT RECRUITMENT MESSAGE

Hi,

My name is Victoria Ikutegbe. I am a PhD researcher at the University of Wollongong studying gardening practices and plant management within the Sydney Basin region. I am looking to interview gardeners within the region who are responsible for the decision making regarding the choice of plants for the garden and how these plants are managed. I would be interested in interviewing gardeners who do not belong to a garden club and who are aged 50 and under. Participants will also be asked whether they have other contacts who would be interested in participating in the study. If you would like to participate in this study, please contact me at 0452552514 or email vui982@uowmail.edu.au

Thanks for your time.



RESEARCH PARTICIPANT CONSENT FORM

A phenomenological study of gardening practices and invasive plant management in the Sydney Basin.

Researchers: Dr Nicholas Gill, Miss Victoria Ikutegbe

I have been given information about the project 'Getting to the 'root' of the problem; invasive garden plants and horticultural networks' and would like to participate in the study. I have had the opportunity to ask the research team any questions I may have about the research and my participation.

I have been advised that any information that I provide will be treated confidentially in any publications or other communications arising from the research. I understand that I will not be personally identified as the source of information such as quotes or opinions, unless I indicate below in this Consent Form that I am willing to be identified in regard to my position within the organisation with which I am associated or employed by.

I understand that my participation in this research is voluntary, I am free to refuse to participate and I am free to withdraw consent from the research at any time. My refusal to participate or withdrawal of consent will not affect my relationship with the University of Wollongong.

If I have any enquiries or concerns about the research, I can contact Victoria Ikutegbe 04 5255 2514 and/or Nicholas Gill (02) 4221 4165 or if I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on 4221 3386 or email rso-ethics@uow.edu.au.

By signing below I am indicating my consent to:

- Participate in an interview and to have the interview audio recorded
- Being quoted directly in the research

- Be identified by name in relation to any quotes or opinions emerging from this research
- Be identified by my position within the organisation in relation to any quotes or opinions emerging from this research

I understand that the data collected from my participation will be used for a PhD thesis and will also be used in journal articles and other publications, and in presentations such as at conferences and I consent for it to be used in that manner.

Signed:

Date:/...../.....

Name (please print):

Appendix G: Weed Managers interview schedule

Job Description

1. What is the role of your organisation?
2. How long has the group been established in the area?
3. What have been the main objectives within the area?
4. What the key factors (law/policy, funding availability and criteria, council politics, concepts/frameworks/ideas/'common sense) that influence what you focus on?
5. What are the factors that influence your management approach?
6. Do you allocate resources to the management of specific garden escapes?
7. What aspect of garden escapes management do you find most time-consuming and resource intensive?
8. To what extent are you satisfied at this allocation of your time and resources?

Garden escapes

1. Which invasive garden plants are you most worried about?
2. What is it about these plants that make them your key concern?
3. Are these plants still being promoted (by planting, swapping or sale)?
4. Is there a particular are/region where you fear this is happening?
5. Has the status of these plants changed over time?
6. What are the main criterions that determine what weeds to prioritize?
7. What are the most difficult invasive garden plant species to manage?
8. What do you see as the main limitations in conducting garden escapes management?
9. How would you overcome these challenges?
10. Does the physical structure of the landscape increase its vulnerability to certain invasive plant species (soil types, topography etc.)?

Management strategy

1. What are your methods for community engagement in garden escapes management?
2. What are the main groups of people you work with in the community?
3. What are the main hindrances to successful community engagement?
4. Has your approach to community engagement changed over time?
5. How would you describe your ideal outcome from community engagement regarding garden escapes management?

6. Do you have adequate skills, resources, tools available to you to get the community to do what they should/need to do?
7. If no, what is lacking? How can this be rectified?

