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**Bureau of Rural Sciences**

## **Providing social data to underpin catchment planning in the Glenelg Hopkins region**

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Ian Byron, Allan Curtis and Jacinta MacKay



*Helping Communities  
Helping Australia*

A Commonwealth Government Initiative



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Postal address:  
Bureau of Rural Sciences  
GPO Box 858  
Canberra, ACT 2601

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## List of acronyms

ABS – Australian Bureau of Statistics

BRS – Bureau of Rural Sciences

CMA – Catchment Management Authority

CRP – Current Recommended Practices

GIS – Geographic Information System

NHT – Natural Heritage Trust

NRM – Natural Resource Management

QA – Quality Assurance

# Executive summary

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## Introduction

This report presents findings from a mail survey of 1,943 landholders in the Glenelg Hopkins region in 2003. The survey focussed on gathering base-line information regarding the key social and economic factors affecting landholder decision making about the adoption of practices expected to improve the management of natural resources in the Glenelg Hopkins region. The Glenelg Hopkins CMA and the Bureau of Rural Sciences were the key project partners.

## Assessment of issues

- Social issues such as the movement of young people out of the district, availability of important services and the decline of small towns were rated as the most important issues affecting respondents' local district.
- The cost of managing weeds and pest animals was the highest rated natural resource management issue with just over two thirds of respondents reporting this was an important issue in their district.
- The majority of respondents also rated the availability of surface or groundwater for agriculture as an important issue.
- Uncertain or low returns limiting investment in the long-term health of their property and the management of pest plants and animals on Crown land affecting their property were the only two issues most respondents said were important on their property.
- Dryland salinity, native vegetation decline, water quality and lack of awareness about Aboriginal cultural heritage were not rated as important issues by most landholders.

## Values attached to property

- A very wide range of social, environmental, and economic values were attached to respondents' property. Being able to pass the property on in better condition, being an attractive place to live, and providing a sense of accomplishment from building/maintaining a viable business were all equally rated as the most important values of respondents' properties.
- A range of other lifestyle values were highly rated by respondents with around three quarters of respondents indicating that being able to work for themselves, providing the lifestyle they want, being a great place to raise a family, being an attractive place to live, and being part of a rural community were important values attached to their property.
- Most respondents also said that providing a sound long-term economic investment, providing most of the household income, contributing to the local economy, and being an asset that will fund retirement were important aspects of their property.
- Contributing to the environmental health of the district was also a value most respondents attached to their property.
- Providing a break from their normal occupation and providing the only job they have ever done were not rated as important aspects of their property for most respondents.

## **Knowledge**

- The only natural resource management topic where at least half of the respondents said they had sound knowledge was legislation about the on-property handling of chemicals.
- Respondents reported more moderate knowledge about the effects of unrestricted stock access, the benefits of ground cover to maintain soil health, the benefits of pastures in crop rotation, benefits of establishing local native plants, the benefits of vegetation in waterways, how to recognise salinity, and the benefits of retaining native vegetation.
- The survey highlighted limited knowledge about Aboriginal land management activities, who to contact for advice about managing Aboriginal cultural heritage sites, the major NRM strategies of the Glenelg Hopkins CMA, and the processes leading to soil acidification.

## **Attitudes towards natural resource management**

- Overall survey data highlighted very positive attitudes across a range of natural resource management topics.
- The most strongly reflected attitude towards natural resource management was that action at the property level can improve the environmental health of the district (81% of respondents agreed).
- While the availability of water was an important issue, over three quarters of respondents also acknowledged that diverting water flow could cause problems for other landholders and the environment.
- Most respondents said they thought landholders should be paid for providing environmental services. At the same time, respondents in the Glenelg Hopkins also appeared willing to make a significant individual contribution with over half of all respondents agreeing that a short-term loss in production could be justified by long-term improvements to the environment.
- Survey findings highlighted an opportunity to improve the management of Aboriginal cultural heritage sites on private property with 42% of respondents agreeing that landholders and Aboriginal communities should work together to manage these sites.

## **Preferred funding arrangements for involving landholders in natural resource management**

- Reduction in rates was the only funding arrangement in which at least half of all survey respondents reported a strong interest.
- Just under half of survey respondents (47%) were strongly interested in tax rebates and almost a third (32%) in grant schemes administered by the CMA or government.
- The majority of respondents had only limited interest in all other options including annual payments for environmental services, coordinated labour, tenders in response to government advertisements, and annual lease payments for land managed by others.

## **Sources of information about natural resource management**

- Newspapers were the most common source of information about natural resource management in the Glenelg Hopkins region, and were used by 73% of respondents. Almost all of these respondents also said that they felt this information was useful.
- Just under half of all respondents said they had used mail brochures and leaflets and Landcare groups as a source of information about natural resource management. Information from these sources was widely considered to be useful.
- The least used sources of information about natural resource management were universities, training courses, and the internet.

