Chapter 4

Landholders and natural resource management

Each of the 133,000 private rural landholders living in Melbourne’s peri-urban rural landscape is unique, and yet it is possible to discern some similarities and differences in their NRM practices and propensities. This chapter develops and applies a framework for understanding why some private landholders manage their natural resources better than others. Analysis is based on a review of the research literature plus empirical research conducted in the three GWRegions (Western, Yarra and South East) selected for detailed examination in this study. As described in Chapter 1, this empirical research consisted of semi-structured qualitative interviews with landholders and NRM service providers, as well as a quantitative survey of 996 landholders. This chapter examines the characteristics of landholders across all the three focus GWRegions: a comparison the three regions is the purview of Chapter 6.

4.1 Who does NRM well and who doesn’t?

A number of studies described in the research literature have explored the behaviour of different types of rural property owners in relation to NRM and related topics. In many cases researchers have developed typologies that distinguish farmers or other rural landholders according to their capacity or willingness to change their behaviour. Many studies in this area endeavour to understand different types of small and lifestyle farms (e.g. Hollier, Francis & Reid 2003; Coster 2004; Wilkinson 2006). Specific reasons for wanting to understand farmers have been diverse, including impacts on native biodiversity (Crosthwaite et al. 2004), participation in Landcare groups (Richards 1996), conservation compatible farm practices (Lambert et al. 2006), engagement in NRM practices (Smith et al. 2005) and low input practices (Barr 1996).

One extensive body of research directed at understanding different types of farmers employs van der Ploeg’s theory of ‘farming styles’ (van der Ploeg 1990, 1994). This theory has been tested in Australia (e.g. Howden et al. 1998). A recent study of farming styles in the viticulture industry (Mesiti & Vanclay 2006) suggested some relevant distinctions, including the business approach of growers (e.g. business-minded, traditional, scientific or lifestyle),
their level of profitability, and their ethnicity (orientation to a ‘non-Australian’ culture). Insights from these and other studies are incorporated into the remainder of the report.

Within the Australian and international literature a banquet of review articles on the factors influencing landholders’ adoption of commercial- and conservation-oriented practices has been served to a hungry audience of extension managers and NRM project officers (Feder & Umali 1993; Guerin & Guerin 1994; Barr & Cary 2000; Rogers 2003; Vanclay 2004; Pannell et al. 2006). A synthesis of these writings, combined with insights from the qualitative research in this project, suggests a productive approach may be to adopt a simple three component model of landholder behaviour. This posits that for landholders to manage their natural resources well, they need to have three qualities:

- motivation
- awareness
- resources\(^{17}\).

**Awareness**

The concept of awareness points to the fact that some landholders are unaware of the natural assets on their properties, of any potential threats to these assets, and of the measures they could take to manage these threats. This is particularly the case for new and inexperienced property owners, of which there are increasing numbers in the PPW region. However, even experienced rural residents may be unaware of problems that are relatively new, that do not directly affect their routine activities, or are otherwise not salient to them (White 1974).

In more problematic cases, a landholder may be all too aware that government authorities, for example, observe certain NRM problems on their properties, but are sceptical about—or even hostile towards—these ‘expert’ assertions. Experienced landholders, in particular, will routinely evaluate the credibility of expert opinions, especially if they have the potential to adversely affect their lifestyle or profitability. In such cases, the term ‘awareness’ is inadequate because it implies that the information is perceived as being (and is) neutral and objective. Extensive research has shown that the public do not automatically defer to scientific and expert pronouncements, especially when such experts have different framing assumptions and cultural viewpoints (Wynne 1993; Irwin & Wynne 1996; Parbery, Wilkinson & Klugman 2005). It goes without saying that the same is true of expert government advice.

**Motivation**

Some landholders may accept that certain natural resource problems affect their property, yet they resist taking action. In other cases they remain uncertain or sceptical about the relevance or validity of expert claims about natural resources on their land. In either case, the landholder takes no action because the costs of undertaking the new management practices outweigh the benefits of doing so. Such costs and benefits consist of more than time and money, although these factors are obviously important (such as the cost of buying and applying herbicide, or of sacrificing productive land to plant native vegetation). They also

\(^{17}\) Carys Evans (formerly PIRVic Spatial Sciences, DPI) suggested that we use this model when she worked on this project in late 2006. The original source is unknown.
involve personal and cultural costs and benefits, such as the personal satisfaction of restoring degraded land, or the social alienation that can result from contravening local cultural norms. Obviously such norms will only be influential if the individual identifies and engages with the community in question. For example, the service provider interviews suggested that around Romsey, in the north of the PPW region, there is a well-established rural community that accepts weed control as a basic neighbourhood responsibility. In contrast, results indicate that the newer landholders closer to Melbourne have little sense of community, and consequently few felt obliged to control weeds for their neighbours’ sake.

**Resources**

In some cases, landholders may be both aware of an NRM issue that needs addressing on their property, and also motivated to take action, yet they lack the resources to do so. The needed resources could include time or money, or it could be equipment or ‘know-how’. As is the case with a true lack of awareness (as opposed to active disbelief), a landholder’s lack of resources is potentially one of the more straightforward problems to fix. The most difficult situations to change are those in which motivation is lacking. Sometimes landholders blame their inaction on a lack of resources when what they really lack is the willingness or motivation to marshal their resources.

### 4.1.1 Typology of rural landholders

What kinds of landholders are likely to lack the awareness, motivation or resources to manage their rural land well? The research literature abounds with typologies delineating different kinds of farmers and other rural landholders, as discussed briefly above (also reviewed by Wilkinson 2006). This literature also identifies a number of social characteristics that can influence or indicate landholder levels of awareness, motivation and resources for conducting good NRM (reviewed by Pannell et al. 2006). These characteristics are summarised in Table 11.

In the present study, a typology of private rural landholders particular to the PPW region has been developed, combining findings from the research literature with results from the service provider interviews. The resulting typology (described in Table 12) defines nine broad ‘types’ of landholders that collectively illustrate diversity across social characteristics of particular relevance to landholders’ NRM attitudes and behaviour.

The typology was used to guide recruitment for the landholder interviews, thereby ensuring a diverse selection of landholders would be represented in each of the three study areas. The development of the typology is reported in greater detail in Ransom and Parbery (2007), a quantitative version of the typology is presented in Section 4.6.1 below, and data for the three focus GWRegions is presented in Chapter 6.
Table 11. Characteristics that can affect NRM behaviour among rural landholders

<table>
<thead>
<tr>
<th>Characteristics of the property</th>
<th>Property size, property location, climate and soil qualities, land use, presence of a dwelling, other infrastructure, commercial activities (including farming), agricultural activities (commercial or hobby), farm industry if applicable (e.g. grazing, dairy, horticulture).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business characteristics</td>
<td>Asset ownership, type of business (farm, tourism, hospitality, active recreation), farm or business profitability, technical experience, business experience, off-farm income, connection to industry bodies, number of people supported by business, hobby, family or corporate business, use of outside labour.</td>
</tr>
<tr>
<td>Type of owner</td>
<td>Individual, family (possibly extended), joint venture, business or corporation.</td>
</tr>
<tr>
<td>Reasons for owning property</td>
<td>Investment, home, recreation (passive or active), farm or other business, conservation, inherited.</td>
</tr>
<tr>
<td>Social and cultural characteristics</td>
<td>Age, health and wellbeing, disposable income, life stage (single, couple without children, family with young or school age children, retirees), socioeconomic status, education and training, gender, ethnicity, political orientation, (sub)cultural background (‘traditional’ and other farm cultures, ‘green’ cultures, ‘urban’ and ‘rural’ cultures), degree of integration and familiarity with local environment and community, personal connection to local area.</td>
</tr>
<tr>
<td>Landholders’ knowledge, attitudes and experience</td>
<td>Training and experience, no or little relevant experience (e.g. new lifestyle owner, new farmer), long-term experience with area (non-work related), farming or other practical experience, professional training (e.g. retired NRM professional), farming methods (e.g. intensive versus ‘conventional’ versus organic), environmental, farming and NRM values (e.g. ‘productionist’ or ‘stewardship’ values).</td>
</tr>
<tr>
<td>Landholders’ relationship with property</td>
<td>Ownership and management: owned (outright or mortgage), rented, leased, ‘in the family’; time landholder spends on property (lives there, visits regularly, irregularly, never, lives overseas); time landholder has owned property; time landholder intends to stay on or own the property; landholders’ emotional attachment or commitment to property.</td>
</tr>
</tbody>
</table>

Throughout this report—including in the typology presented in Table 12—landholders are routinely distinguished according to three broad scales of agricultural activity: ‘lifestyle farmers’, ‘part-time farmers’ and ‘commercial farmers’. It is important at this point to establish more precisely what is meant by these and similar terms. These distinctions are intended to denote three factors, the most important of which is the proportion of an individual’s or household’s income which derives from farming. If the majority of income does derive from farming, a second question arises: is this income sufficient to support a lifestyle acceptable to the individual? The second important factor in making these distinctions is the amount of time spent on farm labour, and the third is the cultural identity of the landholder. Some individuals may have a strong sense of identity as a farmer even in the absence of substantial farm income or labour (they may, for example, be retired from very active farming) (Wilkinson 2006 p. 5; Barr 2004 p. 77).
Table 12. Typology of rural landholders and their characteristics

<table>
<thead>
<tr>
<th>Types</th>
<th>Anticipated and defining characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amenity lifestyler</td>
<td>‘Lifestylers’ are not dependent on income derived from their farming activities (if there is any), and farm labour is undertaken mostly for enjoyment or to fulfil ‘duty of care’ obligations. ‘Amenity’ lifestylers use their rural property principally for the rural ‘amenity’ or lifestyle, and do not have particularly strong environmental or ‘green’ values.</td>
</tr>
<tr>
<td>Green lifestyler</td>
<td>The same as the amenity lifestyler except for their particular interest in nature conservation. Interested in enhancing the conservation value of their rural property. Includes some ‘deep green’ landholders (e.g. organics).</td>
</tr>
<tr>
<td>Part-time farmer</td>
<td>This scale of farming is intermediate between ‘lifestyler’ and ‘commercial farmer’ and captures a range of farmers: they are at least partially dependent on farm income, or have a strong sense of identify as farmers, or their farm work makes up a substantial proportion of labour activities (perhaps 20 hours a week or more, though this depends on circumstances and may vary widely depending on season). Includes some new aspirational farmers and some downscaling. Examples exist in most farm industries; however beef cattle grazing is most common.</td>
</tr>
<tr>
<td>Commercial farmer</td>
<td>Farmers whose farm activities provide the major or sole income for the household, which they generally find to be adequate for their needs. Farming occupies a substantial proportion of labour activities for the household (again depending on circumstances and subject to seasonal variation, but on average greater than 20 hours a week). These farmers are often very experienced in their chosen enterprise.</td>
</tr>
<tr>
<td>Struggling farmer</td>
<td>Same as commercial farmers except that the income they derive from farming is generally not sufficient to support what they consider to be an acceptable lifestyle, and they do not have sufficient access to non-farm income. May be hoping for better fortunes, hanging on until retirement, or hoping to subdivide. Especially in cropping, vegetable growing, smaller scale dairy and larger scale grazing.</td>
</tr>
<tr>
<td>Green commercial farmer</td>
<td>Same as commercial farmers except in having a particular interest in nature conservation that is reflected in their agricultural practices. May use green credentials as in marketing organics, EMS, IPM, eco-labelling or Landcare.</td>
</tr>
<tr>
<td>Hybrid farmer</td>
<td>Businesses that combine agriculture with hospitality, tourism, or other value adding, diversification or vertical integration, for example, a vineyard with winery, restaurant, conference centre, bed and breakfast, niche marketers.</td>
</tr>
<tr>
<td>Non-farm business</td>
<td>Rural businesses that are not focussed on primary production, for example, golf courses, bed and breakfast, active recreation (horses, dirt bikes, paintball), quarries, waste treatment (where private).</td>
</tr>
<tr>
<td>Property speculator</td>
<td>Individuals (or corporations) who own their properties principally as an investment, and may be hoping for urban development, such as absentee owners. Most common in the Western GWRegion and near UGB.</td>
</tr>
</tbody>
</table>
These three interrelated criteria are used to distinguish three broad scales of farming activity, which are described in the typology presented in Table 12, and are here reiterated more clearly, separated from other factors that were incorporated into the typology:

- lifestyle landholder (‘amenity’ or ‘green’)
- part-time farmer
- commercial farmer (including ‘struggling’ and ‘green’ commercial farmer).

This terminology is rather imperfect, and the distinctions not absolute. One problematic aspect is this terminology’s inherent suggestion that a landholders’ labour contribution (part-time or full-time) corresponds to the commercial benefit they derive (semi-commercial versus commercial). In practice, an individual who works full-time on their farm may derive all their income from it, only aspire to earn a viable income from it, or not need any income from it. Conversely, individuals who work only part-time on their farm may still derive a satisfactory income. Also, individuals differ on what a ‘viable income’ consists of. In this report, we define this somewhat arbitrarily as a net income of $50,000 (discussed in Section 5.5). Questions of the commercial scale and economic viability of agriculture are examined in greater detail in Section 5.5.

4.1.2 The landholder interviews: boxed examples

The remainder of Chapter 4 is punctuated by case studies featuring selected landholder interviewees which provide examples for the typology. These illustrate key principles underlying the creation of the typology, as well as the substantial limitations inherent in attempting to categorise individual landholders in this way. Most landholders (perhaps all) would potentially fit into two or more categories. Nonetheless, these examples provide embodied and holistic examples for the more abstract analytic framework developed below to help understand different rural landholders’ NRM attitudes and practices. In all cases, names and other key details have been altered in order to preserve the anonymity of the interviewee.

Each case study begins with a quote of the landholder’s brief description of their property. These give a succinct indication of land use and associated lifestyle, ranging from:

the business-like …

The property is 150 ha, on which we have a major tourist facility, a winery crushing 6,000 tons of grapes. (Hybrid business operator)

to the poetic …

Private and secluded. Windy on the hill. Windy and cold. (Green lifestyler)

to the pragmatic …

It’s a dryland dairy farm I suppose, consisting of Dalmore clay, which seems to be a soil type [that] is fairly significant I suppose, as Dalmore clay doesn’t grow any grass in a dry year. (Commercial farmer)

It’s a rural holding. It’s [an] outstanding location. It’s well-drained, well-fenced, well-run … It’s a bit like a hobby farm. (Part-time farmer)

or a combination …
Throughout the interviews, prompts were kept as general as possible in order to capture what interviewees (rather than the interviewers) felt was important about their properties, and to develop a sense of their spontaneous awareness of different natural assets and NRM problems on their properties.18

CASE STUDY 1
Karen: ‘green lifestyler’ with horses (in the north of the South East GWRegion)

Karen and her family live in a mud brick house on 24 ha on a hilltop in the north of the South East GWRegion. Two-thirds of the property is bushland and the rest is home to horses, some cows, an organic orchard and her husband’s farrier business. They moved to the property 14 years ago from the flats further south where her husband grew up and still has his customer base. They moved because they were “sick of just looking at flatness” and because a state park was “just up the road, so we could ride the horses”. In the future they hope to expand their business through the provision of training and seminars for horse owners.

Karen is acutely aware of, and has strong views on, a range of NRM issues. Their extensive native vegetation is a source of pride, is protected under Trust for Nature and features “an extensive fern gully … lots of grasses and a few orchids” and a “big old gum tree that we’ve had aged at about 700 years old”. Her strong conservation ethic underpins her views on animals from wombats (always welcome) to cats (not welcome). Her approach to conservation and to their modest food production was informed by a “passionate” commitment to organic methods: “we don’t use any chemicals on the farm at all: not even fly spray.” These beliefs led to strong criticism of neighbouring farmers’, local council and Landcare groups’ weed spraying.

Karen confided that despite their initial intentions to build their house and then sell up they have become attached to the property, with their 12-year-old daughter saying “No! You can never sell it, you can never sell it!” Karen seemed to have a low awareness of the green wedges or their implications, but was very opposed to development, saying “I just live in the wrong shire basically [Cardinia] … it’s development, development, development”. However, they did hope to be able to improve their steep access road and create some conference facilities for their horse training business.

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18 Information provided before the interview was also kept general for the same reason.
4.2 A framework for understanding NRM behaviour

The remainder of this chapter develops a framework for understanding landholders’ NRM behaviour, delineated in terms of their awareness, motivation and resources for NRM. The greatest detail is given to the question of motivation, since this factor is critical to efforts to engage landholders, yet is also the most difficult to influence. Scenarios where awareness or resources may be lacking are relatively straightforward to identify and address. New landholders will often lack basic information on how to manage a property and this can easily be addressed by providing such information.

Farmers suffering financial pressures will not adopt measures that compromise their productivity, in which case financial assistance or incentives can be provided. However, where motivation is lacking, offers of additional information and resources aimed at improving NRM will languish unused. Pannell et al. (2006 p. 1419) suggest it is difficult to try and change people’s goals, and in some cases perhaps even ethically contentious. Understanding and working with landholder motivations is therefore a key challenge, and receives the most attention in the remainder of this chapter and this report. Accordingly, motivation is examined first, followed by an examination of the importance of landholders’ awareness of, and resources for, NRM.

4.3 Motivation

What makes landholders and residents want to manage their natural resources in particular ways—or to not manage them? Setting aside for now questions of awareness, cost and convenience, the answer depends on their reasons for owning the land (if they do own it), and the ways in which they use it. Some rural land is not used or managed at all, in which case it may assume the ‘ecological default’ for the area; perhaps an indigenous ecosystem, or a paddock of thistles and serrated tussock (or somewhere in between). In other cases, land is actively managed to some degree in ways that fulfil a complex and often competing mixture of personal and commercial aspirations. This study distinguishes three key elements of landholders’ motivation in relation to NRM: attachment, land use imperatives and NRM values. These are discussed in turn.

4.3.1 Attachment

The qualitative interviews suggested that one of the most basic influences on landholders’ attitude to land management is their level of ‘attachment’ to their property. The concept of attachment has been adapted from child psychology (see Lieberman 1993 p. 2), and in the context of this report describes landholders’ level of emotional commitment to owning, living on or managing a property. A number of comments from the landholder interviews indicated high levels of attachment:

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19 The concept of attachment in child psychology was developed by J Bowlby and M Ainsworth to describe the intense need that small children have (particularly between the ages of one and three) to develop a very close relationship with a small number of cherished adults, most especially the mother or father.
I love it here. I’ve been here all my life and my family, or my son, intends to keep farming the properties. As long as we’re able to, I believe my son will stay here and farm because it’s lifestyle. (Commercial farmer, Yarra GWRegion)

I had people pushing me, asking me to sell it, but when I went home I was tossing and turning: I didn’t want to sell it. I like it so much. (Part-time farmer, Western GWRegion)

The qualitative research indicated that attachment may be important because—other things being equal—it can influence how much of a landholder’s time, money and emotional energy they are willing to invest in actively managing the property. Levels of attachment may vary according to whether or not a landholder owns the property (rather than rents), how much personal history they have with a property, and whether they derive current benefits from the property, for example as a home or business (discussed in detail in Section 4.3.2). High attachment often results from having a long association with a property and the surrounding region.

You can see the part of the old house there, that’s where I was born, so I’m very proud. (Green commercial farmer, South East GWRegion)

However, landholders can develop a deep attachment to their property over a very short period of time. One such interviewee had not even finished building the house on their rural lifestyle property when it took on a profound symbolic importance.

Tragically my husband passed away … And my first feeling was ‘sell the property’ … And then we was [sic] watching a video—my husband videoed the property all over again and again—and [he] was telling [me] how much he loved that and how much he loved this, and the sunset coming in the morning … And so I decided to keep it … I will create this little house, his memorial. (Green lifestyler, Yarra GWRegion)

There is also a range of reasons why someone might have low attachment to their property. Some individuals experience a gradual decline in previously high levels of attachment. This might occur due to a change in life stage, such as getting too old to manage the property, or their children leaving home. A decline in business profitability can also drive this change, leading to financial hardship and a desire to move to ‘greener pastures’. The relationship between attachment and commercial viability is illustrated in one of the measures of attachment used in the telephone survey: whether landholders would be pleased (indicating lower attachment) or disappointed (indicating higher attachment) if their area was marked for urban development. A comparison of commercial farmers (self defined) indicates that those who describe their farms as being ‘highly profitable’ are less likely to be pleased with urban development (13% pleased) that those who indicate they ‘generally operate at a loss’ (33% pleased). The question of farm profitability is examined in greater detail in the next chapter.

Attachment can also decline in response to a change in the social or physical context of the property, such as urban encroachment, or an influx of lifestyle landholders who may be perceived as culturally alien by established landholders. Often these factors occur together and interact with one another, leading an established landholder to withdraw their psychological roots and aspire elsewhere. In such cases there is often emotional conflict between the individual’s potentially long historical association with the property (spanning generations), and their need—for example—to derive a sufficient income from their farming
activities. Attachment is thus many layered and may incorporate strong tensions between staying on a property and leaving.

In the most extreme case, landholders never develop any level of attachment, for example because they acquired their rural property purely as an investment, often anticipating urban development. It is in this scenario that the concept of attachment has the greatest usefulness for understanding NRM behaviour, though telephone data is not available for these absentee land speculators. However, the service provider interviews indicated that such properties are common in the Western GWRegion, with serious negative consequences for that region’s natural resources. This is examined in detail in Section 4.3.3 below.