INDICATIVE INTERVIEW SCHEDULE FOR GARDENERS

GENERAL QUESTIONS

1. Age, Occupation, Education level?
2. Are you the initiator of your garden or was it inherited? How does that influence what you do in the garden?
3. What does gardening mean to you?
4. Why do you garden?
5. What characteristics do you look for when choosing a plant? What do you avoid in a plant?
6. When choosing, does it matter to you whether or not a plant is native? Australian or local?
7. Do you carry out any research into a plant before buying it?
8. Do you worry about whether a plant will spread in or beyond your garden and get out of control?
9. Are there any plants within your garden which concern you at the moment? Why?
10. Do you seek advice about what to put/do in your garden?
11. Where do you get your gardening information/advice from? Which is the most important source?
12. How does that source align with your ideas around gardening? Why take their advice?
13. Are you a member of a garden club? What sort of activities do you do in the club?

GARDENING PRACTICES

1. How often are you out in the garden? What are your aims?
2. How do you dispose of the organic material from the garden?
3. Do you see gardening as a private activity or something that connects neighbours and community?
4. If you saw a weed in your neighbour's garden, would you approach them? Why/why not?
5. Do you know of any weed that could be growing in your garden or in the neighbourhood?
6. Have you had trouble with plants coming into your garden from elsewhere/over the fence? Which plant?
7. How do you find out about weeds and how to manage them?
8. Does your gardening practice have to do with broader weed management goals?
9. Where do you go to obtain plants for your garden? Any reason why them?
10. Is that your main source of plants? If not, what is?

11. Do you sell, exchange or give away plants from your garden? To whom or where?
12. Do you purchase plants online? Have you ever done so? Any issues with the purchase?
13. Do you obtain plants from or sell plants at markets/fetes? How often? Any issues with it?

PERCEPTION

1. Have you ever heard of the term 'garden escapes'? How would you define the term?
2. What do you think about them?
3. What's your opinion about the way they get spread or introduced to an area?
4. Who do you think should be held accountable if these plants start causing problems?
5. In what ways do you think people or the government can manage these garden escapes?
6. What do you think about dumping of garden waste?
7. If it was possible to provide you with non-invasive alternative plants similar to the one you'd prefer, would you be interested? Ever heard of 'Grow Me Instead'?
8. What do you think about the alternative plants in these books?
9. If you discovered that a plant in your garden was invasive, would you be willing to swap it out for an alternative non-invasive plant?
10. If your neighbour or council maintained a weed-free property/land, would that influence you to do the same on your property? Why/Why not?
11. What's your opinion about the sales restrictions put on some plants by the government?



In reply please quote: HE13/532

13 December 2013

Ms Victoria Ikutegbe

Australian Centre for Cultural Environmental Research

School of Earth and Environmental Science

Building 41.G16

University of Wollongong NSW 2522

viciku@uow.edu.au

Dear Ms Ikutegbe

Thank you for your response dated 6 December 2013 to the HREC review of the application detailed below. I am pleased to advise that the application has been approved.

Ethics Number: HE13/532

Project Title: Getting to the 'root' of the problem: Invasive garden plants and horticultural networks

Researchers: Ms Victoria Ikutegbe, Dr Nicholas Gill

Approval Date: 12 December 2013

Expiry Date: 11 December 2014

The University of Wollongong/Illawarra Shoalhaven Local Health District Social Sciences HREC is constituted and functions in accordance with the NHMRC *National Statement on Ethical Conduct in Human Research*. The HREC has reviewed the research proposal for compliance with the *National*

Statement and approval of this project is conditional upon your continuing compliance with this document.

A condition of approval by the HREC is the submission of a progress report annually and a final report on completion of your project. The progress report template is available at <http://www.uow.edu.au/research/rso/ethics/UOW009385.html>. This report must be completed, signed by the appropriate Head of School, and returned to the Research Services Office prior to the expiry date.

As evidence of continuing compliance, the Human Research Ethics Committee also requires that researchers immediately report:

- proposed changes to the protocol including changes to investigators involved
- serious or unexpected adverse effects on participants
- unforeseen events that might affect continued ethical acceptability of the project.

Please note that approvals are granted for a twelve month period. Further extension will be considered on receipt of a progress report prior to expiry date.

If you have any queries regarding the HREC review process, please contact the Ethics Unit on phone 4221 3386 or email rso-ethics@uow.edu.au.

Yours sincerely

Professor Kathleen Clapham

Chair, Social Sciences

Human Research Ethics Committee

Appendix J: Diagrammatic representation of thematic codes