## **Stage of life and long-term plans**

- The average age of landholders in the Glenelg Hopkins region was 52 years.
- Over half of all respondents said it was likely that they would continue to live on their property and that ownership of the property was likely to stay within the family.
- Just over one third of respondents said that their long-term plans were likely to involve expanding the area of land they managed. These respondents already owned/managed significantly larger properties than other respondents.
- Just over a third of respondents said that they were likely to sell or lease all or most of their property in the long-term.
- Of those properties that are likely to be sold the median year that the transfer was likely to occur was 2010.
- The median year of likely transfer for all properties surveyed was 2016 with 37% likely to change hands in the next decade.

## **Involvement in planning processes**

- Just under half of all respondents were involved in whole farm planning and 14% had a completed or on-going whole farm plan.
- Over 80% of respondents said they had a plan or vision about the improvements they would like to make on their property and over a quarter of these respondents said they were well advanced in implementing those changes on their property.
- Despite the finding that most landholders said ownership of their property was likely to stay within the family, most respondents (54%) had not begun to plan the transfer of their property to the next generation.
- Just under half of all respondents (46%) said they had been involved in local action planning (e.g. with Landcare, community development or industry associations).

## **Involvement in government funded programs**

- Twenty-nine percent of respondents said that they had work undertaken on their property that was at least partially funded by government programs in the past five years.
- Over a third of respondents said they were currently a member of a Landcare group. This group of respondents owned or managed 52% of the area surveyed.

- Twenty percent of respondents were a member of a local commodity group.

### **Property size and farming as an occupation**

- The median property size of landholders in the Glenelg Hopkins region was 230 ha.
- Only 8% of respondents owned or managed a property over 1,000 ha yet this small group of respondents managed over half (53%) of the total area surveyed.
- Seventeen percent of respondents owned or managed a property that was under 50 ha in size.
- Sixty-four percent of respondents said that farming was their primary occupation. The 36% of landholders that said farming was not their primary occupation managed approximately 39% of the total area surveyed.

### **Levels of income and property equity**

- Almost three quarters of respondents (73%) in the Glenelg Hopkins region made a net pre-tax on-property profit in the 2001/2002 financial year and the average net pre-tax on-property income was \$18,000.
- Almost three quarters of respondents (72%) also reported an off-property profit for the 2001/2002 financial year with an average off-property income of just over \$18,000.
- The average total household income for all respondents was \$36,000 and only just over one quarter of respondents (26%) reported a combined income in excess of \$50,000.
- There was an almost even split between the contribution of off-property (51%) income and on-property income (49%) to the combined total household income for landholders in the Glenelg Hopkins for the 2001/2002 financial year.
- Most respondents (60%) had more than 80% equity in their property. At the same time, just over a fifth of respondents had less than 60% equity.

### **Constraints to change**

- Over three quarters of respondents said that cash flow, suitability of soils, cost of machinery and the existence of long-term markets were or would be important constraints to changing management practices on their property.
- Availability of surface or groundwater, stage of life, extent the practice will increase property values, and the level of commitment and support from family were also among a range of other factors considered important by the majority of respondents.
- The only two factors that were not considered important in influencing respondents decision making about changing management practices were: the extent there were other people in the district undertaking the practice, and the returns available from off-property investments.

### **Adoption of current recommended practices (CRP)**

- Survey data highlighted high levels of adoption of some CRP including only watering stock from a trough or tank (90% with stock adopted practice), undertaking pest animal and non-crop weed control (81% adopted), planted trees and shrubs (69% adopted), used

minimum tillage (67% with cropping adopted), and had a record of soil test results (64% adopted).

- The majority of respondents had also adopted the CRP fenced to manage stock access to waterways (59%), sown perennial pasture (59%), and cropped using a rotation with pasture (52%).
- Findings demonstrated moderate uptake of the CRP applied lime, cropped with a rotation based on soil test results, tested the quality of main water sources, used time controlled grazing, and fenced to allow management by land classes.
- Only two CRP were adopted by less than 40% of respondents: fenced to manage stock access to native bush (20% with stock adopted); and encouraged regrowth of native vegetation (37% adopted).

### **Confidence in CRP**

- The majority of survey respondents agreed that fencing waterways was an important part of the work required to revegetate these areas. At the same time, some respondents (37%) also acknowledged that fencing makes these areas more difficult to manage.
- Most respondents (57%) also indicated that the time and expense of watering stock off-stream was justified by improvements in bank stability and water quality.
- There was less certainty regarding the benefits and costs of stubble retention with 64% of respondents uncertain if the benefits of stubble retention outweighed problems with disease and the difficulties/costs of seeding through stubble.

### **Differences across sub-catchments**

The Glenelg Hopkins region consists of 32 sub-catchment areas used as the basis for regional planning, asset identification, prioritisation, and integrated works programs. Findings from this research highlighted considerable differences across these sub-catchments and reinforce the need for awareness of these differences to enable effective catchment planning and management. Differences between landholders from the 32 sub-catchments included:

- property size;
- occupation;
- on-property profitability;
- perceived importance of issues;
- values attached to property;
- long-term plans;
- knowledge about natural resource management;
- factors affecting their decision making about changing management practices;
- landcare membership;
- property planning; and
- adoption of CRP.