What did the telephone survey indicate about landholder levels of attachment in the three GWRegions studied? Of the landholders who were surveyed, 5% indicated that they owned their property ‘primarily as an investment’, 9% indicated that they would prefer not to be managing the property in five years time, and 20% indicated they would be pleased if their area were to be ‘marked for future urban development’. Table 13 shows landholder levels of attachment in different parts of the study area, as constructed from these and other relevant questions.

Table 13. ‘Attachment’ to land of landholders who live or work on their property \(^{20}\) (data source: telephone survey)

<table>
<thead>
<tr>
<th></th>
<th>Western (%)</th>
<th>Yarra (%)</th>
<th>South East (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property is primarily an investment</td>
<td>8</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Would feel pleased if area was marked for urban development</td>
<td>46</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>Would probably or definitely not want to retain the property five years from now</td>
<td>11</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Natural assets valued principally for increasing property’s value</td>
<td>10</td>
<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 13 suggests generally lower levels of attachment in the Western GWRegion, consistent with the service providers’ observations that many landholders there are hoping for urban development in the area. This could potentially explain the parlous state of natural resources in the Western GWRegion—the area of the PPW region that is in the worst condition and showing the least improvement according to the Melbourne Environment Report 2007 (PPWCMA 2007). The qualitative research suggested that, other things being equal, attachment could influence landholders’ willingness to invest emotional and material

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\(^{20}\) Landholders’ who neither live nor work on their property (e.g. absentee) would have (potentially much) lower levels of attachment in most cases. However, it was not possible to survey these individuals by telephone (a mail survey could do, but would require access to confidential information (addresses) from local government rates data bases). This information was not accessible.
resources in their rural properties. Individuals who plan to remain on a property for the longer term would appear to be more likely to invest in NRM projects, many of which have long-term rather than short-term rewards.

Interviewer: What made you want to plant up around the creeks and all the roads?
Interviewee: Because I plan on being here for a while. It would be nice for it to be better. (Commercial farmer, South East GWRegion)

However the quantitative telephone survey data did not provide clear support for such a relationship between attachment and NRM behaviour. The questions intended as measures of attachment—such as ‘intention to stay on the property’ and ‘attitudes to urban development’—exhibited little relationship to NRM activity. One likely reason for the apparent lack of relationship between NRM activity and attachment is the over-representation of farmers (who tend to have high NRM activity) and the under-representation of lifestylers (who tend to have low NRM activity) among the individuals who indicated they would be pleased with urban development (suggesting low attachment).

Consequently, it may be that any negative effect of farmers’ lower attachment (potentially caused by a lack of profitability or a desire for retirement) on NRM activity is obscured by the positive effect of their strong commercial imperatives for active NRM and/or greater access to key resources for NRM (including knowledge and equipment). A more important reason that no effect of attachment on NRM behaviour was observed is likely the fact that the landholders with the lowest attachment—absentee landholders—were not included in the survey.

The complex relationships between attachment, support for urban development and NRM behaviour are further illustrated by Figure 13, which shows the spatial distribution of landholders who would be pleased at the prospect of urban development. As expected, there are pockets of high support for urban development in CCDs near to or on the UGB (e.g. Werribee South, Rockbank, Melton and Cranbourne, though some sample sizes are small; see Appendix B). It is also apparent that support for development is lowest in the Yarra GWRegion, where lifestyle landholders—who often value the natural landscape for its natural beauty and conservation values—predominate (see Section 4.3.3 below). Critically, there is greater support for development in areas where commercial agriculture predominates, such as the South East GWRegion, and especially in Werribee South in the south of the Western GWRegion.

This last case warrants closer examination. The telephone survey indicated that the commercial and part-time vegetable growers of the Western GWRegion (75% of whom are at Werribee South according to AAC data) are much more supportive of urban development than in the other two GWRegions (93% versus 17% in Yarra and 35% in the South East), even though fewer are operating at a loss (30% versus 40% in Yarra and 33% in the South East). According to service providers who work closely with these growers, this tight-knit community of farmers is pessimistic about the future of farming in the area due to poor water quality and availability (capped bores and 0% allocation for the last two years), but optimistic about prospects for urban development: their narrow agricultural area is sandwiched
between the established urban suburbs of Werribee South and the waterfront, where a major marina has been approved for development.

As a consequence, although the telephone survey data indicates that 70% of these landholders have high NRM activity (in line with their ongoing commercial agriculture), service providers suggest that some deliberately degrade natural resources on their properties in the hope of encouraging development. This points to the limitations of the quantitative measures of NRM behaviour used in this study, and to the complex interactions between landholders’ NRM behaviour, their level of attachment, and other elements of motivation—especially land use imperatives—explored below.

Figure 13. ‘Resident’ landholders who would be pleased with urban development in their area\(^\text{21}\) (data source: telephone survey)

Overall, the concept of attachment would appear to be most useful in instances where landholders have little involvement with their properties (meaning they are difficult to engage in NRM activities), especially in the case of absentee land speculators. Several service

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\(^{21}\) This map does not include absentee landholders (c.f. ‘resident’ landholders), who are most common in the Western GWRegion and whom we are told often favour urban development. It also does not include landholders who were contacted via the business telephone directory (16% of the sample—though the remaining 84% does include many businesses), because these phone numbers did not have CCD reference associated with them in the electronic directory, which is needed in order to mapped them spatially as in this figure.
providers indicated that such individuals sometimes actively manage key natural resources with the sole purpose of maximising the property’s development potential: usually to the detriment of the environment. Such cases are examined in detail later in this chapter.

### CASE STUDY 2

**Gareth and Oliver: ‘Commercial flower growers’ (Yarra GWRegion)**

It’s a packing shed, a house, and the three greenhouses and a dam.

Gareth and Oliver—a father and son team—grow flowers on a five acre farm in the Yarra Valley. Gareth grew up in the area and has a background growing strawberries, but lived an urban lifestyle before buying the property in the 1980s. Gareth’s wife (an industrial chemist before their career change) was the main driver behind the change to flower growing. The couple now live on their property with their son Oliver, who has “pretty much taken over [the business] now”. Their property holds a house, a large dam and 3,000 square metres of greenhouses (growing gerberas). Gareth and Oliver plan to double the area of shedding once business conditions are favourable. The business currently provides the sole income for father and son, as well as employing four non-family staff.

Gareth and Oliver’s awareness of NRM issues is constrained by their hydroponic production methods and strong commercial focus: “you’ve got a lot more control in hydroponics, and you can get better production per square metre”. Although they originally planted some native vegetation on the property, they have subsequently “had the whole area cleared in preparation for hot houses” and view the remaining unused land as “just an expansion area”. Their greenhouse operations are climate controlled and use water collected from the roof: “soil is not really an issue”. They use integrated pest management (IPM) and when they have to spray, use “very light chemicals and generally try and spot spray”.

The pair is aware they live in a green wedge and view this (and similar planning controls) positively given it has prevented any major changes in their area over the years. Their attitude to the green wedges is linked to the question of whether or not Oliver will be able to continue or expand the business; something they see as being likely unless they “run out of room”, or unless non-farming neighbours object to having their “nice view” compromised by glasshouses. “Either make it easy for horticulture, or to make it easy to subdivide”, is their view.

### 4.3.2 Land use imperatives

If attachment influences how much energy a landholder puts into managing their property, what influences the style of that management? One of the most basic factors is whether a property is used either as a private residence or as a business. Both of these activities create reasons to actively manage a rural property, along with certain imperatives as to how the land
should be managed. Conversely, land that is not used either as a home or as a business may not be managed at all, or may be managed only to facilitate urban development. The absence of any land use imperative generally results in a low level of attachment.

Neither home nor business are dichotomous states, but rather are the extremes of two continua. Combining these two dimensions creates four broad land uses as shown in Figure 14.

![Figure 14. Land use imperatives: commercial to residential](image)

**Figure 14. Land use imperatives: commercial to residential**

In the telephone survey, respondents were asked to indicate whether their property was used as a residence, as a site for business activities, or principally as an investment. The results, which are shown below, substantially underestimate the number of properties used neither as a residence or business, because these properties were largely not contactable for the purpose of the telephone survey:

- home only (61%)
- business only (11%)
- home and business (27%)
- neither\(^{22}\) (<1%; ‘primarily an investment’).

Of the properties where business operations occurred, virtually all were home to some farming activity: 45% of which were ‘commercial’, 28% part-time and 20% lifestyle farms (survey respondents were invited to choose which category they best fitted). In addition, 39% of the business properties (including those with a home) incorporated non-farm business activities in areas such as tourism and hospitality (9%) or recreation (5%).

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\(^{22}\) This category was largely not contactable during the telephone survey, which selected only phone numbers from within rural areas of the GWRegions (meaning that urban absentee land owners were excluded).
Commercial imperatives

The business activities that take place on a given property cover a broad spectrum (the horizontal axis in Figure 14), including (from left to right) lifestyle operations which generate no or minimal income for the landholder (i.e. ‘lifestylers’), commercially-oriented enterprises that are supported by off-farm income (i.e. ‘part-time farmers’) and fully commercial operations (‘commercial farmers’). A detailed profile of agricultural industries within this spectrum for the PPW region can be drawn from AAC data. Figure 15 shows the number of farm establishments in the PPW region in 2001, and distinguishes them according to their estimated value of agricultural output (EVAO)—a measure of their gross level of production. Considering that most farm industries in the region would require an EVAO of at least $100,000/annum to generate a net income of $50,000/annum (see Section 5.5), Figure 15 reveals that the great majority of farms in the region in 2001 fell at the ‘lifestyle’ end of the spectrum. This is particularly true within the grazing industry (which dominates the overall profile), whereas the opposite is true in intensive animal production, which is dominated by large commercial operations. Other industries are made up of less extreme, or more complex, distributions along this spectrum, as explored in Chapter 5. EVAO profiles for all agriculture industries in the region can be found in Ransom and Parbery (2007).

![Figure 15. EVAO profile for agriculture industries in PPW region in 2001 (data source: AAC)](image)

Fully commercial operations create strong land use imperatives, because ongoing commercial success is dependent on particular regimes of land use. In the words of one of the service providers, they are “interested in the bottom line” and “don’t want diversions”. A bed and breakfast operator might need to clear a certain amount of land to build cabins, while also maintaining an aesthetically pleasing environment. A bus or truck depot would also need space (and a level, stable surface) to park vehicles, as well as areas for maintenance.

Meanwhile, for a commercial vegetable farm there are imperatives to sustain a minimum level of production. Depending on the style of agriculture practiced (e.g. ‘conventional’ or ‘organic’), this may include tilling, fertilising, irrigating, and managing pest plants and animals (either through the use of pesticides and herbicides, through IPM, or using organic management regimes). The South East GWRegion is home to a large number of highly...
commercial farms and the service provider interviews there indicated that such farmers were “very focussed, very organised … [and] understand what they’re doing”.

The particular management imperatives of a commercial business obviously vary according to the particular type of business, but the existence of a commercial imperative means that the landholder will be highly motivated to actively manage their property and to manage it within potentially inflexible limits. These commercial imperatives diminish towards the other end of the business spectrum, where alternative sources of motivation would need to be invoked to explain the land use in question. The most common alternative motivation is rural residency, as represented by the vertical axis in Figure 14.

Figure 16 compares the distribution of personal incomes for respondents whose properties provide varying proportions of this income: none, up to 79%, or 80% or more. It shows firstly that most respondents (59%) derive none of their income from their property. Only 14% of respondents derive 80% or more of their income from their property. Secondly, it shows that, on average, individuals whose income is mostly drawn from their property earn less than those with off-farm (or off-property) income. The highest incomes are among those who earn some of their income from their property, but less than 80%. It is important to note that this figure may be substantially biased by omission of the 37% of respondents who declined to divulge their level of personal income.

![Figure 16. Income versus proportion of income derived from property (data source: phone survey)](image)

**Residential imperatives**

As with the business imperative, there are varying degrees to which a property may be used as a place of residence. A property may be a permanent residence (the highest degree of residency), a weekend residence or an occasional holiday house. Alternatively, a house might be under construction on the property, or the landholder could aspire to build on the
property, but lack a permit to build. All these ‘degrees of residency’ have implications for landholders’ current and likely future orientation to NRM.

Full-time residency on a property has some obvious and some not-so-obvious implications for NRM. Other things being equal, permanent residency means landholders will have a greater awareness of NRM issues affecting the property, more time and greater motivation to address them. Increasing degrees of residency are likely to foster increasing attachment, though the study’s landholder interviews indicated that even some permanent residents are ready to sell up as soon as an opportunity to subdivide and sell the property arises.

The existence of a commercial or residential land use imperative determines whether any strong driver for active land management on a property exists, but it does not specify the particular character of this land management. The specific land uses prevalent on a property used as a residence will be influenced by whatever counts as ‘homeliness’ for a given landholder. This is a very personal and diverse quality. Some rural landholders enjoy keeping animals and growing plants (ornamental or edible, native or exotic) others enjoy active recreation pursuits (such as horse riding, motorbike riding or sport), and there are some who have no interest in the outdoors (preferring books or movies, writing or cooking, music, playing with the children, entertaining, housework, woodwork or origami). Some of these activities have strong implications for NRM, while others do not. In order to describe the specific relevance to NRM of different styles of land management, the concept of ‘NRM values’ has been developed and is described below.
CASE STUDY 3

Len: ‘Part-time beef grazier’ (the south of the South East GWRegion)

It’s a rural holding. It’s [an] outstanding location. It’s well-drained, well-fenced, well-run.

Len is an aspiring beef farmer with 300 ha of land (owned and leased) in the South East GWRegion. Although he currently lives in an urban area and works as a motor mechanic, he hopes to eventually build a house and live on his rural property, where his beef farming activities currently contribute only 10% of his income. One of the properties he runs has been owned by his father-in-law for 26 years and remains an important centre for the extended family, where the grandkids can “feed the cows and look at the chooks”.

Len’s traditional farming orientation has influenced his approach to NRM; the need to “improve your water, to make sure that the grass grows and your stock is well-fed.” He is concerned that farmers have to “fight the greenies to make a living”, yet he has undertaken a major planting of native vegetation supported by the Westernport Catchment Landcare Network. His reasons are principally—but not purely—production oriented:

One is the salinity going through the ground. Two is to provide shelters for the stock during summer and winter … [and] obviously you prefer some trees. [Native vegetation] is more resistant to the environment, it attracts the local bird life and I think it looks better.

Len is aware he is in a green wedge and he is ambivalent—tending towards hostile—about the concept. His principal concern is to protect areas with good rainfall (and high farming potential) from urban encroachment or monopolisation by environmental activities. It appears Len could be very supportive of the green wedges if he were convinced of their value in protecting land for agriculture, rather than being a concept driven by “greenies” and the government’s desire to not “bring infrastructure to this area”. However, as with many farmers in green wedges, it seems his support for the concept will be strongly determined by his ability to sustain the rural lifestyle he values:

I’m hoping to establish native vegetation like I wanted to. I want to build a house on it. I want to run it as a cattle farm. Eventually [I will] probably buy some more if I can afford it. Or otherwise, just sell it off and move further away, and buy something bigger.

If this can be achieved, such a lifestyle would contribute very positively to the objectives of the green wedge. However, Len’s ‘plan B’ is potentially incompatible if it involves selling in the hope of subdivision.
4.3.3 NRM values

The foundations of land use discussed above indicate whether there are strong residential or commercial imperatives in managing a property, but they only go some way to explaining a particular landholder’s style of management, and its relevance to NRM. Thus, a commercial business may require constant and close management of soil, plants, animals and water (e.g. a farm) or no active management at all, other than to clear them to make space (e.g. the bus depot). Equally, a full-time rural resident may be avidly interested in gardening and landscaping, or they may have no interest in the outdoors whatsoever. The concept of ‘NRM values’ is here proposed—drawing on research by Crossthwaite et al. (2004), Lowe et al. (1997) and Parbery, Wilkinson and Klugman (2005)—to distinguish different orientations to land according to their implications for NRM.

The concept of NRM values describes an individual’s personal or professional orientation to natural resources, nature and the physical landscape. For example, some individuals are passionately interested in conservation issues, while others are focussed on improving production levels on their property. Others are entirely unaware of, and uninterested in, these or any other aspect of NRM on their property. These personal views are sometimes held as part of a wider cultural worldview, shared by their community (for example a ‘rural’ or ‘environmentalist’ worldview). To some extent, they are linked to other demographic factors, such as gender, occupation, age, education and socioeconomic status (Parbery, Wilkinson & Klugman 2005). In other instances, they are personal orientations that cannot be explained by other sociological factors.

For the purpose of this study, six somewhat distinct NRM values have been distinguished:

- brown (agriculture, farming, growing, raising livestock)
- green (nature conservation)
- aesthetic (pleasing sensory experience, including the view)
- recreation (active outdoor pursuits, such as horse riding, sports)
- zero (uninterested in outdoors or natural resources)
- developer (preparing for sale, subdivision, development).

Most of these broad value positions can be held in combination with one another, such as aesthetic and green, or even brown and green. The majority of landholders hold multiple values, though generally some are more dominant than others. Most of the values can also clash at different times, or in their more extreme manifestations (e.g. green and brown, or developer and green).

The six NRM values and some of their interrelations are explained in turn below. Each is illustrated using examples of real estate advertisements for rural properties within the three study regions. The photograph and key phrases from each advertisement are reproduced verbatim below (including the heading for each), on the premise that these have been very deliberately crafted by the real estate agents to appeal to individuals looking for different qualities in a rural property.
**Brown NRM values**

Individuals who hold brown NRM values are interested in agriculture and primary production. The commercial expression of these values is commercial agriculture, while less commercial and more personal expressions would be various degrees of lifestyle farming, such as a vegetable patch or a hobby farm.

- rich asparagus peat soil
- very good bore, deep dam
- extensive shedding
- immediate income
- three-bedroom house
- weatherboard house
- double carport

**Figure 17. ‘Asparagus farm of 16 ha’ (South East GWRegion)**

In their commercial expression, brown NRM values often have a strong association with the rural ‘cultural worldview’ explored by rural sociologists such as Mellow (2005), Kelly (1989), Urry (1984), Lowe et al. (1997) and others (reviewed Parbery, Wilkinson & Klugman 2005). In this cultural context, farming is not ‘just a job’, but part of a way of life and community that is often deeply valued and integral to a farmer’s sense of identity. In terms of the land use imperatives discussed above, such individuals occupy the top right quadrant (home and business in Figure 14) and the commercial and personal imperatives are profoundly integrated.

In many instances, this rural worldview incorporates a utilitarian ethic of land use, which promotes increasing production as a moral, as well as a commercial, imperative for ‘good farming’: “a vital and morally worthwhile way of life” (Lowe et al. 1997 p. 7).

If you’re a farmer, you run x amount of cattle, you’ve got to buy the stock [and] you’ve got to look after them. You’ve got to improve your water to make sure that the grass grows and your stock is well-fed. (Part-time farmer, South East GWRegion)

In a commercial context, brown NRM values imply a close preoccupation with those natural assets that are needed for agriculture. However, natural assets and NRM problems that lack production relevance may not be of concern:

Blackberries and thistles are only a problem if they are causing economic loss. (Commercial farmer, South East GWRegion)

The availability of water was the most widely mentioned asset (no doubt influenced by the ongoing drought at the time the interviews were conducted). The service provider interviews indicated that many commercial farmers in the South East GWRegion were interested in
production relevant NRM issues, such as rabbits or weeds, but were uninterested in, or even hostile towards, conservation related NRM programs. The commercial farmers interviewed generally knew how to control their weeds and did so thoroughly and routinely without encouragement, noting that “weed spraying is an ongoing thing”, or “the old man’s got that under control”. The service providers indicated that commercial farmers sometimes contrasted what they saw as their own responsible control of weeds with the neglect of duty by their hobby farmer neighbours, whom they would sometimes “look down on”, not viewing them as “proper farmers” (service provider, South East GWRegion).

Yet when taken to extremes, the productivist mindset may lead to the neglect of other land use objectives, such as nature conservation, or even the social sustainability of rural communities. Rural sociologists call this mindset ‘productivism’ (Lawrence 1987; Lawrence & Vanclay 1994; Gray & Lawrence 2001). Thus, in contrast to commercial farmers’ strong motivation and activity on weeds and other production relevant NRM issues, the qualitative interviews (with landholders and with service providers) indicated that some commercial farmers had a very different attitude to native vegetation and biodiversity. A few were reluctant to sacrifice productive land for native vegetation, with vegetable growers in particular feeling they needed “every inch of soil” for production purposes (understandable in light of the high price of good horticultural land in the region and the value per hectare which can be generated). In some cases, concerns for native vegetation were negatively associated with ‘greenies’ and seen as irrelevant, culturally alien or threatening.

There’s no way I’m going to plant a tree in the [north] paddock while we’re working it. They can go to buggery. I’m not going to do it. The old man spent that many years with a hand saw cutting them all down when they first started farming here. And I’m going to go and plant one—he’d shoot me on the spot. I wouldn’t do it anyway. (Struggling farmer, South East GWRegion)

According to one service provider, some commercial farmers saw Landcare as being dominated by “a bunch of greenies” and as “a land grab for planting trees”. A study conducted for the Glenelg Hopkins CMA (TQA Research 2003) produced similar findings, identifying ‘conservative’ farmers as the population segment least likely to favour, or participate in, environmental programs, unless they targeted production relevant problems, such as salinity and erosion.

Thus brown NRM values can clash with green NRM values when operating in the productivist mode. The clash is often manifested, not only in land use outcomes, but also in the social dynamics of land use conflicts and of rural communities more broadly, especially in peri-urban or other ‘amenity’ areas (Lowe et al. 1986).

However, clashes between brown and green NRM values are by no means inevitable. In some cases, commercial farmers hold both types of values and have a profound interest in nature conservation, as well as commercial production. This is particularly apparent among farmers who use organic production methods and who actively market the green NRM values associated with their production methods. However, many non-organic farmers also hold and express green NRM values (reviewed Klugman 2006). Also, there are often synergies between brown and green NRM values, for example in the potential of native
vegetation to provide shelter for stock or to control salinity. Such synergies, however, are dependent on the particular form of agriculture and other circumstances.

In the telephone survey, a series of questions elicited landholders’ NRM values (Questions 13 to 16b in Appendix C). Figure 18 shows the distribution of brown NRM values in the three focus GWRegions. Consistent with areas known to have high agricultural activity (see Chapter 5), it shows a preponderance of brown values in the South East GWRegion and key areas in the other two GWRegions, such as the irrigated vegetable growing area in Werribee South in the Western GWRegion.

Figure 18. Distribution of brown NRM values among ‘resident’ landholders (data source: telephone survey)

**Green NRM values**

Individuals with green NRM values are motivated by an interest in conserving nature. In some cases this interest is grounded in professional knowledge of ecology or NRM. Several rural landholders encountered during the study had a background in teaching, research or government administration in these areas, and wanted to practically apply what they had learned professionally on their own properties. In most cases however, an individual’s environmental interests are personal rather than professional. Some research suggests that such individuals are more likely to have an urban background (Lowe et al. 1997; Robin 1998; Parbery, Wilkinson & Klugman 2005).
SQUARE PEGS IN GREEN WEDGES?
CHAPTER 4
LANDHOLDERS AND NRM

- imagine the serenity of your own perfect bush retreat!
- vacant land (residential)
- mains water
- power
- telephone

Figure 19. ‘8 ha of peace and quiet’ (Yarra GWRegion)

Green values are often expressed through a landholder’s personal life, for example as a nature covenant on part of someone’s property, or occasionally even as a bush block purchased solely for its habitat value.

We like the idea of there actually being a [conservation] covenant on the property so that it can’t be [degraded], even after it’s sold and we go and the kids sell it to get their inheritance, it will be preserved basically, so that’s nice. (Non-farm business, South East GWRegion)

I’m just as interested in the conservation aspect [as in keeping horses]. To me this is very important, this gully and this area of wildlife and I’d like to see it linked up with next door and this one over here [pointing to map]. (Green lifestyler, South East GWRegion)

There are threatened species here in the catchment, so they move through this property, and we have, I suppose, wildlife of interest on the property that aren’t threatened as well. I’m interested in that sort of thing. I’m far more interested in that than horses or pasture management. (Green lifestyler, Yarra GWRegion)

However, there are also commercial expressions of the green NRM values. For example, business operators who rely on tourism and hospitality often take advantage of the synergies between green and aesthetic values and may use their environmental credentials as a marketing advantage. One of the Yarra-based farm-hospitality hybrid farmers interviewed was part of a large multinational company, which had undertaken conservation activities as part of a policy of corporate social responsibility.

We’ve got a very strong environmental drive from the parent company and I’ve sort of taken on the environmental side of vineyard things quite strongly … [Customers] like that and they see a bit of wildlife and stuff as well and because of that we’re actually doing some revegetation around that dam to try and, I guess, improve the surrounding land around that dam so that it’s more appropriate for the bird species that we’re looking to encourage. (Hybrid farmer, Yarra GWRegion)

Landholders with green NRM values obviously have a direct interest in the environmental aspects of NRM, including native vegetation. However they can be uninterested in, and unaware of, NRM issues that are more relevant to primary production, such as the control of certain weeds. The protection of native habitat, restoration of streams and re-establishment of native vegetation were of particular concern to several of the greener landholders interviewed.
We've [revegetated] probably about three hectares, purely because that's what we want to do. (Green lifestyler, South East GWRegion)

There wasn’t any remnant vegetation on this farm when we arrived [in contrast to now]. (Green commercial farmer, Yarra GWRegion)

In several cases, such as the example in Case Study 1, landholders’ environmental interests were part of a broader organic philosophy, and this carried strong implications for other NRM issues, particularly weeds. Landholders who used only organic methods on their properties indicated they would never use chemical controls for weeds or other pests; in one instance “not even fly spray”. Landholders with a strong organic philosophy were sometimes very critical of conventional weed control methods.

So they’re my environmental issues, it’s what everybody else does around here: everyone else sprays and they all … you know … I don’t know … they’re all into their spray, spray, spray. (Green lifestyler, South East GWRegion)

For example, one service provider operating in the Western GWRegion was asked to identify the four ‘worst offenders’ for not controlling the noxious weed serrated tussock on a privately owned property. One of these was revealed—on further questioning—to be a new landholder establishing an organic orchard. This landholder had gone to great efforts to dig out—by hand—the weeds from the orchards he had planted and to carefully fence off and protect the endangered native grasses there. However, this owner steadfastly refused to spray their back paddock, for which presumably they had similar plans. This is a powerful illustration of the fact that landholders are not ‘good or bad’ managers of NRM, but rather may be good at some aspects that particularly interest them (native vegetation) and bad at others that do not, or that conflict with their NRM values and beliefs (chemical weed control).

Even among non-organic lifestyle landholders, some preferred to avoid chemicals as much as possible, both for human and ecological health.

We don’t like using [the herbicide] Roundup … we’ve actually gone in and hand dug them out. (Green lifestyler, South East GWRegion)

You do your best … hopefully you will get on top of it. (Part-time farmer, South East GWRegion)

Along with native vegetation, the issue of weeds, therefore, provides another point of contrast between landholders with strong brown and green NRM values.

Green NRM values correspond to the attitude that Wilkinson (2007) described as wanting to look after land because it “deserved to be looked after”, and wanting to “heal” the land from past degradation. As Wilkinson also observed, these individuals are more often lifestyle residents and will not need incentives to motivate them to revegetate their properties. However, the provision of assistance with logistics and labour would likely accelerate their revegetation projects.

Figure 20 shows the distribution of green NRM values within the three focus GWRegions, as determined from the telephone survey. It is apparent that green values are most prevalent in the Yarra GWRegion and lowest in the south east areas of the South East GWRegion.
Aesthetic NRM values

Individuals with aesthetic NRM values are interested in the experiential qualities of being in ‘the country’—the view, the open space, the sounds and smells, the fresh air—‘nature’.

I enjoy the nature, the fresh air. I enjoy the beautiful sun, the moon, the stars in the night. (Green lifestyler, Yarra GWRegion)

However, this aesthetic enjoyment does not necessarily entail any appreciation of the biological functions of rural landscapes—either ecological or agronomic. At their most passive, aesthetic NRM values may feature the rural landscape merely as a backdrop for dining out or reading a book on holiday. Less passive expressions of aesthetic values include gardening (which also implies some brown NRM values) or even landscaping. This aesthetic appreciation of rural landscapes is the major motivation for many lifestyle residents, weekend residents or holiday house owners, and is a very important consideration for the great majority of rural landholders. It is important to stress that—given aesthetic tastes are very personal—there is great diversity in what kinds of properties and landscapes will satisfy different individuals’ aesthetic values. Research indicates that the landscapes that have the broadest aesthetic appeal are those with hills, trees and the ‘lushness’ that comes with a reasonable amount of rainfall (Reid et al. 2003; Wilkinson 2007; Cary & Williams 2000). This
is at least part of the reason for the high numbers of lifestyle living and tourism in the Yarra GWRegion, and the low amounts in the Western GWRegion. Yet British research suggests that some farmers find cleared (and even ploughed) landscapes more aesthetically pleasing than treed ones, pointing to the fact that an individual’s aesthetic sensibilities are intimately related to their sense of cultural identity (Burton 2004).

Figure 21. ‘Ainsworth Estate’ (Yarra GWRegion)

Aesthetic values hold positive and negative implications for NRM. Some activities motivated by landholders’ aesthetic sensibilities may cause NRM problems, for example, if gardeners introduce and cultivate exotic weeds which escape into the surrounding landscape (such as agapanthus). In the Yarra GWRegion, the service provider interviews indicated that this was the major source of weed problems and that, given many garden escapees were not listed under the CaLP Act, funding was not available to manage them.

On the positive side, aesthetic features can provide an effective ‘hook’ to interest landholders in NRM programs, especially those involving native vegetation and surface water, given these two features have particular amenity appeal (although not all native vegetation is aesthetically equal, with trees having much broader appeal than grasses). One service provider from DPI’s SINL program recounted an example of landholders (not in the PPW region) colour-coordinating their windbreaks, presumably by using trees with different shades of foliage. Animal and plant pest control would be less attractive.

The planting of the trees was as much for beautification as it was for commercial gain. In other words, there are a lot of wattles and things like this that aren’t worth anything in terms of resale but do attract the birds and that type of thing and we’ve got a few horses. We are lucky enough to have all these rare grasses. And actually people (i.e. customers) do like the trees as well, although the experts say that they are nowhere near as important as the grasslands, apparently, but we still work them. (Non-farm business, Western GWRegion)

A second important observation is that given aesthetic appreciation usually extends to the landscape at large, it often leads to clashes between landholders, particularly between lifestyle landholders intent on enjoying the view and commercial farmers intent on continuing their sometimes smelly, noisy or unsightly business activities (in the eyes of some
lifestylers at least). In other circumstances there is a more positive interaction between agriculture and the aesthetics of landscape: grazing industries in particular create a bucolic open landscape which is appealing to many people, and can add substantial economic value to a region by encouraging tourism and increasing real estate prices. By adding value to rural landscapes, aesthetic qualities can, therefore, potentially help to preserve their ‘rurality’ in the face of urban development pressure.

The distribution of aesthetic NRM values in the three focus GWRegions studied is shown in Figure 22 below. As with green values, aesthetic values are most prevalent in the Yarra GWRegion. The similar distribution may be in part due to the strong synergy between green and aesthetic values. Aesthetic values are also more prevalent in other areas known to contain lifestyle landholders, hills and trees, such as the northern part of the Western GWRegion (Figure 22). In the telephone survey, relatively few respondents nominated the other NRM values (described below) as being most important to them, and so maps of these are less informative. These are presented in Appendix G.

Figure 22. Distribution of aesthetic NRM values among ‘resident’ landholders (data source: telephone survey)
Recreation NRM values

Where aesthetic NRM values underpin landholders’ passive appreciation of rural landscapes, recreational NRM values encompass more active and physical engagements, such as horse riding, hiking, bike riding (pushbike or motorbike), paintball or golf. Some of these activities require the landscape to be shaped in particular ways (e.g. golf), in which case they can have strong implications for natural resources. Other activities may have a physical impact on the landscape through trampling plants, compacting soil, or introducing weeds. As with aesthetic values, recreation values do not imply any appreciation of the biological functions of the landscape, either ecological or agronomic.

- excellent commuting
- new kitchen
- covered entertaining area
- double carport
- stable, poultry and dog run
- three large paddocks

Figure 23. ‘Location and lifestyle – 9 ha’ (Yarra GWRegion)

One of the most common and important recreational pursuits in the GWRegions from an NRM point of view is horse riding. Although some properties with horses might seem to be more in line with brown NRM values (e.g. horse breeding), other horse owners are more focussed on the recreational and cultural dimensions of horse ownership. The service provider interviews indicated that horse owners constituted some of the most difficult landholders to engage in NRM programs, due to a number of factors. This was partly because rural land was sometimes viewed merely as a space for keeping and riding horses, with the result that land was frequently overstocked and overgrazed (additional feed can always be bought using off-farm income). Difficulties in engagement may also stem from some landholders’ orientation towards exclusive cultures of horse ownership, though this difficulty can be turned to an advantage by construing NRM programs in these cultural terms. Horse South Australia has developed such a program, called ‘Horses Land and Water’ (HorseSA 2006). The distribution of recreation NRM values is shown in Appendix G.

Zero NRM values

Some rural landholders do not have any interest in the natural resources on their property. This may be because they never visit and may only own the property as an investment (although such individuals may also have ‘developer’ values—see below). In the case of residential landholders, one might wonder why they would live on a rural property at all. Yet such cases do exist; some have inherited their property, others live there because the
property is near to their work, or simply because land prices are low. Examples of the latter were identified on the outskirts of Melton during our service provider interviews.

Interviewee: I have interests other than the property … that’s my last priority for spending money on. Grass is grass for me, so I’ve got no idea … but I’ve had a lot of people from council who … are really rapt in the [native grasses in the] back paddock. But I don’t know what that means.

Interviewer: Are you happy to close it off?

Interviewee: Yeah, they know what they are looking at. If they can help me out I will help them out I suppose and try to keep the peace with everyone. (Part-time farmer, Western GWRegion)

Meanwhile, many businesses locate themselves in rural areas simply because they need a lot of space, but otherwise have no particular need for good soil, rainfall or a view. Examples could include companies involved in transport, storage or manufacturing and a host of other areas. Such properties may incorporate areas that are more urban in character. One person interviewed for this study ran a bus company and used his rural property as a depot (as well as his home).

Basically I bought [the property] to give myself space, to be close to the city and still have space, because I like space and because I’ve got the bus company. So really I was only utilising the 4 or 5 ha around the house and the other 8 ha really weren’t doing much. (Non-farm business, Western GWRegion)

Individuals with zero NRM values generally would not have strong feelings regarding NRM on their property, aside from the cost of any such management. The distribution of zero NRM values is shown in Appendix G.

*Developer NRM values*

Not all absentee owners have zero NRM values. Some property owners wish to develop or sell their property for urban development, and actively manage their property to maximise the chances of this occurring. More than one service provider in the Western GWRegion observed that in some cases this entails the surreptitious destruction of native grasslands, even though they are endangered and legally protected, because the landholders believe their presence could otherwise prevent development of their property. “They want to hide or get rid of native veg before we see it” observed one service provider from the Western GWRegion.

- 10 hectares
- development opportunity high growth area
- 40 minutes from CBD
- identified as future subdivision (subject to final government confirmation)

Figure 24. ‘Gateway to future profits’ (Western GWRegion)
The service providers indicated that in the Western GWRegion land speculators are numerous and include “family” and “professional” speculators, whereas in the South East GWRegion such speculation is more limited to those areas near the UGB. This was reinforced in the survey data. In the Western GWRegion 48% of the landholders surveyed indicated that they would be pleased if the area were marked for urban development, whereas this figure was only 10% in the Yarra GWRegion and 20% in the South East GWRegion.

One service provider described how professional land speculators in the Western GWRegion used their substantial resources and sophisticated understanding of the planning scheme and other regulations to avoid legal controls on clearing native vegetation: “they play the game all the time” to “maximise their profit”. Ironically, from an NRM perspective, one of the most common strategies for destroying native vegetation appears to be spraying herbicide on the premise of controlling weeds, such as serrated tussock (especially where indiscriminate boom spraying is used instead of more targeted spot spraying). “Is weed control an attempt to destroy the native vegetation or not?” asked this service provider rhetorically. This complex and usually hidden dynamic between landholders’ development aspirations and their management of weeds and native vegetation is illustrated well in this extended quote from one of the Western GWRegion’s landholder interviews:

Interviewer 1: If you were to think about the natural advantages of the property, what would you say they are?
Interviewee: Development. What do you want me to say? I love growing [native] grass? … When you buy something like this you invest for the future, so you’re looking to sell …

Interviewer 2: Have you got any native vegetation that’s left over on your property from when you moved in?
Interviewee: No, it had no vegetation on this property … Sheep were put through it and it’s always been sprayed for tussock. When you start spraying for tussock if there’s anything around it, it probably might die. But we’re very clean on this property.

Interviewer 2: Have you planted up any areas? You’ve obviously got the house garden.
Interviewee: Native grasses? No, absolutely not. Not interested because you people take over the properties …

Interviewer 1: I know there are sensitivities about native grasses and development.
Interviewee: That’s exactly right, so we’re not interested in native grasses. We’ve got none on our property and if we had some it would be another issue altogether but we’re not having any.

Interviewer 2: You’re happy not to.
Interviewee: I’m happy not to have any. Why plant something into your property that you don’t need?

Interviewer 2: Especially if it restricts you.

Interviewee: It restricts you in a lot of ways. There are people from your department who are really into that sort of thing and if they found an area that was covered [with native grasses] … they would say ‘don’t even work around that area, we want that area, you can’t plough in there or you can’t plant a tree in that area, you can’t do nothing [sic], we want it. We want, we want!’, but it’s not even their land so we would rather not have [native vegetation], and we’re lucky we don’t have it on our property because of those issues … We hear a lot [about] it and we read the paper and we see it, and you think ‘that’s a bit unfair’. The feeling is that your departments are very dictatorship [sic], very rude. I mean, they want it that way, they have to get it this way, and it frightens a lot of farmers. They have that negative attitude towards your department and that needs to be really cleaned up … If anybody rang up and said ‘Department of Primary Industries’, we would say we don’t want to talk to them. We’re not interested. We’re absolutely not interested. We don’t want you. Go away, leave us alone, don’t even come into my place. You might walk in and see native grasses and you might
cause me more hassle than it’s worth so we don’t want you, you know, go away. (Anonymous landholder, Western GWRegion)

Reading between the lines recalls the service provider’s suggestion that many landholders use weed control as a pretext for destroying native vegetation: “when you start spraying for [the weed serrated] tussock, if there’s anything around it, it probably might die. But we’re very clean on this property”. The same service provider described how another landholder had commissioned a survey of native vegetation on his property, but when it found significant grasslands and a rare native lizard they “kept the report secret and sprayed out the native grasses”.

It can be seen then, that developer NRM values motivate landholders to be fastidiously thorough managers of weeds but catastrophically destructive managers of native vegetation. “There’s a reason for them to be poor land managers” (service provider, Western GWRegion). In this situation the dynamics of NRM capacity (discussed above: awareness, motivation, resources) works against, rather than for, good NRM, in that increasing landholder awareness and resources merely increases their capacity to degrade native vegetation. As a consequence, one service provider in the Western GWRegion indicated that they had stopped advising landholders when they had native vegetation on their property, preferring to leave landholders to their benign neglect of native vegetation than to potentially trigger its wholesale destruction. For similar reasons, grants to promote the protection of native vegetation, being offered by a Western GWRegion council as part of its green wedge management plan, reportedly had landholders “running scared” at the prospect of increasing restrictions on clearing and development, thereby merely adding impetus to the destruction of native vegetation.

Another implication of the widely prevalent developer NRM values in the Western GWRegion is that, according to another service provider: “90%” of landholders felt “very disadvantaged” and “quite angry” at being put into a green wedge. Many refused to accept that the UGB would not move again (a belief reinforced every time the UGB is altered, as it was done in the lead-up to our interviews), or that the Melbourne 2030 policy and its green wedge zones would remain in the long term. Their attitude is that “Melbourne 2030 is more like Melbourne 2010”, asking “what if the (Victorian) Liberals get in?” Such landholders may only be convinced of the stability of the UGB by witnessing its stability despite changes in government. In the meantime, landholders’ hostility towards government, and their distrust of government intentions, remains a major obstacle to addressing a wide range of NRM problems in the Western GWRegion. The distribution of developer NRM values is shown in Appendix G.

4.3.4 Land use matrix

It should be clear from the previous real estate advertisements that most properties potentially appeal to a number of different NRM values. For example, the property used to illustrate green NRM values (Figure 19: ‘imagine the serenity of your own perfect bush retreat!’) could just as easily appeal to aesthetic NRM values, or even to some recreation NRM values. ‘Ainsworth estate’ (Figure 21) could satisfy aesthetic values and brown values (the vineyard) among others. In reality, the six NRM values are not always distinct. In some
manifestations they merge into one another, although in others they can be diametrically opposed. An example from the landholder interviews—suggesting brown, green and aesthetic values—illustrates the seamless relationship between them.

Interviewer: The native vegetation that you’re putting in, is that mainly to address the salinity, or are there other reasons?
Interviewee: There are other reasons. One is the salinity going through the ground. Another is to provide shelters for the stock during summer and winter; to create winter breaks. It’s more resistant to the environment. It attracts the local bird life, and I think it looks better. (Part-time farmer, South East GWRegion)

Also apparent in the real estate examples given is that some properties include a private residence (‘asparagus farm’, ‘Ainsworth Estate’, ‘location and lifestyle’), some are also sites for commercial activities (‘asparagus farm’ and ‘Ainsworth Estate’), and others are currently neither (‘8 ha of peace and quiet’ and ‘gateway to future profits’). These two key land use imperatives of commerce and residency, discussed in Section 4.3.2, can be combined with the six broad NRM values to generate a ‘land use matrix’, which is useful for characterising individual rural properties. This matrix is shown in Table 14 along with examples of the sorts of properties that exemplify each of its cells.