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# 1. Introduction

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## Research context

This report presents findings from a mail survey of 1,943 landholders in the Glenelg Hopkins region of Victoria in 2003. A response rate of 64% (1,081 completed surveys) was achieved for this survey. The survey focussed on gathering base-line information regarding the key social and economic factors affecting landholder decision making about the adoption of practices expected to improve the management of natural resources in the Glenelg Hopkins region.

It is important to recognise that much of Victoria experienced un-seasonally dry conditions in 2003 and that these conditions are likely to affect responses to some of the questions in the mail survey. However, the project partners thought it was important to establish base-line data, and acknowledged that un-seasonally dry conditions had been a reality in much of the area for some time.

This project drew heavily on the methodology of similar projects completed in the Goulburn Broken Dryland in 1999 (Curtis *et al.* 2000), the Ovens Catchment in 2001 (Curtis *et al.* 2002) and the Wimmera region in 2002 (Curtis and Byron 2002). The Glenelg Hopkins CMA and the Bureau of Rural Sciences were key project partners. Funding for this project was sourced through a mix of national, state and regional programs, including the Natural Heritage Trust Extension (NHT).

## Research objectives

1. To provide baseline data for key social and economic conditions/trends at the sub-catchment scale that is required for effective catchment planning (1:25,000)
2. To identify the extent of adoption for recommended practices (sustainable agriculture and biodiversity conservation) and to gain a better understanding of the limitations, barriers, and constraints to the adoption of these practices.
3. To evaluate attitudes towards current tools and potential alternative tools for improved land management and predict landholder responses to a limited number of policy options.
4. To provide information that will allow assessment of NHT program outcomes across intermediate objectives (e.g. awareness of issues, knowledge, business and succession planning, confidence in recommended practices and adoption of practices for sustainable agriculture and biodiversity conservation).
5. To interpret social data against other regional natural resource data layers such as salinity, weeds and vegetation layers.

## 2. Report structure

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The next chapter provides some background to the Glenelg Hopkins region. The subsequent methodology chapter includes a summary of the literature the research team drew upon to identify the variables included in the survey and brief descriptions of the mail out process and the approach to data analysis.

Research findings are presented in Section 5 of this report and are arranged around major topics explored in the mail survey, namely:

1. assessment of issues;
2. Comparison of landholder identified salinity sites and salinity discharge maps
3. values attached to property;
4. knowledge;
5. attitudes towards natural resource management;
6. preferred funding arrangements for involving landholders in natural resource management;
7. source of information about natural resource management;
8. stage of life and long-term plans;
9. involvement in planning process;
10. involvement in government funded programs;
11. property size and farming as an occupation;
12. levels of income and property equity;
13. land use and enterprise mix;
14. constraints to change;
15. adoption of current recommended practices (CRP); and
16. confidence in current recommended practices.

Based on these findings the concluding chapter highlights key issues and strategies for efforts to improve natural resource management in the Glenelg Hopkins region.

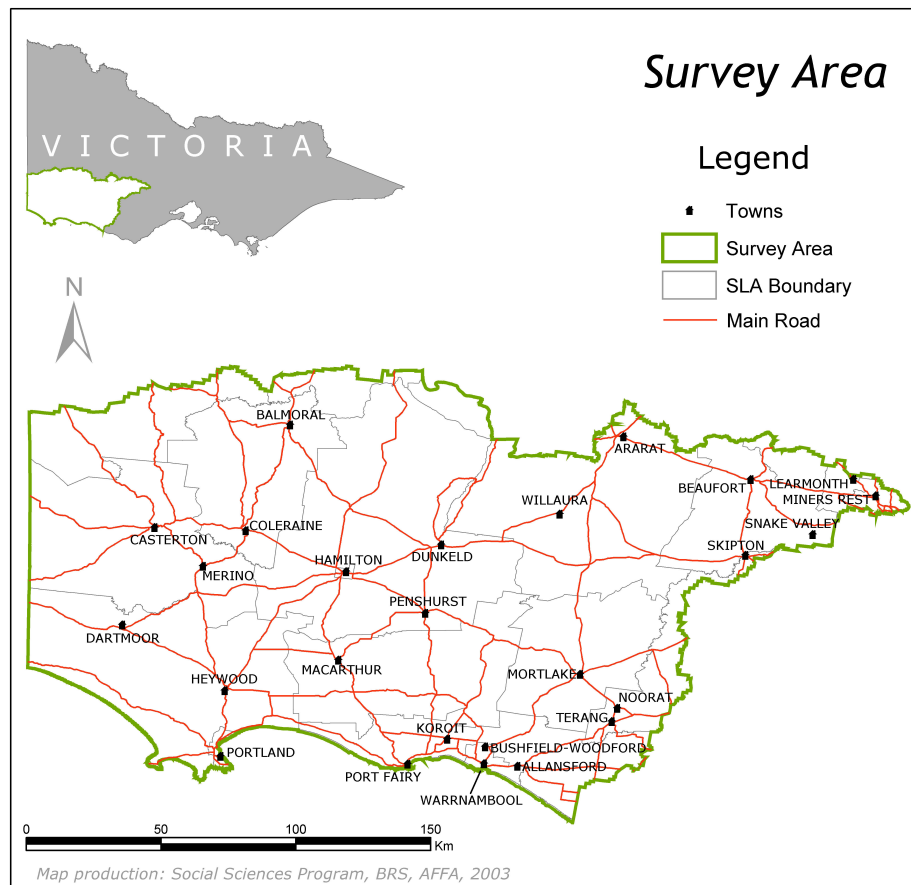
### 3. Background

#### The location and character of the Glenelg Hopkins region

The Glenelg Hopkins region is located in the south west of Victoria and covers an area of approximately 26,000 square kilometres or approximately 11% of the State [Figure 1] (GHCMA 2003). The region includes three major drainage basins: the Glenelg, Hopkins and Portland Coast. Agriculture represents a major contributor to the regional economy and in 1999-2000 was worth approximately \$650 million or approximately 10% of the gross value of agricultural production in Victoria.