Table 14. Land use matrix: land use imperatives plus NRM values

<table>
<thead>
<tr>
<th>Imperative</th>
<th>NRM VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Brown</td>
</tr>
<tr>
<td>Home</td>
<td>Home with livestock or vegetable garden</td>
</tr>
<tr>
<td>Business</td>
<td>Commercial farm</td>
</tr>
<tr>
<td>Both</td>
<td>Family farm</td>
</tr>
<tr>
<td>Neither</td>
<td>Hobby farm</td>
</tr>
</tbody>
</table>

This matrix is useful for describing the range of actual or probable land uses of an individual property or of a wider region. For example, the asparagus farm described in the real estate advertisement (Figure 17) could be represented as shown in Table 15, indicating that the property would most likely be used as both a home and a business (the land use imperatives), and the dominant NRM value is likely to be brown. This obviously implies that the business is a farm. The darkest shade indicates the most likely or dominant use, with lighter shades indicating subsidiary or less probable uses. A land use matrix representation
of Ainsworth Estate (a potentially more complex property) is shown in Table 16 for contrast, and the other real estate examples are shown in Appendix H.

Table 15. Land use matrix for asparagus farm (dominant NRM value is brown)

<table>
<thead>
<tr>
<th>Brown</th>
<th>Green</th>
<th>Aesthetic</th>
<th>Recreation</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Home</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family farm</td>
<td>Eco-home</td>
<td>Beautiful home</td>
<td>Recreational home</td>
<td>Commuter home</td>
</tr>
<tr>
<td><strong>Business</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial farm</td>
<td>Eco-tourism</td>
<td>Hospitality, tourism</td>
<td>Horse riding, paintball</td>
<td>Manufacturing, transportation, storage</td>
</tr>
<tr>
<td><strong>Neither</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hobby farm</td>
<td>Bush block</td>
<td>Quiet space</td>
<td>Play space</td>
<td>Development speculation</td>
</tr>
</tbody>
</table>

In the same way that the land use matrix can be used to describe individual properties, it can also be used to characterise wider geographical regions, such as the Western, Yarra and South Eastern GWRegions explored using the telephone survey. Table 17 shows a land use matrix representation of the relative abundance of landholders with different motivations for land use across all three focus GWRegions. It shows that in terms of landholder numbers, the region is dominated by ‘aesthetic homes’ (19%), followed by ‘green homes’ (12%), ‘brown home-businesses’ (11%) and ‘brown homes’ (10%). Due to the exclusion of absentee landholders from the telephone survey sample, these figures do not take into account individuals with no land use imperative (the bottom row), and may underestimate properties with a ‘business only’ imperative (second row). This is especially important in the Western GWRegion, where as much as 50% of rural land is owned by absentee landholders according to one service provider and to preliminary analysis of rural Wyndham rates data (unfortunately rates data was not obtainable from any other local governments).
Table 17. Relative abundance (%) of different landholders with different land use motivations (data source: telephone survey)

<table>
<thead>
<tr>
<th></th>
<th>Brown</th>
<th>Green</th>
<th>Aesthetic</th>
<th>Recreation</th>
<th>Developer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>10</td>
<td>12</td>
<td>19</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Business</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Both</td>
<td>11</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Neither</td>
<td>no data</td>
<td>no data</td>
<td>no data</td>
<td>no data</td>
<td>no data</td>
</tr>
</tbody>
</table>

Along with the concept of attachment to property, the land use matrix provides a framework for thinking about rural landholders' motivations for owning and managing rural land, although these do not exhaust the relevant dimensions of landholder motivation. Understanding and working realistically with these motivations is in turn critical to successfully encouraging private rural landholders to improve their NRM practices (Pannell et al. 2006). Where motivations have not been sufficiently taken into account, the research literature on NRM practice change suggests that extension programs and other NRM policy instruments stand little hope of being effective. The above schema for understanding landholder motivations is translated into a framework for selecting NRM appropriate policy instruments in Chapter 7.

Chapter 4 began by suggesting that for private property landholders to adopt best NRM practice they must have positive motivation to manage particular resources well, an awareness of any NRM problems and their solutions, and the resources to implement these solutions. Having examined the question of landholder motivations in some detail, this chapter closes with a briefer examination of the levels of awareness and resources that landholders bring to the challenge of managing their natural resources.
CASE STUDY 4

James and Paul: ‘Struggling potato farmers’ (Yarra GWRegion)

It’s a farm. It’s gets cold in winter time, beautiful in summer time.

James and Paul are middle-aged brothers who grow potatoes commercially on their 100 ha property in the Yarra Valley and Yarra and Dandenong Ranges green wedge. Their grandfather established the property when he emigrated from Italy in the 1950s. The family side of things is still “huge”—Paul and James’ cousins now run the potato packing and sales operations on the same property, and their father and uncle (who both still live on the property) run beef cattle on the fallow paddocks. Yet profitability is marginal or non-existent, “the area’s dying” for potato growing, with few farmers left and no younger ones. Their parents own the farm and succession is “a sore point”. Consequently, the brothers “just live day by day”, saying “we’re better off not thinking about it”.

The brothers are not very mindful of environmental problems or assets on their property. Largely they take their management practices for granted, processes that came to them as “second nature”, having “grown up seeing it done”. In their minds, environmental issues are synonymous with tree planting, though “Dad would shoot me on the spot if I planted a tree” after generations spent cutting them down. They are rather careful to avoid “the chemical side of things” (possibly a legacy of their Dieldrin contaminated soil), which requires a holding period before sale to clear their cattle of the chemical. They only use chemicals “if I have to”, for example to control blackberries in creek areas where they can’t be slashed, or to occasionally fumigate the soil for wireworm. To control weeds during production, they prefer to use the scarifier to heap soil. Although they acknowledge that they lost some soil after a heavy rain (their property is on a considerable slope with stream frontage), this is not seen as a big problem. The use of irrigation and fertilisers were simply taken for granted as necessary, “a bit of nitrogen, a bit of potash, phosphorus, nitrogen, potassium, a bit of calcium, whatever else we think. They give you a blend”.

James and Paul were not sure whether their property fell into a green wedge or not, although they were aware of the concept. “You can’t subdivide it, or do anything to your land” was their understanding. Not that their father would even begin to consider subdivision, but if it were up to them they might think differently; so “you’ve got something you can sell off … if times are hard”. Though they would hate to see the area “destroyed” by urbanisation, they didn’t see the point of locking up commercially unviable 100 acre blocks. Ten or 15 acre blocks was their ideal; to attract lifestyleers who would “put up trees here and there” and bring more people into the area. They felt that some “shifty shit” was going on at the local council, because property developers had been permitted to make land subdivisions that the original farmer owners had been blocked from making.
4.4 Awareness

As discussed at the beginning of this chapter, some landholders are simply unaware that their properties have particular natural assets or NRM problems. A service provider from the South East GWRegion indicated that many landholders—particularly lifestylers—are delighted to discover the existence of rare or endangered species on their properties (especially if they have an interest in conservation). Such discoveries can be powerful ‘hooks’ for interesting landholders in a wider program of NRM activities. In such cases, this information may be all that is required to effect improved land management practices, although as Wilkinson (2007) points out, additional assistance can accelerate positive change (especially where resources are lacking). Similarly, the same service provider indicated that landholders invariably sign up for vegetation programs if salinity is found on their property, given none saw any advantage in disputing the existence or relevance of salinity, which has a detrimental effect on landholders of all types by damaging plant life and built infrastructure. These unproblematic cases work well under the traditional one-way model of extension, whereby expert understandings are imparted to landholders through extension.

An example from the qualitative landholder interviews was one part-time landholder who spoke glowingly about DPI’s fact sheets on basic land management (though they could no longer find them):

When we were starting off [on the property] they were invaluable ... [We got advice on] how to use a chainsaw, [There was] a page on it. I’m serious. How to make a fence, how to tie up a broken fence. I mean some city slickers like us work very hard to try and work that out. But you know, if you’ve got instructions, you get more out of the week. (Green lifestyler, South Eastern GWRegion)

Or another example:

The last two years have been great for me, especially [the local council extension officer]. He’s told me what to do and what’s different. [He] told me what was native grass, but to me it looks like tussock [laughter]. And I got my car and spray gear and went to the back paddock to spray. The week before that, he told me what the difference was between the native grass and serrated tussock. (Part-time farmer, Western GWRegion)

The reliance of some new landholders on expert advice is highlighted by another landholder’s observation that their “tree selection was done via a nursery ... they picked pretty much everything”. This last example highlights the importance of ensuring that industries involved in providing advice (and in this case, trees) to landholders are themselves well-informed and responsible, for example in controlling the spread of weeds species. DPI’s TWoPL program identified the nursery wholesale industry as a critical point for controlling the introduction of new weeds (DPI 2005b).

The landholder and service provider interviews indicated that landholders draw information and advice from a wide range of sources in making their decisions about NRM, as summarised in Table 18. The degree to which individuals make use of these specific sources of information often depends on their previous experience with agriculture or other forms of land management.
Table 18. Landholder activities to support decision making about NRM
(data source: landholder and service provider interviews)

<table>
<thead>
<tr>
<th>No active decision making</th>
<th>Little or no active management; set methods and programs (e.g. came with the farm); luck</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent research</td>
<td>Local and rural newspaper; internet; books and industry magazines; visits to industry centres (e.g. overseas industry hotspot); weather maps</td>
</tr>
<tr>
<td>Social networks</td>
<td>Neighbours; family on the property or in the industry (or related industries); other farmers in the industry; peers with similar interests (e.g. gardening, organics, slow food)</td>
</tr>
<tr>
<td>Non-government associations</td>
<td>Landcare; ‘friends of’ groups; environmental organisations (e.g. ACF); Country Fire Authority; Rotary; sports clubs</td>
</tr>
<tr>
<td>Government</td>
<td>DPI/council extension officers; DPI fact sheets; programs (can involve consultation with external consultant); councils</td>
</tr>
<tr>
<td>Experience</td>
<td>Grew up and worked on a farm; experience acquired in adult life (farming, NRM or other)</td>
</tr>
<tr>
<td>Trial and error</td>
<td>Figure it out as you go</td>
</tr>
<tr>
<td>Industry</td>
<td>Suppliers (e.g. fertiliser and stock feed agents, factories, nursery staff); customers (e.g. of a farrier); contractors and consultants (agronomists, plant pathologists, breeders, tree services)</td>
</tr>
<tr>
<td>Professional networks</td>
<td>Industry associations (e.g. VFF, VGA); grower groups/meetings/associations; industry conferences/tradeshows</td>
</tr>
<tr>
<td>Formal study</td>
<td>Part-time study (TAFE night courses)</td>
</tr>
</tbody>
</table>

During the telephone survey, individuals were asked which sources they used for information and advice, among a smaller range of alternatives. Table 19 shows the data based on the participants’ answers.

The survey data indicates that overall, 22% of respondents had not sought advice from any sources. In some cases, this may be because the landholder is not particularly active in managing their natural resources. In other cases, it may be that they already feel they know what they need to know about land management. The service provider interviews suggested that this was sometimes the case with more experienced landholders, many of whom are farmers. Some highly experienced landholders benefit not only from having decades of hands-on experience managing their property, but also from the experience of their ancestors working the same property or surrounding area.
Such landholders’ ideas of best practice come in part from having “grown up seeing it done”, as one farmer put it, thereby inheriting a comprehensive body of knowledge and practice. For farmers who fit this profile, decision making on the farm was “second nature” and “just an everyday thing”, so the notion of having to actively make decisions was met with some bemusement: “we know what we’ve got to do”.

We’ll try anything if it’s going to improve it. [But we] always go back to the old way, go back to what the old man and my uncles say. And we do. (Struggling farmer, Yarra GWRegion)

Table 19. Sources of advice used in the past two years (data source: telephone survey)

<table>
<thead>
<tr>
<th>Source of advice</th>
<th>Respondents using this source (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>21</td>
</tr>
<tr>
<td>Newspapers or magazines</td>
<td>45</td>
</tr>
<tr>
<td>Other farmers/farming organisations</td>
<td>40</td>
</tr>
<tr>
<td>Government organisations (e.g. local government or the DPI)</td>
<td>38</td>
</tr>
<tr>
<td>Family and friends</td>
<td>37</td>
</tr>
<tr>
<td>Internet</td>
<td>31</td>
</tr>
<tr>
<td>Commercial suppliers (e.g. consultants or farm suppliers)</td>
<td>29</td>
</tr>
<tr>
<td>Environmental groups</td>
<td>25</td>
</tr>
<tr>
<td>Further study (e.g. TAFE)</td>
<td>9</td>
</tr>
<tr>
<td>Landcare</td>
<td>2</td>
</tr>
<tr>
<td>Any other sources</td>
<td>2</td>
</tr>
<tr>
<td>Can’t say</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total number of landholders</strong></td>
<td><strong>996</strong></td>
</tr>
</tbody>
</table>

Individuals who have a comprehensive set of established practices may be closed to new information and ideas. The service providers interviewed repeatedly observed that ‘traditional’ farmers were often less open to new methods and ideas, compared with new landholders. This is partly because they often do not feel they need such advice, and secondly they are often more informed, discerning and sometimes sceptical about expert advice:

We’ve had a bit of a run-in with a few agronomists. I don’t know where the hell they come from, but anyway, sometimes the information they give you, mate you think ‘Has this guy just come out of Uni or what?’ I’m not
hanging it on the Unis, but I don’t know, they should stay there some of them … They’ve read everything in
text books, and they think it’s going to work the same out here. It doesn’t work like that. (Struggling farmer,
Yarra GWRegion)

The other major reason that experienced landholders can be less receptive to expert advice
than new landholders is that ‘hereditary experience’ possessed by multi-generational farmers
implies much more than ‘knowledge’; it also involves a potentially deep commitment to a
particular farming community, culture and set of values, as discussed previously in relation
to brown NRM values. These may be at odds with, or even threatened by, the NRM values
and social origins of NRM programs that have an ecological, rather than an agronomic
orientation. Some service providers suggested this is the cultural orientation of some
Landcare groups, and there is evidence that some Landcare groups (not necessarily in green
wedge areas)—having started out green—have had to become ‘more brown’ in order to
broaden their appeal. It is also important to note that many experienced farmers hold a mix
of brown and green NRM values and are very open to participation in ecologically oriented
NRM programs.

Thus, landholder receptiveness to expert advice appears to depend on a combination of
whether they already have established practices in place, whether they have the knowledge
to critically appraise expert advice and whether there is compatibility between the NRM
values and social background of the landholder and the service provider.

One important example of where a clash in NRM philosophies may limit landholder uptake
of government advice—even between an *inexperienced* landholder and ‘expert’ service
provider—is in relation to organic production and the use of agricultural chemicals.
Individuals committed to organic methods of production on their property (who could be
said to hold ‘deep green’ NRM values) will be impervious to expert advice that recommends
the use of herbicides and pesticides. This can be a major cause of friction between an organic
landholder, neighbours engaged in conventional production and government service
providers.

One green lifestyle landholder had complaints about—and would be reluctant to learn
from—many potential sources:

The council …

[It] would be nice if local council had information on alternative approaches to weed control … whenever I
drive around I’m disappointed wherever I go, with what I see, with what other people are doing, what council
does … the spraying that they regularly do. The whole grassy edge of Bessy Creek Road gets sprayed. Now
either they should plant it out and have it all trees and not spray it, or use a grader or something … it’s all a
bit, I dunno.

Landcare …

I’ve got no respect for Landcare anywhere. I think what they’re doing is disgusting. They spray before trees
are planted and around creeks. (This landholder did approve of many other, non-spraying, activities
conducted by Landcare).

The neighbour …
He sprays every year. Or most years he sprays. He sprayed for something and after he sprayed he had a whole influx of capeweed. And then he sprayed his capeweed and he had an influx of something else. (Green lifestyler, South East GWRegion)

Different NRM values not only influence landholder receptiveness to new information and advice, but also their pre-existing awareness and appreciation of particular natural assets and NRM problems on their properties. In order to test landholder awareness and beliefs about the value of—and any problems with—the natural features on their properties, telephone interviewees were asked to identify any valued natural features on their property (initially unprompted). Response rates varied widely across different issues, as can be seen in Table 20. They also varied between different landholder groups. In part this variation reflects different levels of awareness of different natural assets. However, the response would also have been influenced by other factors, such as the actual existence of particular assets on their property, their perceptions of the value of these assets, and their willingness to admit the existence of natural features which they might prefer were not present (such as native vegetation for speculative land developers). These combined influences are illustrated in Figure 25 which shows the amount of native vegetation that landholders report having on their land (as a percentage of the total area), comparing landholders whose dominant NRM value is green, to landholders who indicated they would be pleased if their area were marked for urban development (i.e. pro-development landholders). Clearly landholders who value native vegetation are more likely both to mention that they have native vegetation on their property, but also to buy properties which have native vegetation on their property in the first place (and to subsequently add more), and it is not possible to discern the relative contribution of these two factors to the responses presented in Figure 25.

![Figure 25. Number of landholders reporting different amounts of native vegetation on their properties, comparing ‘green’ and ‘pro-development’ landholders (data source: telephone survey)](image-url)
Table 20. Spontaneous awareness of natural assets and NRM problems  
(data source: telephone survey)

<table>
<thead>
<tr>
<th>Assets</th>
<th>No or lifestyle farming (%)</th>
<th>Commercial farming (%)</th>
<th>Problems</th>
<th>No or lifestyle farming (%)</th>
<th>Commercial farming (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native vegetation</td>
<td>47</td>
<td>27</td>
<td>Water supply issues</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>Water availability</td>
<td>23</td>
<td>41</td>
<td>Animal pests (including kangaroos)</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>The view</td>
<td>28</td>
<td>16</td>
<td>Weeds</td>
<td>21</td>
<td>9</td>
</tr>
<tr>
<td>Soil</td>
<td>13</td>
<td>35</td>
<td>Poor soils</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Native animals</td>
<td>21</td>
<td>7</td>
<td>Bushfires/ bushfire prone</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Native habitat</td>
<td>20</td>
<td>11</td>
<td>Erosion</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Water quality</td>
<td>8</td>
<td>17</td>
<td>Lack of native vegetation</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Climate</td>
<td>6</td>
<td>12</td>
<td>Poor drainage/flooding</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Agricultural produce (plants or animals)</td>
<td>6</td>
<td>11</td>
<td>Water quality issues</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Space and tranquillity</td>
<td>8</td>
<td>2</td>
<td>Land too steep</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Topography</td>
<td>6</td>
<td>9</td>
<td>Too much native vegetation</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Trees</td>
<td>5</td>
<td>7</td>
<td>Salinity</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Waterway/ dam</td>
<td>4</td>
<td>4</td>
<td>Poor pasture</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Location</td>
<td>3</td>
<td>5</td>
<td>Poor land management on neighbouring property (private land)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Grass/ pasture</td>
<td>4</td>
<td>2</td>
<td>Lack of native animals</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>7</td>
<td>Poor land management on neighbouring property (public land)</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Can’t say</td>
<td>2</td>
<td>1</td>
<td>Other</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>None</td>
<td>4</td>
<td>4</td>
<td>Can’t say</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Number of properties</td>
<td>507</td>
<td>181</td>
<td>Total number</td>
<td>507</td>
<td>181</td>
</tr>
</tbody>
</table>
4.5 Resources

During the telephone survey, respondents were asked whether a lack of any particular resource prevented them from managing their properties as they would like to, namely money, time, information, practical ‘know-how’, equipment, or (a surplus of) bureaucratic ‘red tape’. The results in Table 21 include a comparison of landholders who felt they were inexperienced (17% of the total) or experienced (57% of the total) as land managers. This indicates that the biggest differences in their needs are in information and know-how, confirming the importance of extension activities for new landholders. On the same question of resource needs, a comparison of landholders who indicated they had no farming activity or were ‘lifestylers’ with those who indicated they were ‘commercial farmers’ showed surprising few differences, with the only substantial differences being for:

- practical know-how (lacking for 20% of lifestylers but only 10% of commercial farmers)
- equipment (30% of lifestylers but only 17% of commercial farmers)
- red tape (46% of commercial farmers feel burdened, but only 32% of lifestylers).

It is worth noting that in all cases, information is the resource which landholders feel they lack least. While important for new landholders, this points to the fact that the provision of further information through extension is not necessarily an effective way of inducing change.