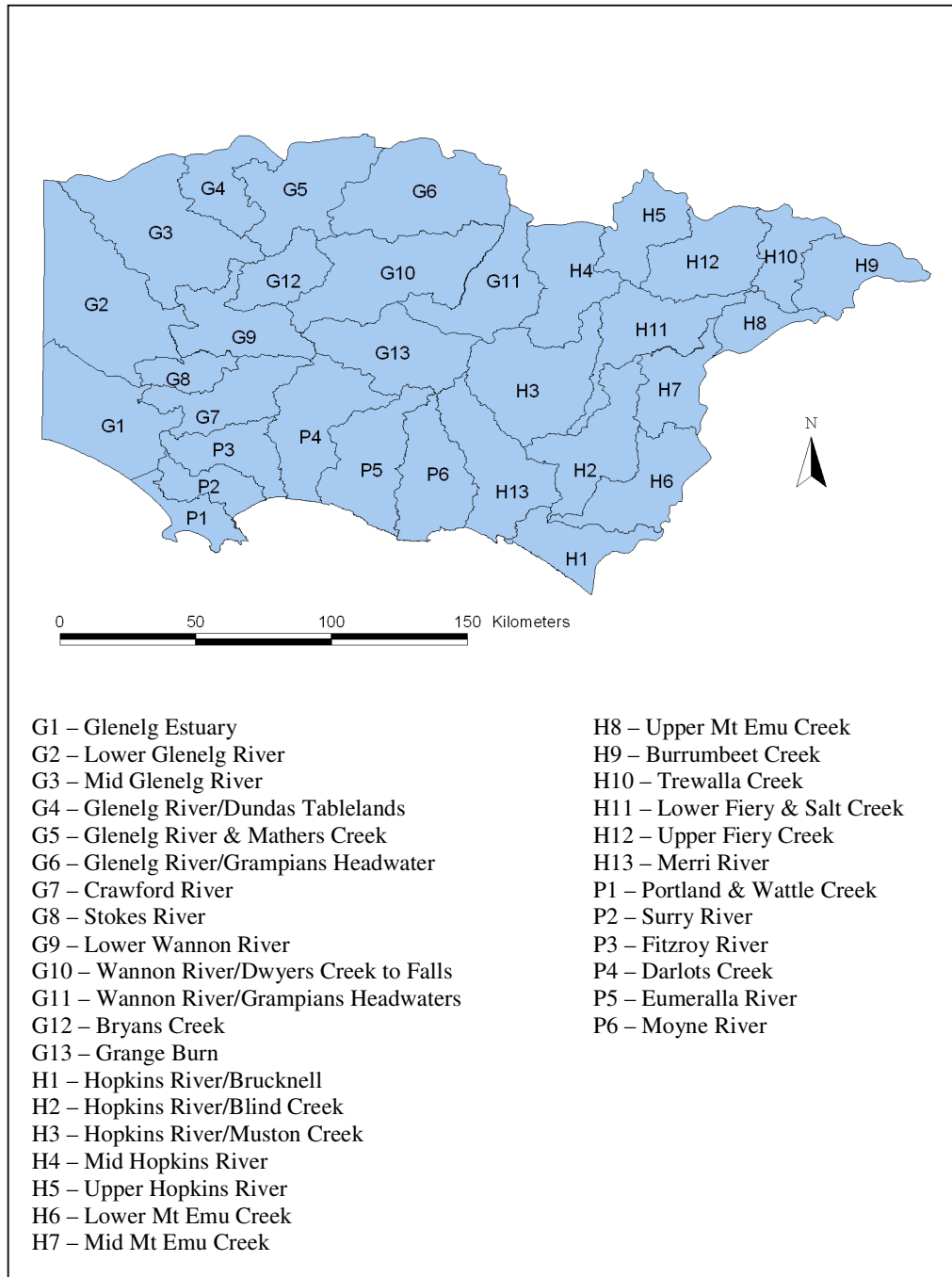
Major cities and townships include Ballarat, Warrnambool, Hamilton, Portland, Ararat, Port Fairy, Beaufort, Casterton, and Coleraine. The Glenelg Hopkins CMA has identified biodiversity, water health and water quality, soil decline and salinity, pest plants and animals, and coastal areas as major natural resource management issues affecting the catchment (GHCMA 2003).