Table 21. What landholders feel they are lacking (data source: telephone survey)

<table>
<thead>
<tr>
<th></th>
<th>All landholders (%)</th>
<th>Inexperienced (%)</th>
<th>Experienced (%)</th>
<th>Western (%)</th>
<th>Yarra (%)</th>
<th>South East (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Money</td>
<td>57</td>
<td>53</td>
<td>57</td>
<td>54</td>
<td>60</td>
<td>55</td>
</tr>
<tr>
<td>Time</td>
<td>56</td>
<td>59</td>
<td>54</td>
<td>55</td>
<td>61</td>
<td>53</td>
</tr>
<tr>
<td>Information</td>
<td>9</td>
<td>15</td>
<td>7</td>
<td>11</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Know-how</td>
<td>17</td>
<td>32</td>
<td>10</td>
<td>16</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>Equipment</td>
<td>31</td>
<td>33</td>
<td>27</td>
<td>32</td>
<td>34</td>
<td>28</td>
</tr>
<tr>
<td>Red tape (surplus of)</td>
<td>35</td>
<td>30</td>
<td>38</td>
<td>39</td>
<td>40</td>
<td>31</td>
</tr>
<tr>
<td>Can’t say</td>
<td>&lt;1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>None of the above</td>
<td>19</td>
<td>22</td>
<td>19</td>
<td>21</td>
<td>17</td>
<td>19</td>
</tr>
</tbody>
</table>

During the telephone survey, landholders were also given the opportunity to identify any other assistance with land management that they would find useful. Most requests reiterated needs already identified above (for financial assistance, information and training, equipment
hire and reduced bureaucratic red tape) or NRM problems identified above (weeds, water supply, animal pests, and planting native vegetation). Some new issues did emerge, such as assistance with labour (3%), better maintenance of public land (3%), fencing (2%), governments to have a better understanding of landholders (2%), more effective controls on other landholders’ poor land management (2%) and better maintenance of riparian zones (including public land: 1%).

4.6 The influence of awareness, motivation and resources on NRM behaviour

This chapter has examined some of the key social characteristics that the qualitative research (interviews) and the published literature indicate have an influence on landholders’ NRM behaviour. This puts us in a position to now examine whether these factors do appear to influence NRM behaviour, according to the quantitative (telephone survey) data. In Section 3.2, the NRM behaviour of telephone survey respondents was defined as either ‘high NRM activity’ (a proxy for good) or ‘low NRM activity’ (a proxy for less good) on the basis of how many specified NRM activities they indicated they had performed in the last two years (listed below). Individuals who performed three or more activities were classified as having ‘high’ activity (40% of all landholders), and everyone else as having ‘low activity’ (60% of landholders). These five NRM activities were:

- developed a property management plan
- protected ground and surface water from pollution or runoff
- actively managed soil health issues such as salinity or erosion
- planted or protected native vegetation by fencing or strategic grazing
- monitored or reviewed the effectiveness of their land management practices.

What does the telephone survey data indicate about the relationship between high NRM behaviour and the various elements of awareness, motivation and resources explored in this chapter? In the comparisons which follow, only high NRM activity is reported; the proportion having low NRM activity can be inferred as ‘everyone else’\(^{23}\). For most of these characteristics—as measured by the survey instrument—there appears a distinct and plausible relationship, although it is always possible that this is indirect rather than direct (i.e. mediated and caused by a third factor). The clearest example is for the resource limitations examined above. High NRM activity was somewhat more common among individuals who indicated they have no resource limitations (71%) than among those who indicated they were constrained by one or more resource limitations (56%).

Plausible relationships are also apparent in relation to landholders’ motivation, as represented in the land use matrix introduced in Section 4.3.4 (see Table 14). Table 22, shows the prevalence of high NRM activity among groups with different land use motivations, as defined by the land use matrix, with the yellow box indicated the average for the whole

\(^{23}\) i.e. % with low NRM activity = 100 – % with high NRM activity. See Section 3.2.
sample. It shows that, among those groups where the sample size is large enough to be meaningful, the group with the highest level of NRM activity is the ‘businesses only’ landholders with brown NRM values (69% high). In general, it appears that a business imperative leads to higher NRM activity, as do brown NRM values, and to a lesser extent green ones. Conversely, the lowest levels of NRM activity are found in home-only properties, especially those with NRM values other than brown and green. It is very likely that NRM activity would be (substantially) lower still for individuals who have neither a home nor business imperative to actively manage their property (i.e. ‘neither’), though such individuals could unfortunately not be included in the sample. Overall, these findings appear consistent with the qualitative findings, which suggested that individuals with brown and green NRM values would be the most motivated to manage their natural resources, though potentially with different styles and to different ends.

Table 22. Percentage of individuals having ‘high NRM activity’ among groups with different motivations for land use (data source: telephone survey)

| Land use incentives | NRM values |  |
|---------------------|------------|--|---|---|---|---|---|---|
|                     | Brown | Green | Aesthetic | Recreation | None | Developer | Totals |
| Home                | 51    | 40    | 28        | 35         | 23   | 33         | 35     |
| Business            | 69    | 50*   | 31        | 60*        | 47   | 29*        | 57     |
| Both                | 51    | 51    | 46        | 29*        | 58   | 39         | 49     |
| Neither             | No data | No data | No data | No data | No data | No data | No data |
| Averages            | 55    | 43    | 32        | 36         | 36   | 35         | 41     |

* Indicates small sample size (below 10).

One finding from the survey data that contradicted our expectations concerning NRM activity was that this is not lower among individuals with low attachment, on the measures used in the telephone survey data. Individuals who indicated they would be pleased by urban development (one potential indicator of low attachment) are no more likely to have high NRM activity than those who would be disappointed (both 58%). The other measures of attachment introduced in Section 4.3.1 also indicate little difference in levels of NRM activity. As discussed in Section 4.3.1, there are several possible reasons for this. One possible explanation is that experienced commercial farmers looking to retire have high NRM activity (due to their commercial imperatives and experience) but also high hopes for an ‘urban development funded’ pension. These complex interrelationships require further analysis. It should also be noted that the concept of attachment is most applicable to absentee land speculators who are not represented in the quantitative survey data.
4.6.1 Quantification of the landholder typology

The telephone survey data was used to quantify an adapted version of the typology presented in Section 4.1 (Table 12), and to examine the levels of NRM activity and NRM program use among these different types (Table 24). Two changes were made to the qualitative typology presented in Table 12. Firstly, a third category of lifestylers was distinguished—‘horse lifestylers’—due to their high numbers and important characteristics as discussed in the Section 4.3.3 (‘Recreation NRM values’). Secondly, the ‘property speculator’ type from the original qualitative typology was replaced by a ‘resident speculator’ type in the quantitative version. This is because the original (and more comprehensive) type includes absentee landholders who were not contactable for the purpose of the telephone survey, and who are therefore not represented in this telephone survey data. The resulting types are shown in Table 23 and were defined as follows.

‘Lifestylers’ were defined as individuals with no or only hobby-scale farming activities (self-reported). Farmers distinguished themselves as being ‘part-time’ or ‘commercial’, and those commercial farmers who indicated they ‘generally operate at a loss’ were defined as ‘struggling farmers’. ‘Green’ farmers and lifestylers are those which identified nature conservation as their most important reason for valuing their natural resources (i.e. those for whom green NRM values were most important). ‘Amenity lifestylers’ are all those lifestylers who are not ‘green’ and do not have horses. ‘Hybrid farmers’ are businesses which combine farm and non-farm operations, and ‘resident land speculators’ are those who do not plan to remain on their property in five years and who would be pleased at the prospect of urban development in their area.

Table 23 shows the relative abundance of these types of landholders across all of the three GWRegions studied, ranked according to the area they occupy. It is important to emphasise that the distinctions made in this typology are far from absolute, since many landholders plausibly fit multiple categories. Critically, these figures do not include absentee landholders, since these were largely not contactable for the purposes of the telephone survey. As a consequence, these figures are likely to substantially underestimate the number of land speculators (omitting most absentee landholders including land speculators), as discussed above in Section 4.3.1. This is especially true in the Western GWRegion, where it is estimated that around half of all rural land is owned by absentee landholders. Service providers from the other two GWRegions were more uncertain about the amount of land owned by absentee landholders. One service provider speculated that perhaps 20% of all land in the South East GWRegion could be owned by absentee landholders, while a service provider from the Yarra GWRegion—citing rates data from three years ago—indicated that around an eighth of rural properties in the Shire of Yarra Ranges had owners with mailing addresses outside the shire (they doubted many of these were land speculators).

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Note that areas were estimated by multiplying the median property size for each category by the number of properties in that category.

This estimate was based on a preliminary analysis of rural rates data from Wyndham City Council along with the observations of a NRM service provider from this area.
Table 23. Quantitative estimation of number of properties and relative area according to landholder type (data source: telephone survey)

<table>
<thead>
<tr>
<th>Landholder type</th>
<th>% by number of properties*</th>
<th>% by area†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial farmer</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>Part-time farmer</td>
<td>13</td>
<td>18</td>
</tr>
<tr>
<td>Amenity lifestyler</td>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>Green lifestyler</td>
<td>21</td>
<td>14</td>
</tr>
<tr>
<td>Horse lifestyler</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>Hybrid farmer</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Struggling farmer</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Resident land speculator</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Green commercial farmer</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Non-farm business</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td><strong>Totals and averages</strong></td>
<td><strong>996 individuals</strong></td>
<td><strong>estimated 10,700 ha</strong></td>
</tr>
</tbody>
</table>

Note: Absentee landholders were not surveyed. Land owned by absentee landholders could approximate 20% to 30% of the land across the Western, Yarra and South East GWRegions.

* Indicates the percentage of all properties represented by each landholder type. Due to rounding of percentages to nearest whole number, this column totals 101%.

† Indicates the percentage of total area represented by each landholder type. This area and the derived percentages-by-area were estimated using the median area for each landholder type across all three GWRegions. This was done by multiplying the number of properties within each type by the median size for each type. The median area (rather than the mean area) method was used due to the skewed area distributions present for some types (some types including a very small number of very large properties). Note that due to the use of median areas (rather than mean areas), the area of the three GWRegions calculated for this table does not equal the sum of areas from each of the three individual GWRegions, as shown in Chapter 6.

With these caveats established, several observations can be made. The first is that, numerically, the study area is dominated by various kinds of lifestylers, who collectively make up 58% of all properties. The remainder is dominated by various kinds of farmers, though land speculators are not uncommon (4%) even with the absentee landholders excluded. Yet a quite different picture emerges of the importance of different types of landholders if one considers the proportion of area that each occupies. Spatially, the landscape is dominated by commercial farmers (20%) and part-time farmers (18%), with amenity and green lifestylers making substantial but lesser contributions (16% and 14% respectively). A comparison of the three focus GWRegions indicates that they are reasonably similar in terms of the relative numbers of different landholders, but rather different in terms of the relative area, with the Western GWRegion dominated by struggling farmers (53%), the Yarra GWRegion dominated by green and amenity lifestylers (each 20%), and the South East...
GWRegion dominated by commercial and part-time farmers (30% and 16% respectively). Full quantitative typologies for each of the three GWRegions are provided in Chapter 6.

Table 24 also compares the levels of NRM activity and NRM program use among these different types (explained in Sections 3.2 and 3.3 respectively). Largely, the indications of NRM activity are consistent with those examined above in relation to the land use matrix (Table 22). For example, it can be seen that individuals involved in some degree of (especially commercial) agricultural production (including horses) have higher activity than those who do not. Furthermore, types with dominant green NRM values have higher activity than others (for both lifestylers and commercial farmers), amenity lifestylers again have the lowest levels of NRM activity, and the land speculators have rather high NRM activity — possibly due to the fact that many are commercial farmers with low (or negative) profitability, particularly graziers. In interpreting these figures, it should be remembered that the ‘NRM activity’ construct appears to have some limitations as an indicator of ‘good NRM’, as discussed in Sections 3.2 and 4.3.1.

Table 24. Quantitative estimation of levels of NRM activity and program use according to landholder type (data source: telephone survey)

<table>
<thead>
<tr>
<th>Landholder type</th>
<th>% with ‘high NRM activity’</th>
<th>% that are ‘program users’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial farmer</td>
<td>51</td>
<td>53</td>
</tr>
<tr>
<td>Part-time farmer</td>
<td>50</td>
<td>53</td>
</tr>
<tr>
<td>Amenity lifestyler</td>
<td>28</td>
<td>30</td>
</tr>
<tr>
<td>Green lifestyler</td>
<td>42</td>
<td>47</td>
</tr>
<tr>
<td>Horse lifestyler</td>
<td>33</td>
<td>45</td>
</tr>
<tr>
<td>Hybrid farmer</td>
<td>62</td>
<td>55</td>
</tr>
<tr>
<td>Struggling farmer</td>
<td>53</td>
<td>40</td>
</tr>
<tr>
<td>Resident land speculator</td>
<td>47</td>
<td>47</td>
</tr>
<tr>
<td>Green commercial farmer</td>
<td>82</td>
<td>82</td>
</tr>
<tr>
<td>Non-farm business</td>
<td>33</td>
<td>43</td>
</tr>
<tr>
<td>Weighted averages</td>
<td>42</td>
<td>45</td>
</tr>
</tbody>
</table>

* Indicates the percentage of each type that has high NRM activity. All individuals who do not have high NRM activity have low NRM activity, i.e. % with low NRM activity = 100 − % with high NRM activity.
† Indicates the percentage within each type that are NRM ‘program users’. All individuals who are not ‘program users’ are ‘program non-users’, i.e. % that are program non-users = 100 − % that are program users.

Levels of NRM program use also provide some potentially useful insights. The lowest levels of program use are among amenity lifestylers but also among struggling farmers. The highest
levels of use are among commercial and hybrid farmers (not surprising), land speculators (no longer that surprising) and horse lifestylers.

4.7 Conclusion

Encouraging rural landholders to improve their NRM practices requires understanding the reasons why they might not already be doing better. Are they unaware or sceptical about the need for improvement? Are they simply short of time, money, equipment or know-how? Perhaps they are simply uninterested, or perceive that changing their practices will disadvantage them in some way. Perhaps their only interest in their land is in its potential for urban subdivision—the worst scenario from the point of view of maintaining the green wedges and keeping their natural resources intact.

The answers to such questions can underpin a more strategic approach to engaging with or otherwise influencing rural landholders. For example, it could enable efforts to be focussed on areas where the biggest difference can be made with the least intervention. This could involve identifying and targeting landholders who are already highly motivated to manage their natural resources well. Such individuals may only need appropriate information, training or resources to become active; potentially even becoming community leaders in tackling local NRM issues and helping make the green wedges a success.

The answers to such questions could also inform the development of strategies to motivate more reluctant landholders, or remove barriers to participation. For example, the study found evidence that in certain areas (e.g. Cardinia and Casey) some farmers view Landcare as a program suited to—and dominated by—lifestyle property owners interested predominantly in planting trees. An improved understanding of the cultural differences between landholders with green and brown NRM values could help practitioners to make Landcare programs more appealing to these farmers. Alternatively, Wilkinson (2004) has suggested that where cultural differences appear too great, it may be worthwhile establishing two parallel Landcare groups: one for ‘farmers’ and one for ‘lifestyle’ owners (without wishing to reify this somewhat arbitrary distinction).

This chapter has developed a basis for such strategic thinking, identifying characteristics that appear to influence landholders’ NRM behaviour and their attitudes to the green wedges. Later in this report (Chapter 7), these insights are used as inputs to a framework for selecting policy instruments aimed at improving landholders’ NRM practices; instruments such as extension, positive or negative incentives, or informed inaction.

First though, two lines of inquiry are followed to greater lengths. Chapter 5 examines agriculture in greater detail, on account of it being the major land use in the study region and the dominant commercial imperative for land use. Then, in Chapter 6, the principles and data already introduced in Chapters 2–5 are applied in greater detail to each of the three focus GWRegions: Western, Yarra and South East.
Chapter 5

Agriculture in the Port Phillip and Westernport region

Agriculture is important within the green wedges and wider PPW region for many reasons. It is the primary private rural land use, accounting for up to 64.4% of all green wedge land according to the land use data examined in Chapter 2 (Table 5). It is also a distinctive and influential culture, with the telephone survey revealing ‘brown NRM values’ as being more important than others for 28% of landholders.

Agriculture is also a substantial contributor to the rural and regional economy. ABS data indicates that in 2001 agriculture directly employed 12% of the rural workforce and generated $890 million of produce in the PPW region (CPH and AAC data respectively). In some parts of the region, agriculture employed as much as 65% of the rural population (CPH data, see Figure 26). It also supports a range of ancillary industries, including farm inputs (feed and fertiliser, materials and machinery), transport and food processing. Gardner (2002) has estimated that these ancillary industries triple the value of agriculture within the region, providing substantial further employment. Together, these commercial land use imperatives help to create rural areas that are economically and socially viable and buttress them against urban encroachment.

In addition, agriculture contributes to a landscape that has high amenity value, in terms of views, open space, fresh air and tranquillity. These landscapes are important assets in Melbourne’s hinterland because they provide opportunities for conservation, recreation and tourism, as well as lifestyle farming. This potential synergy with non-agricultural pursuits is particularly relevant in extensive agriculture, such as grazing, which creates scenic rural landscapes. It is less pertinent for more intensive forms of agriculture, such as intensive animal production, or even some fruit, flower and dairy production. These enterprises can generate noise, smells and less-scenic landscapes (such as broiler sheds or glasshouses), which don’t always complement rural residency or tourism values and can cause disputes between neighbours.

Agriculture has a range of implications for NRM in the PPW region. The more negative implications date from colonisation when land clearing for agricultural purposes began. Clearing has subsequently contributed to the loss of about 70% of the region’s native
vegetation and natural habitat (PPWCMA 2006 p. 4). Today, some agricultural practices continue to have harmful effects on the environment—such as salinisation, erosion, eutrophication of waterways and other forms of pollution—all of which present substantial problems in some parts of the region. More positively, agricultural land tends to be well-managed in other aspects, such as the control of weeds and feral animals (PPWCMA 2004).

Figure 26. Percentage of workforce employed in agriculture in PPW region in 2001 (data source: CPH 2001)

The high importance of agriculture in the green wedges and other rural areas of the PPW region resulted in this report having a particularly detailed empirical focus on landholders involved in agriculture. The typology used to guide the qualitative landholder interviews

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26 Of the remaining 386,818 ha of native vegetation, it is estimated that 33% is on private land (PPWCMA 2006 p. 4)
(Table 12) included five types that have some explicit involvement in agriculture: part-time farmer, commercial farmer, struggling farmer, commercial farmer with particular environmental values and farm-hospitality hybrid farmer. In addition, most lifestyle landholders spend some of their time and energy ‘growing things’: a few cows, horses or goats, or some fruit trees and a vegetable patch. Only 19% of the telephone survey respondents indicated that they did not engage in any farming activity on their rural property. Most (48%) described their property as a hobby or lifestyle property, 16% described their farming activity as being ‘part-time supplemented by off farm income’ and 18% described themselves as having ‘full-time commercial’ operations.

Throughout this report—including in the typology presented in Table 12—landholders have been routinely distinguished according to three broad scales of agricultural activity: ‘lifestylers’, ‘part-time farmers’ and ‘commercial farmers’.

While useful for the purpose of categorising and discussing broad types of landholders, there is in reality a continuous spectrum in the commercial scale of agricultural activity which landholders engage in on their properties. The more detailed analysis of agriculture presented in this section requires some more sophisticated—and less categorical—distinctions than those used in the qualitative and quantitative typologies presented in Tables 12 and 23. Hereafter in this report, the terms ‘commercial’ and ‘non-commercial’ are sometimes used to describe agricultural strategies or orientations (rather than farmers per se) at the two ends of this spectrum. In such cases, either term may apply to ‘part-time farmers’ as defined in the qualitative typologies, since landholders may be defined as ‘part-time’ on a number of criteria other than their economic viability (see Table 12).

Two other terms are used throughout this chapter: the economic viability and the ‘social viability’ of farming operations, explained below.

Economically viable (or unviable)

Economically unviable farming operations are operations which currently do not provide the landholder with what they consider to be a satisfactory income (the converse applies to economically viable farming operations). This may or may not be a problem for the landholder, depending on whether they have other sources of income.

Socially viable (or unviable)

Socially viable operations indicate a rural lifestyle which is entirely satisfactory to the landholder in terms of income and lifestyle, and which may be supported by farm or off-farm income or both. For example, grazing beef cattle appears to be economically unviable but socially viable in the PPW region in that it is generally not possible to make a satisfactory income from grazing alone in the region, but it is very possible (and indeed common) to supplement income from grazing with off-farm income to support an enjoyable lifestyle. By contrast, it is more difficult to combine dairy farming with off-farm work, and so if a dairy farming operation is economically unviable, it may also be socially unviable.

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27 Recall that the derivation of the quantitative typology was described in Chapter 4, and relied on respondents’ subjective categorisation of themselves as being engaged in ‘hobby or lifestyle farming’, ‘part-time farming supplemented by non-farm income’ or ‘full-time commercial farming’. ‘Struggling farmers’ were those commercial farmers who indicated they were ‘generally operating at a loss’.
In examining agriculture in greater detail in the green wedges and in the wider PPW region, this chapter draws information from a number of sources. The primary source is the AAC, which collects data on all farms in Australia and is conducted every five years (annually until 1997). Data has also been drawn from the CPH, which collects information on all households and individuals in Australia every five years. Some data was sourced from land use maps and industry and government reports (Hider 2002; Pickersgill 2004; Gardner 2002; Langworthy & Hackett 2000; Buxton et al. 2006). To aid data interpretation, 12 interviews were conducted with sources from within different agricultural industries in the region (the results of these interviews were reported in detail in Ransom & Parbery 2007). This section also incorporates quantitative data from the telephone survey conducted in the Western, Yarra and South East GWRegions.