FIGURE 1: SURVEY AREA



For planning purposes the Glenelg Hopkins region has been divided into 32 sub-catchments [Figure 2]. These 32 sub-catchments have been used to help identify sub-regional differences across the survey topics. At the end of each section of the report there is a brief discussion of any differences across the 32 sub-catchments. Summaries of the information collected in the project for each of the 32 sub-catchments are presented in Appendix 1. Appendix 2 presents a detailed break down across topics where there were significant differences between sub-catchments.

FIGURE 2 – SUB-CATCHMENTS IN THE GLENELG HOPKINS REGION



## 4. Methodology

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### Background to this research

Catchment groups in Australia are required to develop regional plans that set out how the land, water and biodiversity of the region are to be managed. Each catchment plan is to be endorsed by State and Australian government agencies prior to their implementation. While there are State and regional differences, these catchment groups are typically asked to:

- articulate their vision and objectives (Where do we want to go?);
- describe their catchment condition and identify the key regional challenges (Where are we now?);
- explain how they will implement their strategy (How do we go forward?); and
- identify targets for the implementation of management actions and for improvements in resource condition that will enable the assessment of progress towards plan objectives (How do we know what we have achieved and learned?).

Clearly, there are opportunities for social research to play an important role at each stage of the planning phase identified above. Cavaye (2003) has recently prepared a practical guide outlining how catchment groups might integrate social and economic issues into their regional plans. Potential roles for social research could include:

- contributing to processes that capture the range of stakeholder perspectives about possible futures for catchments;
- drawing on secondary and primary data sources to describe the social structure and trends across a catchment;
- employing processes that enable stakeholders to explore potential trade-offs inherent in many resource allocation decisions across different issues and parts of a catchment;
- drawing on a range research that would enhance the communication activities of catchment groups, the uptake of recommended practices for managing land and water degradation, and the efficacy of investment through community education;
- assisting groups to develop measures of progress that can be attributed to investments and actions undertaken through their catchment plans; and
- employing social impact assessment tools to predict and minimise the negative social impacts of proposed interventions, including changes to land use or resource access.

It is increasingly obvious that there are limits to the capacity of landholders to voluntarily affect required change at the landscape scale (Curtis 2000). Affecting behavioural change in private landholders is a complex task and experience suggests that no single instrument will address the underlying reasons for non-adoption (Vanclay 1997; Lockwood *et al.* 2001). As Dovers (1995) and Dovers and Mobbs (1997) emphasised, the challenge is to develop integrated packages that may include:

- legislation or regulations to create the institutional framework for management, set aside areas of land, and enforce standards and prohibitions;
- self regulation;

- research to clarify problems, develop solutions, and monitor environmental conditions;
- education to convince people of the need to change behaviour, gain support for policies, and ensure the ability to apply policy instruments; and
- economic measures such as charges, subsidies, penalties, and tradeable permits to assist efficient allocation of resources and equitable distribution of costs and benefits.

This research also recognised that regional catchments are, increasingly, the scale at which natural resource management occurs in Australia. As recent research in the Goulburn Broken Dryland (Curtis *et al.* 2000), Ovens Catchment (Curtis *et al.* 2002), and Wimmera Region (Curtis and Byron 2002) illustrated, there are also considerable differences at the sub-regional scale. To the extent that there are significant differences at the sub-regional scale, there will also need to be sub-regional differences in the policy mix implemented by the regional groups and other organisations (Curtis *et al.* 2001a).

Governments have assumed that, at least in part, poor adoption rates for recommended practices arose because landholders were unaware of important land degradation issues; lacked sufficient knowledge and skills; or had attitudes that emphasised short-term economic returns over maintaining the long-term health of the land (MDBC 1990; ASCC 1991). There has been a large investment of resources over the past decade in awareness raising and education programs, including those carried out by Landcare groups. There is credible evidence that these activities do contribute to increased awareness and understanding and that these changes enhance landholder capacity to adopt recommended practices (Vanclay 1992; Curtis and De Lacy 1996; Curtis *et al.* 2001a).

Some landholders have lifestyles and values that limit their response to approaches that focus on increasing agricultural production and profit maximisation (Barr *et al.* 2000; Curtis *et al.* 2001b). Non-farmers and retirees may respond less quickly to economic signals; be more averse to risking off-property income in on-property enterprises; and will probably have less time for property management (Barr *et al.* 2000). On the other hand, non-farmers may bring new ideas, skills and financial resources that contribute to the renewal of local communities and they may be more likely to respond to appeals for biodiversity conservation (Curtis and De Lacy 1996).

There is now abundant evidence that part of the explanation of low adoption is that many of the current recommended practices or enterprises are either unprofitable and/or unsustainable. Amongst other things, some of the recommended plant-based management systems “leak” water and contribute to ground water flows that mobilise salt (Stirzacker *et al.* 2000; Walker *et al.* 1999). Lack of confidence in recommended practices has been identified as an important constraint affecting adoption (Curtis *et al.* 2001b).

Low on-property income will constrain the capacity of landholders to respond to new opportunities. Over the past decade, many broad acre farming enterprises have been unprofitable using the FM 500 project benchmark of financial sustainability (Barr *et al.* 2000). The FM 500 benchmark assumed that a disposable family income exceeding \$50,000 per year was required to sustain a household and fund investment in a farm’s natural and capital resources (Rendell *et al.* 1996). There is increasing evidence that many rural landholders have limited on-property incomes and that this is a critical constraint to adoption (Barr *et al.* 2000; Curtis *et al.* 2001a). Poor returns from grazing have meant that landholders could not afford the remedial lime and fertiliser regimes required to maintain pastures and prevent the downward spiral in grass production that affects water uptake and eventually, farm income (Millar and Curtis 1997).



It is also unlikely that many dryland landholders will generate substantial income from new enterprises such as olives, wine grapes and farm forestry (Stirzacker *et al.* 2000; Curtis *et al.* 2000). Landholders are very reluctant to take on new enterprises that will involve them entering long-term agreements with powerful industry partners (Curtis and Race 1996). Problems also arise if recommended practices or new enterprises are complex, are perceived as being risky, do not fit with existing enterprises or conflict with existing social norms (Vanclay 1992; Curtis and Race 1996; Barr and Cary 2000).

Landholders are also increasingly aware that they are being asked to implement work that has community benefits in terms of biodiversity conservation, improved public health and protecting export income (agriculture and tourism) and infrastructure. They also understand that many of the problems that they are being asked to address have in part resulted from previous government policies. Establishment of the Natural Heritage Trust (NHT), with the Federal Government sharing the costs of large-scale on-ground work on private land, was an acknowledgment of the legitimacy of these arguments (Curtis and Lockwood 2000).

Discontinuity between the source and impact of issues, particularly those related to water degradation, adds a further complication. Many landholders in the upper reaches of catchments are either not experiencing these problems, believe they can live with them or are unaware or unconcerned about contributing to downstream impacts (Curtis *et al.* 2001a).

Australia has an ageing rural population with life expectancy increasing and younger people drifting from rural areas to the more prosperous and attractive lifestyles in urban centres (Haberkorn *et al.* 1999). We can no longer assume that a substantial proportion of the inter-generational transfer of properties will occur within families. Where family succession is unlikely, property owners may be less willing to invest in recommended practices or new enterprises. In an era of reduced farm profitability and lower land prices, particularly where demand for rural subdivisions is not high, some landholders may feel they are locked into living on their properties in retirement. With increasing life expectancy, this trend could delay inter-generational property transfer. These elderly property owners may also be less willing to invest in recommended practice or new enterprises. Guerin (1999) and Curtis *et al.* (2001a) found that there was no clear correlation between landholder age and adoption, and suggested this was an important area for future investigation.

Such pressures were expected to lead to the amalgamation of some smaller grazing properties into larger units. While some amalgamation has occurred, there has not been large-scale consolidation of properties, and the trend has not been uniform (Barr *et al.* 2000). Within commuting distance of larger regional centres, there has been considerable conversion and subdivision of existing holdings into lifestyle farming enterprises for retirees and people with off-farm work. Land prices based on rural residential use will work against the aggregation of smaller and less viable holdings and closer settlement may impose environmental controls on broad acre farming.

### **Need to conduct the survey**

Australians profiling regional communities have usually included attributes that measure some aspect of the four capitals: human capital (e.g. skills and education), produced-economic capital (e.g. financial resources and infrastructure), social capital (e.g. networks and links), and natural capital (e.g. landforms, plants and animals) (Webb and Curtis, 2002; Cavaye, 2003). Barr *et al.* (2000) used Census and other national data-bases to combine social and economic data to explore the structure of agriculture over time in the catchments of the Murray-Darling Basin. Using local government areas as the unit of analysis, this seminal study examined attributes such as farm size, farm family income, farmer age, entry and exit

from farming, and changes in farming family numbers, and clearly demonstrated that these attributes had changed over time.

The analysis of data collected through farm and household censuses can provide useful information, but as Schultz et al. (1999) and Curtis et al. (2001) demonstrated, these data are unlikely to satisfy catchment managers who need to understand the behaviour of the private landholders who control most of the land in their catchments. In the first instance, these national data collection processes are unlikely to address most of the topics for which data are needed. Furthermore, data are only available to the public in aggregated form, the smallest scale being census collector districts that combine data for about 200 households. Aggregation reduces the usefulness of data, particularly when sub-regional contexts are important, as for the Glenelg Hopkins region.

### **Topics and questions included in the mail survey**

Drawing on the above literature and given the constraints of a mailed survey (mainly space and the type of questions that can be effectively posed), the authors, in collaboration with our industry partners, identified the topics listed below for inclusion in the survey. Response options for each topic and any additional background information are also provided in the relevant section of this report.

- Assessment of issues affecting property and district.
- Values attached to property.
- Self-assessment of knowledge for different topics.
- Awareness of on-property salinity.
- Views about balancing production and resource conservation.
- Views about the importance of factors affecting decision making about changing management systems.
- Preferred funding arrangement for natural resource management activities.
- Sources of information about natural resource management.
- Involvement in planning related to family succession, property and business.
- Long-term plans for the property.
- Adoption of recommended practices.
- Other property data, including: property size, broad enterprise mix, remnant bush, and area under specific enterprises.
- Background socio-economic data, including: age, gender, education, occupation, on and off-property workload, on and off-property household income, Landcare membership, funding through government programs, time lived in district, level of equity in property.