As with the Chapter 4, the focus of this chapter is not on any particular GWRegion: that is the purview of Chapter 6. Rather, it continues to develop broader principles—this time for understanding agriculture across the whole PPW region—which are subsequently applied to the three focus GWRegions. However, it does incorporate some comparisons of the three focus GWRegions.

The PPW region is home to a wide range of agricultural industries, ranging from those that are intensive and potentially highly profitable, such as horticulture and broiler chicken production, through to somewhat less-intensive farms, such as dairy and fruit growing, to generally less profitable ‘extensive’ industries, such as grazing. For the purpose of this study, ten industries have been distinguished:

- flowers and nurseries
- vegetables
- viticulture
- fruit28
- grains29
- other crops30
- grazing31
- horses
- dairy
- intensive animal32.

---

28 This category includes orchard fruit (apples, pears, stone fruit, kiwi fruit) and plantation fruit and also berries.
29 Some grain is also counted in grazing under this schema, in the form of grain-sheep and grain-beef combinations.
30 The most important crop in this category in the study region is mushrooms, which are highly productive per hectare.
31 This category is dominated by beef grazing in the study area, but also includes some sheep, deer, alpacas, goats and other relatively minor livestock. It excludes horses and dairy.
32 This includes broiler farms for chicken meat and eggs and intensive pig production.
5.1 Broad trends or strategies for success

Analysis of agricultural data suggests that there are four broad trends in the region, which may also be understood as strategies for continuing ‘success’ (success in this instance implying simply continued existence as a land use, or its ‘social viability’). Some industries combine multiple strategies, either within a single business, or in different parts of the industry. These strategies are outlined below.

5.1.1 Intensification

This is a commercial strategy that increases the level of production without increasing the area of land, through capital investment in improved inputs and methods, such as feeds, stocks, chemicals, equipment, buildings, or watering systems. The significant advantage of this approach in peri-urban areas is that it is not constrained by high land prices. The disadvantage is that intensive methods often trigger ‘right-to-farm’ disputes with nearby lifestyle residents or even other farmers, especially in high-amenity areas. In some cases, intensive industries can create a built-up environment (e.g. broiler sheds and greenhouses) that lacks much of the amenity of an open rural landscape. This strategy is common in all three of the focus GWRegions, particularly Yarra, where properties are generally smaller (possibly because land prices are higher), although less common in the Western GWRegion, where properties are generally larger (and land prices lower).

This strategy applies to intensive animal production, mushrooms, nurseries and flowers; to a lesser extent horticulture, dairy and viticulture enterprises.

5.1.2 Aggregation

Aggregation is also a commercial strategy that relies on increasing economies of scale through buying or leasing nearby properties. High land prices severely restrict this approach in peri-urban areas. Its advantage (although not necessarily to the farmer) is that it creates an open rural landscape that has high-amenity value and is relatively compatible with other peri-urban land uses (e.g. tourism, rural lifestyle).

Aggregation is most common in the South East GWRegion, where some broadacre industries are still commercially viable (principally dairying). The Western GWRegion has the largest properties (used for grazing and cropping) but these are mostly in commercial decline. However, the service providers indicated that there are some successful ‘share croppers’ in this region (where one farmer works several individuals’ properties), which is a form of aggregation with transfer of land usage rights but not ownership. There is also some aggregation in the vegetable industry in the Western GWRegion (particularly in the Werribee South green wedge).

This strategy applies to grain and dairy enterprises, and to a lesser extent, horticulture and grazing enterprises.

5.1.3 Hybridisation

Hybridisation is a partly commercial strategy, whereby value is added to what may otherwise be an economically unviable agricultural enterprise, through diversification into
tourism, hospitality, direct marketing, niche marketing or other forms of value adding and vertical integration. Examples include vineyards with cellar door sales or restaurants, retail nurseries with cafes, ‘pick-your-own’ berry farms, farm stay B& Bs, organic and boutique growers, and growers who market their produce through farmers’ markets. Peri-urban areas provide many opportunities for hybrid businesses because of the close proximity to a very large and diverse market.

The telephone survey indicated that 23% of all farms in the three GWRegions incorporated some other kind of business activity. Opportunities for hybridisation with tourism and hospitality type businesses abound in high-amenity areas, such as the Yarra GWRegion (the Shire of Yarra Ranges has developed a report on such hybrid industries; see Langworthy, Howard & Mawson 2006). Of the 19 businesses which combine farming with tourism, hospitality or recreation that were contacted in the course of the telephone survey, half were located in the Yarra GWRegion and half in the South East GWRegion. The downside of this strategy is that it often requires substantial new skills, infrastructure and paperwork (Langworthy, Howard & Mawson 2006).

This strategy applies to viticulture enterprises, and to a lesser extent, flowers and nurseries, some fruit and grazing enterprises.

5.1.4 Gentrification

This is a trend towards non-commercial operations run by lifestyle owners, part-timers or retirees. These operations often rely on off-farm income (including a pension) to remain socially viable (as defined directly above). This strategy is most likely to develop in farm industries that can be worked part-time, and which are perceived as having an appealing lifestyle. In particular, beef cattle farming is a retirement farming activity, especially in high-amenity areas (Barr, Karunaratne & Wilkinson 2005). This strategy is marginally more common in the Yarra GWRegion, where 59% of all properties with agricultural activity surveyed were lifestyle farms, compared with 52% in the Western and 51% in the South Eastern GWRegions.

This strategy applies to grazing (beef, sheep and goats), horses and viticulture (small scale) enterprises, and to a lesser extent, flower and nursery enterprises.

These four trends do not always apply uniformly across particular industries; they sometimes apply only to particular parts of an industry. The viticulture industry is probably the most diverse example, with financially large viticulture operations pursuing intensification and/or hybridisation, while financially small viticulture operations are predominantly gentrified. Nonetheless, these four trends in regional agriculture provide useful analytic themes.

5.2 Some questions of definition

Before answering basic questions about agriculture—such as ‘How many farms are there in the PPW region?’, and ‘What area do they encompass?’—it is necessary to clarify how the answers were calculated when using data from the AAC.
The AAC collects data from ‘farm establishments’ (hereafter ‘farms’), each of which may consist of several separate properties that the farm operator manages as one unit. However, the AAC collects data only from farms that have a minimum level of gross agricultural production, measured by the estimated value of agricultural output (EVAO), which is calculated by taking the number of production units (e.g. head of cattle, tons of potatoes) reported by AAC respondents, and multiplying it by the national average market price for that commodity. Importantly, this may underestimate the value of produce from farms in the region, by a factor of about two, because produce from the region generally fetches a higher market price than the national average due to the often higher quality of the produce (Gardner 2002; Buxton et al. 2006 p. 173). Similar conclusions were reached in a study of agriculture based on industry sources in the Yarra Valley, which estimated that the value of agriculture in that region alone was $648.9 million, which was “considerably greater than ABS estimates” (Langworthy & Hackett 2000 p. 1). Note that the figures in this report have not been adjusted to reflect such suspected underestimations in ABS statistics.

In 2001, the EVAO ‘cut-off threshold’ was $5,000 per annum; therefore, only farms with an EVAO higher than this were counted the 2001 AAC. In 2006, a new method of identifying farms for inclusion in the AAC was used. Preliminary results indicate that this new method has increased the number of farms appearing in the AAC by about 30% nationally (N Barr pers. comm., 5 November 2007). Most of this increase is likely to represent financially small farms, which were previously excluded because of the EVAO cut-off threshold. Consequently, this altered method of measurement is likely to increase the number of farms in the 2006 AAC by more than 30% in peri-urban areas. The telephone survey indicated that 55% of all properties with some agricultural activity (but no other business activities) had a gross annual turnover below $5,000.

In order to understand the AAC data it is necessary to understand how the area of the PPW region and the GWRegions were defined, in terms of the spatial units. These spatial units—known as ‘statistical local areas’ (SLAs)—are shown in Appendix D against the PPW and GWRegion boundaries for 2001 and 1986 (the SLA boundaries changed somewhat over this period). Unfortunately, SLA boundaries do not exactly match PPW or green wedge boundaries (this was the reason we created the GWRegions, which do match SLA boundaries). To estimate values for the whole PPW region we had to make some boundary adjustments. For the purpose of this study, the PPW region has been defined in two ways for different purposes.

For ‘snapshot’ data on farming in the region in 2001, a base map derived from a concordance of the agricultural area of SLAs with the PPW region boundary has been used. This concordance was calculated from a 1997 land use map (Gardner unpublished; the more up-to-date land use data presented in this study was not yet available). It allowed us to estimate data for the PPW region by adjusting whole SLA data according to the difference in area of agricultural land between the combined SLAs and the PPW region.

33 The ACC now collects data from all properties registered as a farm business for tax purposes.
For ‘time series’ data (which compares data from 1986 and 2001), the base map that was used fitted the PPW boundary less precisely but remained constant over the period of comparison (Appendix D1). This accommodated changes to SLA boundaries within the PPW region that were made over this time. The unforeseen disadvantage of this method is that it excluded three boundary SLAs in the south-east of the region (Bass Coast Balance, Baw Baw Part B West and South Gippsland West) which have high levels of agriculture. The principal effect is a small underestimation of total farm numbers, area and value of production in the time series data (this underestimation is not present in the ‘snapshot’ data). Given most of the agriculture in this area is beef and dairy farming, only the data for these two industries is affected. A comparison of the data for the omitted areas for these two industries indicates that the farm establishments that were omitted had very similar structure (in terms of EVAO and area of holding (AoH) profiles) to those that were included in the analysis presented below.

In order to analyse AAC data specific to particular green wedges areas—both for ‘snapshot’ and time series analysis—it was necessary to approximate official green wedges by creating the GWRegions, as discussed in Section 2.2. The base map used for these analyses are shown in Appendix D2.

With these methodological clarifications established, the findings reveal that in 2001 there were 4,010 farms in the PPW region. These farms occupied a total of 429,859 ha and produced food and fibre worth an estimated $890.859 million dollars.

The different farm industries are important to the region in various ways. From an economic point of view, vegetables, intensive animals and dairy are the most important contributors. The total EVAO in 2001 for the ten industries defined in this study are shown here in descending order in Table 25.
Table 25. Relative financial size of agricultural sectors in PPW region
(data source: AAC 2001)

<table>
<thead>
<tr>
<th>Agricultural sector</th>
<th>% of total EVAO for PPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>22.6</td>
</tr>
<tr>
<td>Intensive animals</td>
<td>21.0</td>
</tr>
<tr>
<td>Dairy</td>
<td>15.2</td>
</tr>
<tr>
<td>Flowers and nurseries</td>
<td>12.8</td>
</tr>
<tr>
<td>Fruit (except grapes)</td>
<td>9.7</td>
</tr>
<tr>
<td>Grazing</td>
<td>8.4</td>
</tr>
<tr>
<td>Other crops</td>
<td>3.5</td>
</tr>
<tr>
<td>Viticulture</td>
<td>4.3</td>
</tr>
<tr>
<td>Horses</td>
<td>0.8</td>
</tr>
<tr>
<td>Grains</td>
<td>0.2</td>
</tr>
<tr>
<td>Other farms</td>
<td>1.3</td>
</tr>
<tr>
<td>Total</td>
<td>99.8</td>
</tr>
</tbody>
</table>

However, in terms of their importance as a land use, less economically dominant industries are more relevant, as can be seen in Table 26.
Table 26. Relative physical area of agricultural sectors in PPW region (data source: AAC 2001)

<table>
<thead>
<tr>
<th>Agricultural sector</th>
<th>% of total area for PPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grazing</td>
<td>67.5</td>
</tr>
<tr>
<td>Dairy</td>
<td>10.6</td>
</tr>
<tr>
<td>Vegetables</td>
<td>6.0</td>
</tr>
<tr>
<td>Viticulture</td>
<td>3.5</td>
</tr>
<tr>
<td>Horses</td>
<td>3.2</td>
</tr>
<tr>
<td>Fruit (except grapes)</td>
<td>2.8</td>
</tr>
<tr>
<td>Flowers and nurseries</td>
<td>2.4</td>
</tr>
<tr>
<td>Grain</td>
<td>1.8</td>
</tr>
<tr>
<td>Intensive animals</td>
<td>1.7</td>
</tr>
<tr>
<td>Other crops</td>
<td>0.4</td>
</tr>
<tr>
<td>Other farms</td>
<td>0.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.5</strong></td>
</tr>
</tbody>
</table>

Grazing in particular, occupies 67.5% of the farmed area, but produces only 8.4% of the region’s total EVAO. In contrast, farms engaged in intensive animal production occupy a mere 1.7% of the farmed area, yet they produce 21.0% of the total value of production, nearly as high as vegetables. Together, the five most intensive farm industries—being flowers and nurseries, vegetables, fruit, other crops (largely mushrooms) and intensive animals—produce 70% of the EVAO, from only 10% of the area. While grazing is not as economically important, the grazing industry makes important contributions to the region as a lifestyle of choice for part-time operators, as well as contributing to a high-amenity landscape and potentially providing important ecological services (where such properties are well-managed). It can also act as a buffer around aesthetically unappealing intensive industries.

Figure 27 provides a broad comparison between different industries in the region, in terms of the number of properties, the area they occupy and the value of their produce.

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However, it is important to note that broiler chicken production depends on feed grown and processed in other locations. In particular, broadacre grain growing requires considerable acreage, and occurs largely outside the PPW region (and in some cases the feed comes from outside Australia: for example soymeal is a major protein source in chicken feed and is largely imported).
Figure 27. A broad comparison of ten farm industry groups in the PPW region (data source: AAC 2001)

It is evident that in some industries (such as horses and grazing), the ratio of farm numbers to total EVAO is very high, indicating that these industries are substantially gentrified. For other industries the ratio of farm numbers to total EVAO is very low (such as intensive animals and vegetables), suggesting that these industries are largely commercial and are less attractive or practical as purely lifestyle pursuits.

The ratio of area of land to total EVAO is also instructive, with intensive industries having a low ratio (intensive animals, nurseries, vegetables, fruit, other crops) and more extensive industries have a high ratio (grains, grazing, horses and to a lesser extent dairy). These sorts of comparisons are developed in greater detail below.

In terms of the landholder typology used to guide the qualitative interviews, the 4,010 farms in the PPW region include commercial, part-time and struggling farmers as well as hybrid farmers and commercial farmers with green values. They also include many lifestyle landholders whose production levels are nonetheless high enough to be included in the AAC. The 2001 EVAO threshold of $5,000 is extremely low, and on the basis of income alone, it would not be sufficient to qualify a landholder even as a part-time farmer. Note, however, that such an individual might be described (or describe themselves) as a ‘farmer’ for other reasons, such as their land use, however unproductive, or cultural identity.

One strategy for understanding the mix of commercial and non-commercial farmers is to examine the EVAO ‘profile’ of farms within the study area. However, before examining this rather complex topic, it is useful to start with some more straightforward dimensions of the
AAC data, such as the numbers and sizes of farms in different farm industries. In the meantime, it is necessary to bear in mind that the following data includes a broad mixture of commercial and semi-commercial farmers and lifestyle operators. See Wilkinson (2006) for a more sophisticated discussion of the distinction between ‘farmers’ and ‘lifestylers’.

In terms of the number of farm establishments as shown in Figure 28, it is clear that grazing dominates agriculture within the PPW region. More than 80% of these establishments run beef cattle, with the remainder made-up of various combinations of sheep, beef and other livestock (particularly deer), sometimes combined with grain growing. The dominance of grazing is even greater if one examines the area of the different farm industries as shown in Figure 29.

Figure 28. Relative number of farms in different farm industries within the study area (data source: AAC 2001)

Figure 29. Relative area covered by farms in different industries within study area (data source: AAC 2001)
Grazing properties account for a disproportionately large area because they are, on average, much larger in area than other farm types. The average size of grazing properties in 2001 (180 ha) was nearly double the overall average of farms within the region (102 ha). In contrast, flower and nursery establishments were the second most numerous in the region (13%), but occupied a mere 2.4% of the total area, having the smallest average size at only 19 ha. Across all industries, physically small farms of 0–20 ha accounted for 34% of farm numbers, but occupied less than 3% of the farmed landscape. In contrast, only 9% of farms were physically large (250–2000 ha), but these occupied 45% of the farmed area. Meanwhile, medium-sized farms dominated the landscape both in terms of their numbers (58% of the total) and in terms of the area that they occupied (52% of the total). As discussed, most of these are grazing establishments. The distribution of farm sizes in different industries is shown in Table 27 and in Figures 30–32.

Table 27. Physical size of farms in different industries (data source: AAC 2001)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Small (0–20 ha)</th>
<th>Medium (20–250 ha)</th>
<th>Large (250–2000 ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average size (ha)</td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td>Flowers and nurseries</td>
<td>19</td>
<td>82</td>
<td>17</td>
</tr>
<tr>
<td>Intensive animal</td>
<td>27</td>
<td>71</td>
<td>28</td>
</tr>
<tr>
<td>Fruit</td>
<td>34</td>
<td>64</td>
<td>35</td>
</tr>
<tr>
<td>Viticulture</td>
<td>39</td>
<td>58</td>
<td>41</td>
</tr>
<tr>
<td>Vegetables</td>
<td>58</td>
<td>45</td>
<td>51</td>
</tr>
<tr>
<td>Other crops</td>
<td>66</td>
<td>23</td>
<td>77</td>
</tr>
<tr>
<td>Horses</td>
<td>84</td>
<td>32</td>
<td>62</td>
</tr>
<tr>
<td>Dairy</td>
<td>130</td>
<td>3</td>
<td>92</td>
</tr>
<tr>
<td>Grazing</td>
<td>180</td>
<td>2</td>
<td>78</td>
</tr>
<tr>
<td>Grain</td>
<td>335</td>
<td>0</td>
<td>43</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>102</strong></td>
<td><strong>34</strong></td>
<td><strong>57</strong></td>
</tr>
</tbody>
</table>

Note: The industries are ordered by increasing average size. The three groupings correspond to those used in Figures 30–32.
Figure 30. Profiles for industries with larger farm sizes (data source: AAC 2001)

Figure 31. Profiles for industries with medium farm sizes (data source: AAC 2001)

Figure 32. Profiles for industries with smaller farm sizes (data source: AAC 2001)
Farms and farm industries that cover a larger area obviously have a greater direct impact on the region’s natural resources, at least for on-farm NRM issues, such as native habitat and weeds. Due to this, attempts to encourage good management of such natural resources on private agricultural land may be more efficient if service providers work with industries with large farms. For the same ‘transaction cost’—efforts expended to engage one landholder (or family)—improvements could be made to a much larger property. However, to address ‘off-site’ impacts, such as water quality, it may be necessary to target small intensive farms, because these properties can have a disproportionately large impact on off-farm (especially downstream) natural resources as point sources for waterborne sediments, nutrients and pollution. This may be particularly relevant in the official Westernport green wedge, where large numbers of intensive horticultural farms have the potential to affect water quality in Westernport Bay.

This study has highlighted an important question: What are the major impacts and demands of different farm industries on natural resources? Some insights can be drawn from the qualitative interviews with industry sources, landholders and service providers; however, a more systematic response is beyond the scope of this study. More research in this area would provide an invaluable supplement to the information in this report and would help underpin a systematic strategy for improving the management of natural resources on private agricultural land.

5.3 Comparisons between the Western, Yarra and South East GWRegions

How do the three focus GWRegions compare, in terms of the numbers and area of farms in different agricultural industries? In 2001, the South East GWRegion contained the largest number of farms (821) and produced the largest EVAO ($241 million) of the three GWRegions: 27% of the total for the whole of the PPW region (AAC data). In part this is because of its large size (total farm area of 64,199 ha). By contrast, the Yarra GWRegion had fewer farms (578), a lower EVAO ($188 million or 21% of the total EVAO for the PPW region), and a much smaller total farm area (24,985ha). Yet the Yarra GWRegion’s (generally smaller) farms had the highest productivity of all three GWRegions: $7,500 per ha versus only $3,750 per ha in the South East GWRegion and $850 per ha in the Western GWRegion. This large difference in agricultural productivity in the three areas is partially due to differences in the annual rainfall of these areas: around 1,000 mm, 850 mm and 500 mm respectively. Thus the Western GWRegion has the largest agricultural area of the three GWRegions (74,646 ha), but the smallest number of farms (224) and the smallest total EVAO ($63 million or 7% of total EVAO for the PPW region). Some of these statistics are summarised in Table 28 below and further details—including trends between 1986 and 2001—can be found in Chapter 6 and Appendix J.
Table 28. Agricultural contribution of each of the six GWRegions in 2001

<table>
<thead>
<tr>
<th>GWRegion</th>
<th>% of total farms</th>
<th>% of total area</th>
<th>% of total EVAO*</th>
<th>$/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western</td>
<td>10.0</td>
<td>34.7</td>
<td>9.5</td>
<td>850</td>
</tr>
<tr>
<td>Sunbury</td>
<td>2.5</td>
<td>5.8</td>
<td>0.9</td>
<td>457</td>
</tr>
<tr>
<td>Northern</td>
<td>8.6</td>
<td>8.7</td>
<td>8.7</td>
<td>3,116</td>
</tr>
<tr>
<td>Yarra</td>
<td>25.7</td>
<td>11.6</td>
<td>28.1</td>
<td>7,507</td>
</tr>
<tr>
<td>South East</td>
<td>36.5</td>
<td>29.9</td>
<td>36.2</td>
<td>3,754</td>
</tr>
<tr>
<td>Peninsula</td>
<td>16.6</td>
<td>9.3</td>
<td>16.6</td>
<td>5,538</td>
</tr>
<tr>
<td>Total</td>
<td>2,248 farms</td>
<td>214,902 ha</td>
<td>$666,400,929</td>
<td>3,101</td>
</tr>
</tbody>
</table>

* This data only includes farms with EVAO of $10,000 or more.

How do the three GWRegions that were not the focus of this study—the Sunbury, Northern and Peninsula GWRegions—compare to the three GWRegions examined above? The AAC data indicates that, in many respects, the Sunbury GWRegion is similar to the Western GWRegion, except that it is much smaller and has no intensive irrigated vegetable growing area (Werribee South in the Western GWRegion). Its productivity is very low ($457/ha in 2001), as is its annual rainfall, and the agricultural area is thoroughly dominated by economically unviable grazing operations. The Northern GWRegion is more productive ($3,116/ha in 2001: similar to the South East GWRegion), but due to its relatively small amount of agricultural land, its contribution to total EVAO in 2001 was modest (less than a quarter of the total EVAO from the South East GWRegion: see Table 28). The EVAO of the Northern GWRegion is principally generated by ‘other crops’ (possibly mushrooms) and intensive animal production. The Peninsula GWRegion had the second highest agricultural productivity of the six GWRegions ($5,538/ha: second to the Yarra GWRegion). Within the Peninsula GWRegion the two agricultural sectors which produced the greatest value in 2001 were intensive animal production and vegetable growing. The Peninsula was the only GWRegion in which vegetable growing appeared to have become, on average, more (rather than less) profitable between 1986 and 2001 (on the basis of the increase in total EVAO). Full statistics for all six GWRegions—including a breakdown by farm sector, and changes between 1986 and 2001—are presented in Appendix J2.

Between them, the six GWRegions in 2001 accounted for 61.6% of the total number of farms present in the whole PPW region and 75.0% of the total EVAO.

Figure 33 shows the distribution of farms among different agricultural sectors within the three focus GWRegions (Western, Yarra and South East). The most striking feature is the total

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35 Note that AAC data presented throughout this chapter for the whole PPW region includes farms with EVAO of $5,000 or above, except for data which shows comparisons through time (which includes farms with EVAO of $10,000 or more). By contrast, all of the AAC data specific to the six GWRegions is for farms with EVAO of $10,000 or more.
domination of the Western GWRegion—in terms of the number of farms—by horticulture operations, most of which are in the Werribee South green wedge. This reflects the availability of good soil and irrigation water (lately rather limited) in this area, and the dearth of these resources in most other parts of the Western GWRegion. By contrast, the other two GWRegions are much more diverse, with farm numbers spread across a wider range of agricultural industries.

![Figure 33. Proportion of farm numbers contributed by ten farm industries within the three focus GWRegions (data source: AAC 2001)](image)

Figure 34 compares the proportion of area occupied by different agricultural industries within each GWRegion, and tells a similar story to Figure 33; namely the limited diversity of agriculture in the Western GWRegion in contrast to the other regions. However, the land area in the Western GWRegion is dominated by grazing (accounting for about 90% of the total agricultural area). Again, this reflects the dearth of opportunities for more commercially-oriented forms of agriculture in this region, due to lack of rainfall. By comparison grazing is (though still the major land use in the other two GWRegions) less dominant due to greater diversity, in particular the presence of more commercial farm industries. The South East GWRegion has substantial areas devoted to dairy and vegetable farming (which require rainfall or irrigation water largely unavailable in the Western GWRegion). Agriculture in the Yarra GWRegion is more diverse again (once more in part due to better rainfall), with substantial areas of viticulture, fruit and nurseries. A drive along the Maroondah Highway from Coldstream to Healesville would confirm the establishment of the Yarra Valley as a major wine region.
Figure 34. Proportion of area occupied by ten farm industries within the three focus GWRegions (data source: AAC 2001)

Figure 35 also illustrates the lack of diversity in agriculture in the Western GWRegion. More than 75% of the total value of agriculture in the Western GWRegion is generated from a single industry—horticulture—75% of which is in turn generated from the Werribee South green wedge, where good soils and (limited) irrigation water are available. Grazing is the second largest economic contributor in the Western GWRegion, although intensive animal production generates almost the same value using about 1% of the area. By contrast, the other two GWRegions are much more diverse. The differences between the Yarra and South East GWRegions are similar to those observed in relation to area in Figure 34, with dairy and vegetables dominating in the latter, and nurseries, viticulture and fruit in the former. As with the Western GWRegion, the exception is intensive animal production where the proportion of EVAO far exceeds the area it occupies. Comparisons of agriculture between the three focus GWRegions are developed in further detail below and also in Chapter 6.
5.4 Changes to agricultural land use between 1986 and 2001

How have the number and size of farms in the PPW region changed between 1986 and 2001? The answers to this question provide some indication of which farm industries have a more secure future in the region. They also indicate which industries are likely to have increasing implications for NRM in the area, although this can prove a complex issue.

Overall, there was an 18% decline in the number of farms in the study area between 1986 and 2001, along with a 23% reduction in the area of land under agriculture. This illustrates that decreasing farm numbers are generally not due to aggregation of smaller into larger farms. Rather, farms and farm land are either dropping out of agricultural production, or they are dropping out of the AAC as their EVAO drops below $5,000. This second possibility will be explored further.

5.4.1 Fragmentation in PPW region

Overall, farms in the region are getting smaller rather than bigger, with the average size declining from 117 ha to 102 ha. This is consistent with the observation of Barr (2004 p. 37) that agricultural land in peri-urban areas across Australia is undergoing a process of ‘fragmentation’, in contrast with the trend of ‘production landscapes’ (occurring in the Wimmera and Mallee) towards aggregation into fewer larger properties (Barr, Karunaratne & Wilkinson 2005). This fragmentation of agricultural land in the PPW region can be explained through the dual drivers of intensification and gentrification. Both generate strong demand for smaller land parcels, suitable either for intensive farming or for hobby farming and rural...
residency. This increases pressure on larger farms to subdivide, particularly when they are no longer commercially viable.

At the same time, this demand raises land prices beyond the point where aggregation of larger farms is economically feasible. Buying the neighbour’s farm to increase the scale of production is not a viable option if the cost of the land outweighs the commercial return. The net result is that physically small farms (<20 ha) defied the trend of decline, increasing their numbers slightly (by 6%) between 1986 and 2001, in contrast with substantial reductions in the numbers of medium (20–250 ha) and large farms (>250 ha) over the same period (21% and 25% respectively). These changes to the size profile of farms in the region are shown in greater detail in Figure 36. The change in the number of farms in different industries is shown in Figures 37 and 38.

![Figure 36. Change in the ‘area of holding’ profile for all farms in the PPW region between 1986 and 2001 (data source: AAC 1986, 2001)](image)

Figures 37 and 38 illustrate the decline in the numbers of properties in most agricultural sectors. The exceptions are viticulture, and flowers and nurseries (both of whose numbers of establishments have increased strongly), and horses and ‘other crops’ (mostly mushrooms) which have increased their numbers modestly. The number of intensive animal producers has increased somewhat since 1996, following a larger decline. This change in the number of establishments is relevant in terms of the number of properties which extension professionals may need to engage with, but it does not necessarily provide an adequate measure of these industries’ persistence as a land use. As discussed above, the increase in numbers may in some cases be due to the fragmentation of larger into smaller properties which are potentially run as lifestyle operations rather than commercial ones. Also, a decline in numbers does not necessarily indicate a decline in area: it may indicate the consolidation of smaller into larger properties among commercial operations. To understand the somewhat separate question of the persistence of agricultural sectors as a land use, it is necessary to examine the change in area.
CHAPTER 5
AGRICULTURE

Figure 37. Change in numbers of farm establishments in PPW region (data source: AAC 1986, 2001)

Figure 38. Detail from Figure 37
Table 29 combines data on the change in the number of establishments in each farm industry between 1986 and 2001, and the average size of farms within each agricultural sector. Industries are ranked according to the change in number of establishments. It is apparent that the industries which experienced the smallest decline in farm numbers were those which decreased the average size of their operations. This meant that the grazing and intensive animal sectors experienced a net decline in their physical area, at least as recorded in the AAC.

Table 29. Changes in farm numbers, physical sizes and financial scale between 1986 and 2001 in the PPW region (data source: AAC 1986, 2001)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Change in number of farms 1986–2001 (%)</th>
<th>Change in total area of industry 1986–2001 (%)</th>
<th>Average area of farms in 2001 (ha)</th>
<th>Change in average area of farms 1986–2001 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viticulture</td>
<td>998</td>
<td>777</td>
<td>39</td>
<td>−20</td>
</tr>
<tr>
<td>Flowers and nurseries</td>
<td>31</td>
<td>29</td>
<td>19</td>
<td>−1</td>
</tr>
<tr>
<td>Intensive animal</td>
<td>−15</td>
<td>−39</td>
<td>27</td>
<td>−28</td>
</tr>
<tr>
<td>Grazing</td>
<td>−17</td>
<td>−28</td>
<td>180</td>
<td>−13</td>
</tr>
<tr>
<td>Fruit</td>
<td>−30</td>
<td>−26</td>
<td>34</td>
<td>5</td>
</tr>
<tr>
<td>Vegetables</td>
<td>−43</td>
<td>−16</td>
<td>58</td>
<td>47</td>
</tr>
<tr>
<td>Dairy</td>
<td>−48</td>
<td>−38</td>
<td>130</td>
<td>21</td>
</tr>
<tr>
<td>Grain</td>
<td>−55</td>
<td>−36</td>
<td>335</td>
<td>43</td>
</tr>
<tr>
<td>Other crops</td>
<td>no data</td>
<td>no data</td>
<td>66</td>
<td>no data</td>
</tr>
<tr>
<td>Horses</td>
<td>no data</td>
<td>no data</td>
<td>84</td>
<td>no data</td>
</tr>
<tr>
<td>Totals</td>
<td>−18</td>
<td>−23</td>
<td>102</td>
<td>−9</td>
</tr>
</tbody>
</table>

Key

- Increase in number of farms and total area of industry
- Reduction in number of farms and total area of industry
- Decrease in average size (industries undergoing intensification or gentrification)
- Increase in average size (industries undergoing aggregation)

Note: The ordering used in Table 29 incidentally groups farms according to whether they are decreasing in physical size (intensifying or gentrifying), or increasing in physical size (aggregating). This may reflect that the need to aggregate brings vulnerability to the constraint of land prices.
This trend towards smaller properties in the PPW region may indicate that the strategies of intensification, hybridisation and gentrification are more likely to be successful than aggregation in peri-urban areas. Indeed, the two farm industries that have grown most strongly in terms of their numbers and area are those that can combine multiple strategies.

The viticulture industry grew phenomenally in terms of the numbers of farms (998%) and the area of farming (777%) during the period from 1986 to 2001 (growth of this industry subsequently slowed considerably, and may even have reversed, although the 2006 data that would reveal such a change was not available when this analysis was undertaken). This growth occurred in both commercial and lifestyle parts of this diverse industry. Viticulture can intensify its operations (for example through irrigation), hybridise (winemaking, ‘cellar door’ sales and restaurants) and also gentrify as it has a relatively high proportion of operators (37%) who report a major occupation other than farming. This is not to say that other factors might not be more important in the phenomenal success of the viticulture industry, such as the increase in the price of grapes during this period (Barr 2004 p. 11).

Flowers and nurseries is another farm industry that is able to take advantage of intensification (through the use of greenhouses) and hybridisation (through retailing). Like viticulture, this industry increased both in number (31%) and area (29%) over the study period. No other farm industry in the region increased either in terms of the number of farms or the area of agriculture in the region. The success of the farms in both of these industries may in part be due to the fact that they tend to be relatively small in area. In the case of viticulture, the average area fell by 20% between 1986 and 2001.

Another intensive industry that strongly decreased its average area between 1986 and 2001 (by 28%; the largest decrease) was intensive animal farming, largely consisting of pig and chicken production (for meat and eggs). Barr (2006) has suggested that intensive animal production is a quintessentially peri-urban form of agriculture, in the sense that it has the potential to be highly commercially competitive and doesn’t require a lot of land. Unlike the two growing industries examined above (viticulture, flowers and nurseries), both the number of farms and the area of land in the intensive animal industry fell in the PPW region between 1986 and 2001. However, this change may best be understood as a consequence of industry consolidation and the move towards more intensive production that occurs through the greater use of broiler chicken sheds. The industry appears to have a secure future in the region, from an economic point of view at least, because the median EVAO for farms in this industry increased by 400% in the region (second only to viticulture and well in excess of inflation). This dramatic structural adjustment is apparent in Figure 39, which shows the change in the EVAO profile over this period. The change suggests that despite the small decline in numbers of farms, this industry is likely to produce increasing amounts of high-value produce from a decreasing amount of land. Indeed, by 2001 this industry had achieved the second highest value of production (21% of the total, compared with 23% for vegetables, which it may overtake), from one of the lowest areas of agricultural land (2% of the total) (see Figures 28 and 29).

The intensive animal industry does, however, face some challenges, due to its limited compatibility with other rural land uses (if indeed it can be counted as a rural land use,
rather than a semi-industrial one), such as tourism and rural residency. The qualitative landholder interviews confirmed that there is opposition to intensive animal production from councils and other rural landholders in many areas of the region due to its potentially adverse effects on rural amenity, including smells, noise and shedding. There is also widespread concern among food consumers about the humaneness of some intensive animal production methods, which is evident from the popularity of ‘free range’ eggs, for example (Parbery, Wilkinson & Klugman 2005; Klugman 2006). It remains to be seen whether these social constraints will substantially curtail the growth of the intensive animal production industry in the future.

Figure 39. Change in the EVAO profile for the intensive animal industry in the PPW region (data source: AAC 1986, 2001)

The reduction in land area that farm industries occupy raises the question of what use this land has been converted to. In some cases, agricultural land has been converted from one farm industry into another, for example, from vegetables to viticulture, or from dairy to (beef cattle) grazing. The phenomenal growth in the area of land used for viticulture suggests this has likely been the destiny for many struggling farms in other industries, especially in the Yarra Valley and Mornington Peninsula. Similarly, the flower and nursery industry has likely taken over agricultural land from other less profitable forms of agriculture (though neither industry can absorb large amounts of land, because their farms are relatively small).

Another popular land use conversion is from dairy to beef farming, as farmers retire or seek off-farm work to supplement their incomes. In the grazing industry, however, the total grazing area has declined, indicating that some properties have reduced or ceased agricultural production to become lifestyle properties or hobby farms that are too small to be reflected in the AAC.

5.4.2 Farms in some industries are aggregating

Not all industries in the PPW region followed the broader trend of fragmentation into smaller properties. The trend in the vegetable, grain and dairy industries—and to a lesser extent the fruit industry— was towards farm aggregation, with the numbers of farms
decreasing strongly, while their average areas increased (highlighted amber in the fourth column of Table 29). In all three cases, the net result was a decrease in the total area under agriculture. This is consistent with industry evidence that parts of these industries are undergoing a difficult period of adjustment in the region.

Very few grain farms remain, few are considered to be economically viable, and the service providers indicated those which are viable succeed through share farming (one individual cropping properties owned by several people), which is itself a form of aggregation without any transfer of property titles. Vegetable farming is still the region’s largest economic contributor, but while parts of this industry are highly profitable, many vegetable farmers are struggling in the face of strong supply chain pressures (especially from supermarkets) and intense competition from overseas imports (such as China, where cheap labour makes labour-intensive vegetable growing very competitive) (N Barr pers. comm., 12 September 2006).

The dairy industry has undergone major structural adjustment over the period of this study, with a collapse in the number of financially small dairy farms. The changes in the economic structure of different industries are discussed in greater detail by Ransom and Parbery (2007).

It seems that in contrast to farm industries that can subsist on small amounts of land—either commercially or as lifestyle properties—‘extensive’ farm industries face difficult challenges in peri-urban regions due to their dependence on aggregation (often combined with intensification) for commercial survival. It is these industries that will benefit the most from the green wedges policy—at least for those farms that are big enough to remain commercially viable. The green wedges policy is intended to promote the use of larger land allotments in green wedges, which are better suited to extensive agriculture than intensive or lifestyle living. Reduced competition (including speculative buying) from these more intensive land uses should, in principle, keep prices lower, again making aggregation of commercial extensive farms more possible.

Sources within the dairy and horticulture industries confirmed that for these reasons the green wedges were welcomed among commercial operators, but were not welcomed among economically (and socially) non-viable operators looking to exit the industry through subdivision and sale.

In some parts of the region it may be that agricultural land is already subdivided beyond the point where controls on further subdivision can effectively protect the viability of extensive commercial agriculture. Figure 40 shows that some areas, such as Yarra and South East GWRegions, are already dominated by relatively small properties that would be suitable for intensive agriculture or lifestyle if a house exists or can be built on the property (a more detailed map of property sizes in each of the three GWRegions is provided in Chapter 6).

For the grazing industry it appears that land is already subdivided and too expensive across all parts of the PPW region for the green wedges legislation to have any beneficial effect. The agriculture industry interviews indicated that beef grazing is no longer commercially viable in the PPW region, and the telephone survey provided qualified support for this observation; only 12% of graziers (excluding horses and dairy) who earned more than 60% of their income...
from their property indicated that their income was more than $52,000/annum. A comparison of grazing in the three GWRegions indicates that the Western GWRegion has the highest proportion of lifestyle graziers and the lowest proportion of commercial graziers. The South East GWRegion is the opposite, with the highest proportion of commercial and the lowest proportion of lifestyle graziers (Table 30).

Table 30. Commercial scale of grazing farms in the three GWRegions (data source: telephone survey)

<table>
<thead>
<tr>
<th></th>
<th>Western GWRegion %</th>
<th>Yarra GWRegion %</th>
<th>South East GWRegion %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifestyle</td>
<td>69</td>
<td>61</td>
<td>51</td>
</tr>
<tr>
<td>Part-time</td>
<td>13</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Commercial</td>
<td>18</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>98</td>
<td>98</td>
</tr>
</tbody>
</table>

The observation that grazing in the region is now largely non-commercial makes sense of the fact that, unlike other extensive industries, farms in the grazing industry did not increase their average size between 1986 and 2001 (Table 29). It seems that grazing in the region is largely beyond the possibility of commercial aggregation and is now undergoing gentrification through fragmentation into smaller properties run by part-time or lifestyle operators.

The fact that gentrification is a strong option in the grazing industry explains the relatively modest decline in numbers between 1986 and 2001 (fourth lowest, see Table 29). The grazing industry has a number of characteristics that make it popular and, therefore, persistent or ‘socially viable’ as a land use. Most importantly, it is not very labour intensive compared with other farm industries, and requires relatively few inputs, such as fertiliser, herbicides or diesel. Grazing establishments can, therefore, be run part-time and are an attractive option for retired commercial farmers. Most importantly, farm incomes can easily be supplemented with off-farm income, making the lifestyle viable independent of farm profitability.

Grazing is also popular because it creates an open rural landscape that many people find aesthetically pleasing: rolling pastures, a few trees, fences and cattle. Its bucolic appeal as a gentleman’s pastime is well-recognised. Finally, the rural landscape that grazing creates has commercial potential through tourism and property values. In this sense, it is a quintessentially ‘peri-urban’ form of agriculture, which is highly compatible (and demonstrably persisting).
Figure 40. Size of properties in the PPW region. Note this figure in fact shows ‘land parcel size’, not ‘property size’. A single property (or farm establishment) may incorporate multiple land parcels. Consequently, the size ranges in this figure do not always correspond to those found in the AAC data (data source: property layer, Vicmap © The State of Victoria, DSE, 2007. Reproduced by permission of DSE)
Grazing experienced the lowest reduction in numbers, other than viticulture and flowers and nurseries, losing only 15%. In the Western GWRegion, grazing in fact increased its total area making it even more dominant in that region. This suggests that grazing is also something of a ‘default’ land use, which becomes prevalent in the absence of pressure for other uses. This is consistent with the relatively low amount of grazing in the Yarra GWRegion, where there are opportunities for many other (and more profitable) forms of agriculture, and high land prices limit the viability of extensive agriculture (i.e. those requiring large amounts of land). This leads to the questions of: Which industries are likely to have a commercial future in the region? What are the options for those that do not have a commercial future in the region?

5.5 Commercial scale and viability

This report has indicated that the majority of farms in the PPW region are non-commercial, in that their EVAO would be insufficient to support most households without off-farm income. What is the EVAO profile of farms in the region and what level of EVAO indicates commercial viability? The answer to the first question appears in Figures 41–43. Figure 41 shows that most farms in the region are financially small (42.7% with EVAO less than $50,000) or medium in size (41.3% with EVAO between $50,000 and $350,000). Only 15.9% are financially large, having an EVAO greater than $350,000. Between 1996 and 2001, the trend was towards fewer (financially) medium- and small-sized farms and more large farms.