### **Current Recommended Practices (CRP)**

A key purpose of collecting survey data in the Glenelg Hopkins region was to explore the key factors linked to adoption of current recommended practices (CRP).

Considerable energy was expended in identifying and operationalising (establishing the format of statements to be asked in the survey) the CRP to be included in the survey. This process took into account the:

- key NRM issues identified by the Glenelg Hopkins CMA's Regional Catchment Strategy;
- views of our industry partners;
- practicalities of a mail survey; and
- the results of pre-testing the survey with peers, agency partners and landholders.

There were 15 CRP included in the survey.

1. Time controlled or spell grazing.
2. Varying crop rotation according to soil test results.
3. Cropping using a rotation with pasture (e.g. lucerne).
4. Applying lime.
5. Completing soil tests in paddocks.
6. Only watering stock from troughs, tanks or dams.
7. Fencing to allow management according to land classes.
8. Fencing waterways to manage stock access.
9. Fencing native bush to manage stock access.
10. Encouraging regrowth of native vegetation.
11. Cropping using minimum tillage practices.
12. Sowing perennial pasture and lucerne.
13. Planting trees and shrubs (including direct seeding).
14. Time spent to control non-crop weeds and pest animals.
15. Testing water quality of main water source on property.

### **The mail survey process**

The following points briefly outline the sampling method used in the mail survey to landholders in the Glenelg Hopkins region.

- BRS employed a consultant to approach the eight municipalities to cooperate and provide landholder details within the survey region using their local government rural property lists.
- Local government property data was provided to BRS on the provision that it be used for this survey only and that the lists be destroyed at the conclusion of the survey process.
- All properties less than 10 ha were excluded from the potential survey sample.

- These names and addresses were forwarded on to BRS, where duplicate names were identified and removed from the sample.
- Tables containing rural property information were then entered into a Geographic Information System (ArcView GIS) and each property assigned to one of 32 sub-catchments.
- A stratified random sample (spread evenly across the region) of 1,943 landholders was obtained from the remaining names and addresses.

The sampling process was stratified to provide data across the 32 sub-catchment areas identified in the Glenelg Hopkins Regional Catchment Strategy. As the size and population within these sub-catchments varied widely a stratified sampling strategy was used to enable comparisons to be made across these sub-catchments. The following guidelines were used to develop the sample.

1. If a sub-catchment contained 50 or fewer properties (over 10 ha) all of these were included in the sample.
2. If a sub-catchment contained between 51 and 200 properties a random selection of 50 properties was included in the sample.
3. If a sub-catchment contained between 201 and 300 properties a random selection of 75 properties was included in the sample.
4. If a sub-catchment contained over 300 properties a random selection of 100 properties was included in the sample.

This approach resulted in a final sample of 1,943 landholders.

The survey design and mail out processes were undertaken using Dillman's (1979) *Total Design Method*. The survey was pre-tested by peers and a project steering committee comprised of community representatives, Glenelg Hopkins CMA, state agency, private consulting firm, and university staff. A draft version of the survey was pre-tested with three focus groups comprised of representatives from a cross section of landholders in the Glenelg Hopkins region. Feedback from the workshop sessions resulted in some important refinements to the survey instrument.

The total design method for mail surveys involves using a series of survey mail outs and reminder cards over a period of almost two months. The first mail out of surveys is followed by a reminder card sent out one week later, with a second and third reminder card mailed out each consecutive week. Four weeks after the initial survey mail out, another copy of the survey and a brief letter are sent to landholders that have not responded. The second mail out is followed by another reminder card one week later.

Surveys were addressed to property owners identified on the local government rural property owner lists. In the majority of cases only a surname and an initial were provided. It was therefore impossible to tell the gender balance in the survey sample.

After a period of approximately 10 weeks a final survey response rate of 64% was achieved [Figure 3]. Of the 1,943 surveys sent out to landholders in the Glenelg Hopkins 1,081 were completed and returned, 198 were returned incomplete as the person no longer owned or managed the property or they were too ill to complete the form, and 64 were returned to sender as the addressee was no longer living on the property. The achievement of a high response rate (double that achieved by many mail surveys) provides considerable confidence that findings from this research are representative of the broader population of landholders in the Glenelg Hopkins region.

As highlighted in Figure 4 there was a good geographical spread of survey respondents across the region. Keeping in mind that the survey targeted only rural landholders the limited number of respondents in the far eastern corner corresponds with the city of Ballarat and surrounding area. There is also a small area in the upper middle section that corresponds with the Grampians National Park. The lack of responses from landholders in the upper west corner of the region reflects a small section of the West Wimmera Shire that extends into the Glenelg Hopkins region. For most of the properties in the West Wimmera Shire there was no spatial information available and it was therefore impossible to determine the properties that were within the Glenelg Hopkins region. Almost all of the West Wimmera Shire is located in the Wimmera region where landholders were surveyed in 2002 (Curtis and Byron 2002).