What do these EVAO profiles say about the profitability of different agricultural sectors in the region? This question is much more problematic. Barr (2004 p. 75) has suggested that generally there is “very little likelihood” that a farm with an EVAO of below $50,000 could support an individual without some external income. Meanwhile, Reid et al. (2003) defined a ‘family farm’ as having an EVAO between $100,000 and $300,000, which they suggest is too large to be part-time, but too small to be viable in Victoria. More recently, DPI’s SINL project has defined ‘small, new and lifestyle’ landholders operationally as those with an EVAO below $225,000 (and who have been on their less-than-100 ha properties for less than five years) (J Francis pers. comm., 15 April 2007).

Putting even a rough number on the EVAO threshold that defines ‘commercial’ farming is highly problematic for a range of reasons. The same EVAO (a gross measure of production) yields a widely varying net profit for different farm industries, in part because some are more capital and input intensive than others. Beef farming for example, requires relatively low inputs (aside from large amounts of land) in comparison with intensive vegetable or chicken production, which can use substantial amounts of fuel, agricultural chemicals, feed and other inputs. Even within a single farm industry, the profit from a particular EVAO varies depending on the landholder’s level of debt, their experience, skill and luck as a farmer, the quality of an area’s local soil and climate, and seasonal and climatic variation. In addition, landholders have different ideas of how much net farm income can support various acceptable lifestyles without off-farm income. The life stage of the landholder will also influence this, particularly if they have school-aged children.

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* Note that the numbers of financially small farms is dramatically underestimated due to the exclusion of farm establishments whose EVAO is below the threshold for inclusion in the AAC.
During the course of this project, representatives from a wide range of farm industries within the study area were asked to estimate what level of EVAO yielded, on average, an annual income of $50,000 (which was defined somewhat arbitrarily as an ‘adequate income’). These estimates were always very heavily qualified along the lines described above, but ranged from about $200,000 in the beef industry to as high as $400,000 in the fruit industry. As a rough estimate, and without distinguishing different industries, this would imply that about 75% of all farms in the PPW region are non-commercial because their EVAO is less than $200,000, while 16% are classified as fully commercial because their EVAO is greater than $350,000, and 10% are in the (even) more ambiguous range between these two (see Figure 41). The fact that farms with an EVAO of less than $5,000 have not been included in these figures means that the results underestimate the number of non-commercial farms.

Figure 41. Changes in EVAO profile for farms in the PPW region 1996–2001 (data source: AAC 1996, 2001)

Conversely, they may underestimate the number of commercial farms in the region as some farmers may under-report their level of production in the AAC and the ABS may then further underestimate the value of production in the region when calculating EVAO from average prices (by a factor of two, according to Gardner (2002), although this is probably not the case for all commodities in the region). Indeed, consultation with sources within different agricultural industries suggested that for several industries (for example dairy and viticulture), the number of high-EVAO operators was substantially underestimated in the AAC statistics presented in this study (see Ransom & Parbery 2007).

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37 These industry consultations were conducted by Michael Ransom, whose report forms the basis for Chapter 3.
The telephone survey data provided a more direct measure of farm profitability, which accords fairly well with the above estimates. Of the landholders who earned more than 80% of their income from agriculture on their property, only 21% indicated that their personal income was $52,000/annum or higher. This figure cannot be calculated for individual industries, as this would reduce the sample size to the point where results become unreliable. The above figure must be qualified with the observation that it does not include the substantial number of landholders (38%) who chose not to divulge their annual income.

Figure 42. Comparison of EVAO profile in the three focus GWRegions (data source: AAC 2001)

The conclusion—albeit a very rough one—that only 21% of farms in the PPW region are economically viable on the basis of their agricultural activities, does not imply that the remaining 75% are not socially viable, or sustainable through some other means. This report has already covered the potential in some industries for hybridisation and gentrification, both of which can make economically non-viable farms socially viable due to income from non-agricultural sources.
Of course, there are also many farms in the region that are not economically viable yet have no other sources of income. These may be farmers that are: continuing in the hope of an improvement in yields or market prices; looking for an opportunity to actively change their operation through intensification, hybridisation or expansion of their current business; changing (farm) industries; moving to a different area; retiring; or ceasing farming altogether and selling their property. Alternatively they may be, as Wilkinson (2006) has observed, farmers with “very tight belts” who are accustomed to their austere existence and who do not aspire to more.

In the typology of private rural land ownership shown in Table 12, economically viable commercial farmers who generally do not depend on non-agricultural income were distinguished from three other kinds of farmers: part-time, hybrid and struggling, as well as from ‘non-farmers’, such as lifestylers (who are sometimes included in the AAC).

As discussed in Sections 4.3.3 and 4.6 (on ‘brown NRM values’), these distinctions can have implications for NRM, for example in determining the extent to which commercial imperatives influence landholder activities, their degree of identification with ‘traditional’ farming cultures, their exposure to other cultural perspectives on NRM, their degree of reliance on agricultural income and the financial resources they have available for NRM. These distinctions also help us to understand the possible and likely futures for different farm industries in the PPW region, not only in terms of whether different industries have a commercial future through being economically viable, but also whether there are non-commercial options available that could enable them to remain socially viable, and thereby persist as a land use. The AAC and telephone survey data provide some insights on these issues. A comparison between the beef and dairy industries will provide an informative example.
5.5.1 Economic and social viability

The beef (grazing) and dairy industries are somewhat similar in the sense that they are both extensive industries requiring substantial amounts of land. Indeed, the profiles of their physical size are similar (Figure 30). However, these industries have quite different futures in the PPW region, due to differences in their economic and social viability (terms which were explained at the beginning of this chapter).

Figures 44 and 45 show the EVAO profiles of the grazing and dairy industries, along with the responses of their operators to a question about their occupational status. Questions about occupational status will be revisited shortly. The observation is that in the grazing industry (Figure 44), most farms are financially small (76% with EVAO below $50,000: an underestimate given the existence of farms below the EVAO cut-off threshold).

Industry sources suggested that for beef grazing operations to generate a net income of $50,000 per annum they would, on average (and bearing in mind wide variation due to debt levels and other factors) need to have a minimum EVAO of $200,000. Even allowing for the observation by Gardner (2002) that the ABS underestimates the EVAO for farms in this region by a factor of two—by adjusting this viability threshold down to $100,000—it becomes evident from Figure 44 that almost no grazing establishments are economically viable commercial enterprises\(^\text{38}\). As previously noted, the study’s industry source also indicated that currently there was practically no full-time commercial beef grazing remaining in the PPW region.

In comparison, Figure 45 shows that there are relatively few small operators in the dairy industry. The study’s dairy industry source estimated—again very roughly—that the minimum EVAO for a commercially viable dairy farm was upwards of $250,000, which by the same logic applied above, implies $125,000 when applied to these figures. This would suggest that, in diametrical contrast to the (beef) grazing industry, most dairy farms are commercially viable operations, albeit with a substantial number operating with marginal profitability as the industry undergoes a challenging period of adjustment. This also concurs with the industry source’s general appraisal of the dairy industry within the PPW region.

This comparison returns us to the question of why such a significant number of grazing establishments remain in the area when the majority of them are not economically viable. The answer lies in the fact that grazing is a highly gentrified industry that relies on off-farm income to remain a highly socially viable (and indeed sought after) lifestyle, despite the fact that it is not commercially viable on the basis of agricultural income alone. This is illustrated in the second element of Figures 44 and 45, which indicates farm operators’ responses to a question about whether running the farm was “the main occupation of the person who manages or operates this holding”. These responses provide a sense—albeit an imperfect one—of whether sub-commercial farms are simply struggling along, or whether their incomes may be (potentially very comfortably) supplemented from other sources (either as hybrids, part-timers, or lifestylers).

\(^{38}\) The degree to which the ABS commodity values used to calculate EVAO differ from the actual value of produce from the PPW region no doubt varies widely between different commodities. For example, it is unlikely that the value of beef from the PPW region is double the ABS-derived value. This does not alter the analysis above.
Figure 44. EVAO profile for the grazing industry in the PPW region (data source: AAC 2001)

Figure 45. EVAO profile for dairy industry within the PPW region (data source: AAC 2001)

Figure 44 illustrates that in the grazing industry the proportion of farm operators who report that farming is not their main occupation increases as the financial scale of farms decreases. Clearly, many grazing operators have other work, either in other agricultural businesses, or more commonly in off-farm work (albeit possibly related to agriculture). It is important to note that even those respondents who indicate that running the property is their main occupation may have other sources of income. Barr (2004) has demonstrated that respondents’ answers to this question are often influenced by their sense of identity as farmers as much as by their source of income. Furthermore, even commercial farmers routinely do off-farm work in some farm industries, particularly where their farm activities are seasonal, as in some vegetable industries. A trend towards supplementing farm incomes with off-farm work has been noted over several decades not only in peri-urban areas but in most parts of Australia (Barr 2004 p. 77).

Nonetheless, the grazing industry has a very high proportion of farmers who report a main occupation other than farming (40%), compared with other farm industries, including dairy (11%). This is a reflection of the fact that, unlike beef grazing, dairy farms are difficult to run part-time and, therefore, need to be economically viable (independent of off-farm income) if they are to remain socially viable and persist as a lifestyle and land use. Consequently, there
are few non-economically viable dairy farms. This contrast becomes even more explicit when examining the change in the EVAO profile of the two industries shown in Figures 46 and 47.

Figure 47 confirms that the dairy industry experienced a much more extreme loss of farm numbers than the beef industry (48% versus 17% loss in the grazing industry) and also shows that this loss occurred most strongly among small- to medium-scale farms, up to an EVAO of $100,000. As a consequence of this reduction, the peak in the dairy EVAO profile has shifted to the right (see arrows). This shift is too large to be explained through inflation alone. Rather, it points to the fact that financially smaller dairy operations have become economically non-viable and, therefore, have gone out of business. Some of these farms were likely absorbed by remaining dairy businesses, in the pattern of aggregation discussed above (dairy on average increasing in physical size by 21%). In contrast, the EVAO profile of the grazing industry (Figure 46) indicates little or no adjustment to cost-price pressures. This is because this industry is sheltered from market forces by off-farm income. In summary, the grazing industry is a gentrified lifestyle industry, while the dairy industry is an intensifying and aggregating commercial industry.

![Figure 46. Change in the EVAO profile for the grazing industry in the PPW region (data source: AAC 1986, 2001)](image)

The dairy industry, therefore, provides one example of structural adjustment within the PPW region, with operations expanding (and possibly intensifying) to remain ahead of the terms of trade (increasing cost of inputs and declining real prices for produce). The implication—confirmed through the study’s industry consultation—is that for the dairy industry to remain viable in the region, it will need to continue to structurally adjust. The major obstacle to making this adjustment is land prices, though the region’s relatively high rainfall (in the east) may increasingly give its dairy industry an advantage over dairy areas that rely on irrigation allocations.
How do other industries compare, in terms of the numbers of ‘non-farmer’ operators and the proportion of farms that are economically viable? Figure 48 shows the proportion (in various farm industries) of farm operators who indicate that running the property in question is not their main occupation. It shows that the viticulture, grazing and horse industries all have a relatively high proportion of respondents that indicated that running the property in question was not their main occupation (the sample size for ‘other crops’ is too low to make that result meaningful). This is consistent with other sources, which suggest that horses and viticulture are both attractive and practical agricultural pursuits for part-time farmers or lifestyler. The EVAO and occupation profile of the horse industry is similar to grazing—dominated by financially small part-time operators. However, the viticulture industry is somewhat different, with the part-time operators dominating the financially medium-sized farms (there are fewer small farms), but also with a substantial number of larger commercial operations.

What structural adjustments have been made in other industries in the region? The changes in the EVAO profile between 1986 and 2001 have already been examined for two agricultural sectors in the PPW region: intensive animal production (Figure 39) and dairy (Figure 47). Both experienced growth in the number of (financially) large-scale operations and a reduction in the number of smaller-scale operations. This general trend was common to most agricultural industries in the PPW region between 1986 and 2001, albeit usually to a much less dramatic extent (and partly caused by an increase in the value of production caused by inflation). The only industries which resisted the trend towards larger-scale operations were grazing (Figure 46), horses and perhaps viticulture—all of which are somewhat gentrified farm sectors which are thereby sheltered from the ‘terms of trade’ pressures that drive structural changes in other agricultural sectors. Viticulture strongly increased its number of
farms in all parts of the EVAO profile, but increased it proportion of medium-sized farms, contrary to the trend in most industries towards financially larger operations.

Figure 48. Responses to question: ‘Is running this farm your main occupation?’ (data source: AAC)

A few agricultural sectors exhibited changes in their EVAO profiles that warrant further attention, especially given changes in other key measures such as their total area and number of farms. The most important of these is the vegetable growing industry, whose EVAO profile (Figure 49) shows a dramatic collapse in the number of small- and mid-sized farms, coupled with strong growth in the number of large-scale farms. Combined with the fact that vegetable growing experienced a large decrease in farm numbers (43%, the third largest: see Table 29) but only a small decrease in total area (16%, the third smallest), the change in the industry’s EVAO profile indicates that vegetable growing experienced some of the strongest structural adjustment in the PPW region (after intensive animal production), with smaller operators exiting the industry and larger operators absorbing much of their land to further increase their commercial scale.

Another agricultural sector that experienced changes beyond the general trend towards larger-scale operations was the fruit industry (Figure 50). In addition to a steady contraction in farm numbers and some (rather inflationary) growth towards financially larger operations, the fruit industry also experienced a spike of growth in the numbers of farms with high EVAO, between $500,000 and $1,000,000. It is unclear what specific products this spike may represent, although a 2000 study of agriculture in the Shire of Yarra Ranges (the major fruit producing area in the PPW region) predicted *Pome* fruit (such as apples and pears) and *Rubus* fruit (such as blackberries and raspberries) for growth (Langworthy & Hackett 2000). Further details of the changes in and prospects for these industries in the region can be found in Ransom and Parbery (2007).
Figure 49. Changes in the EVAO profile of the vegetable sector in the PPW region (data source: AAC 1986, 2001)

Figure 50. Change in EVAO profile of the fruit industry in the PPW region (data source: AAC 1986, 2001)

Some additional indication of the economic viability of the ten agricultural sectors examined in the region can be gleaned from the telephone survey data presented in Table 31. Landholders who indicated they conducted some business activities on their properties were asked to indicate whether these activities were ‘highly profitable’, ‘somewhat profitable’ or ‘generally operating at a loss’. Individuals were also asked to indicate what, if anything, they
grew or grazed on their property. Table 31 shows the level of business profitability against what individuals grew or grazed on their property. Note that many individuals indicated they grew or grazed multiple things on their property (in addition, potentially, to off-farm business activities), and so while the data in Table 31 shows the level of profitability of ‘individuals with horses or grapes’ (etc.), it does not necessarily indicate the horses or grapes (etc.) were the principal cause of their business profitability (or lack of it).

Table 31 distinguishes rural businesses according to what is grown or grazed on the property, and for each category shows the proportion of businesses that were ‘generally operating at a loss’ and those which were ‘highly profitable’ (as reported by the survey respondent). Most of the remainder indicated they were ‘somewhat profitable (on average, 3% couldn’t say). The categories are ranked according to the ratio between ‘highly profitable’ and ‘loss making’ businesses, with the most profitable agricultural activities first. This data suggests that the most profitable businesses were those with no agricultural activity at all, for which businesses ‘generally operating at a loss’ were only 50% more common than those that are ‘highly profitable’. The agricultural products associated with the most profitable businesses were flowers and nurseries and ‘other fruit’. This supports the strong growth in numbers and area of flower and nursery establishments shown in Table 29, though it is less consistent the less spectacular performance of ‘other fruit’ in Table 29. This reflects the different times at which these measures were generated (2007 for the telephone survey data versus 1986 to 2001 for the AAC data on number and area of farms) or the shortcoming of some or all of these measures of economic viability. A third (and also imperfect) source of insight on economic viability was the interviews with industry sources presented in Ransom and Parbery (2007). These were reasonably consistent with the above optimistic outlook for these two industries. These interviews suggested that the flower and nursery sector would enjoy a “steady but not spectacular increase” over the next few years, and that fruit growers had “greater optimism” than ten years ago due to increasing advantages over competition in irrigated fruit growing areas (Ransom & Parbery 2007). Langworthy and Hackett (2000) noted especially strong prospects for Pome (e.g. apple and pear) and Rubus fruit growers (e.g. raspberries, blackberries) in the official Yarra Valley and Yarra and Dandenong Ranges green wedge.

The agricultural products associated with the least profitable business—according to the data in Table 31—were vegetables, grazing other livestock (mostly beef cattle) and cropping. This information accords well with the AAC data and with the qualitative interviews with service providers and agriculture industry sources. Table 31 shows that no businesses with cropping activities reported being highly profitable, and in the AAC data (Table 29), cropping experienced the largest decline in farm numbers and the third largest decline in area of all farm sectors. Service providers from the Western GWRegion noted that there are almost no profitable croppers remaining in the region. Among businesses with ‘other livestock’, loss making businesses are 8.5 times more common than highly profitable ones. This is also highly consistent with the interviews with industry sources, which found the commercial grazing (note the emphasis) was “the agricultural industry under most challenge” in the region. That there was not a greater reduction in the numbers and area of grazing operations (Table 29 shows that grazing experienced the fourth smallest decline in farm numbers) can be
explained by the social viability of this industry as a lifestyle pursuit supported by off-farm income.

The various data on the vegetable industry are also in reasonable agreement. Table 31 indicates that among businesses that grow vegetables on their property, 17 are making a loss for every one that is highly profitable—the worst profitability ratio for any agricultural activity except cropping. This is consistent with the changes discussed in relation to this industry’s EVAO profile above (Figure 49)—the industry includes a large number of economically unviable operators (often of small or medium size) looking to exit the industry, and whose departure is enabling structural adjustment as larger operators absorb the farms relinquished by smaller operators. The interviews with industry sources provide support for this interpretation, with Ransom and Parbery (2007 pp. 7–8) reporting that cost-price pressures were “causing smaller growers to leave the industry”, while larger operators were looking to further enlarge and intensify their operations.

Table 31. Profitability of rural businesses which grow or graze different things on their property in the PPW region (data source: telephone survey)

<table>
<thead>
<tr>
<th>Agricultural activity</th>
<th>Proportion of businesses ‘generally operating at a loss’ (%)</th>
<th>Proportion of businesses that are ‘highly profitable’ (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>Flowers or nursery</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td>Other fruit</td>
<td>50</td>
<td>13</td>
</tr>
<tr>
<td>Intensive animals</td>
<td>38</td>
<td>5</td>
</tr>
<tr>
<td>Dairy</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>Grapes</td>
<td>33</td>
<td>4</td>
</tr>
<tr>
<td>Horses</td>
<td>43</td>
<td>5</td>
</tr>
<tr>
<td>Other livestock</td>
<td>38</td>
<td>4</td>
</tr>
<tr>
<td>Vegetables</td>
<td>34</td>
<td>2</td>
</tr>
<tr>
<td>Grains</td>
<td>38</td>
<td>0</td>
</tr>
</tbody>
</table>

AAC data indicates that, between 1986 and 2001, the percentage increase in total EVAO from vegetable growing was greater than inflation over this period (167%) in only one of the six GWRegions: Peninsula (and the increase there was substantial: 443%, see Appendix J2).
5.6 Conclusion

Agriculture in most parts of the PPW region is very diverse in comparison with other parts of the state (with the exception of the Western GWRegion). Some agricultural enterprises are highly profitable, others are struggling to remain economically viable and still others are comfortably non-commercial lifestyle pursuits. Some industries are thoroughly integrated with tourism, taking advantage of their location in Melbourne’s scenic rural hinterland to add value to their operations. For other agricultural enterprises, the need to coexist with other users of Melbourne’s rural amenity landscapes is a major constraint on further intensification.

In this chapter, different aspects of agriculture in the region have been examined, such as the economic contribution of different industries, their importance as a land use and their numbers of properties. This chapter has also explored how these characteristics have changed over time, and gives some indication of the future prospects for different industries in the region. Rather than examining each of the ten industries defined in this study in detail, this report uses particular industries to illustrate wider principles. These broader principles have been applied to the individual farm industries distinguished in the study by Ransom and Parbery (2007).

This chapter described four strategies used by agriculture in the region: intensification, hybridisation, gentrification and aggregation. In the long term, the first three of these strategies appear more likely to be more successful than the last, although the introduction of green wedges may aid industries that need to aggregate to survive. Other strategies also have their limitations, such as the problem of coexistence linked with intensification and the lack of time and expertise often associated with gentrification. The relative success or failure of individual agricultural industries will largely depend on how these challenges and opportunities are managed.

The varying forms of agriculture also make different demands and impacts on the region’s natural resources. Water is in demand among all agricultural enterprises, for some much more than others. Intensive farms can require more water (especially if irrigated) and may have more severe impacts on water quality downstream. Yet, intensive farms can afford to be much smaller than extensive farms and direct effects are small in proportion to their size. Ironically, however, because the properties are small, their operators often feel they cannot afford to leave space for native vegetation or habitat, compared with larger farms. A systematic examination of the implications for NRM of different farm industries would be highly beneficial, although beyond the scope of this study.

This chapter has incorporated some comparisons of agriculture in the Western, Yarra and South East GWRegions. These comparisons are developed further in the next chapter, which draws on the general principles developed in previous chapters to create a more integrated, detailed and empirically-based description of land, landholders and NRM in the three focus GWRegions.