FIGURE 3 - SURVEY RESPONSE RATE

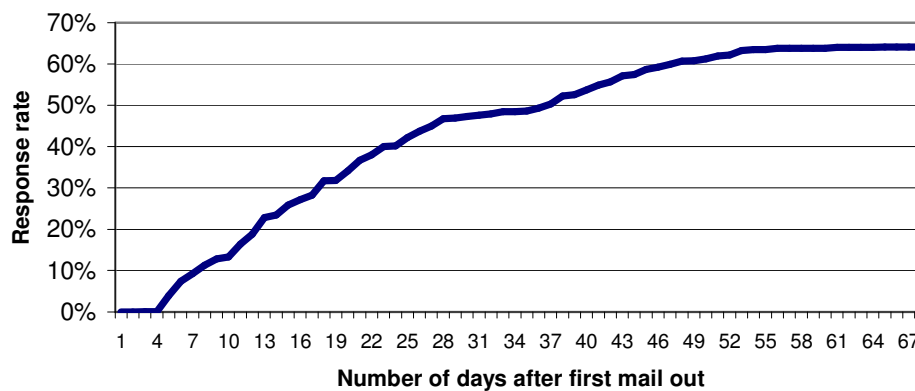
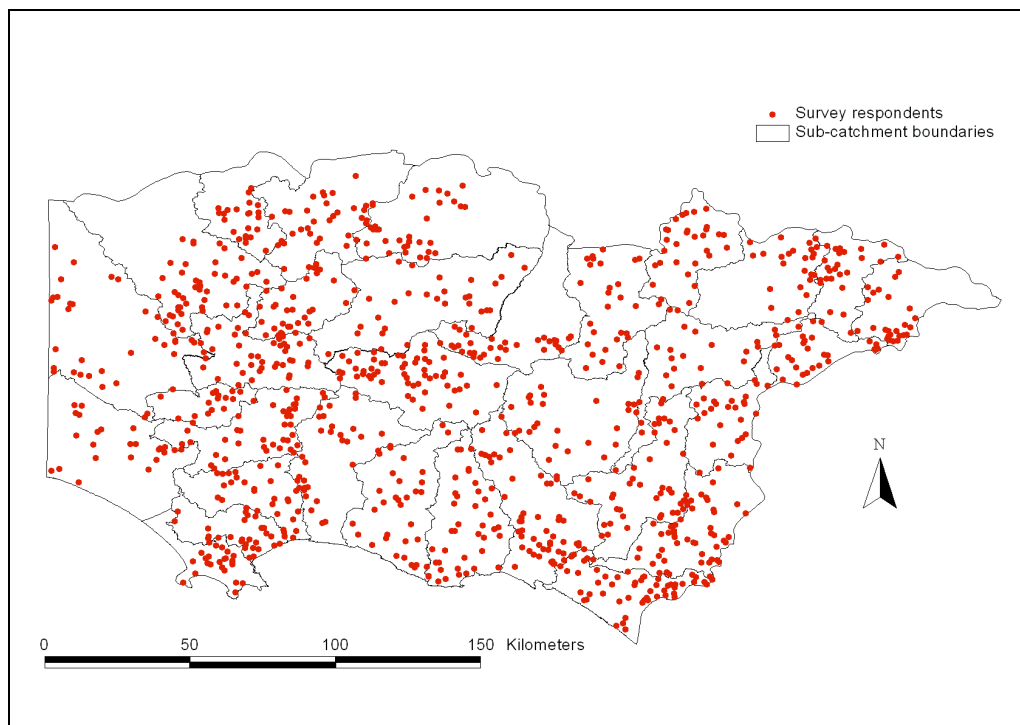


FIGURE 4 - GEOGRAPHIC SPREAD OF SURVEY RESPONDENTS



## Data Analysis

Findings in this report have been presented so they can be interpreted without understanding the statistical methods used. However, for those who are interested to know how we approached the task of data analysis, a brief explanation of the statistical methods used is given below.

Statistical analysis included in this report consists of descriptive statistics, Spearman rank order correlations, Gamma correlations, non-parametric chi-square tests, binary logistic regression, alpha estimation, and paired samples T test. All statistical analyses used the SPSS software package.

Spearman rank order correlations were used to identify hypothesised relationships between variables. For example, higher on-property profitability was hypothesised as being linked to larger property size. Spearman rank order correlations place respondents on each variable from highest to lowest and determine the extent that there is a relationship between ranks on the two variables. For cases exploring the relationship between ordinal variables, Gamma correlations were used. A negative correlation coefficient or  $r_s$  indicates that a higher score on one variable is linked to a lower score on the other. The value of  $r_s$  can range from 1 to -1 with higher values (either negative or positive) indicating a stronger relationship.

Kruskal-Wallis chi-square tests were used to determine the presence of significant differences across continuous variables for two or more independent groups. For example, the Kruskal-Wallis chi-square was used to determine if there were any significant differences in property size between those adopting a CRP and non-adopters. The value of the chi-square statistic or  $\chi^2$  indicates the strength of the difference between groups on a given variable with a higher value indicating a larger difference. However, the  $\chi^2$  value does not indicate the direction of the relationship. The Pearson chi-square test was used to determine the presence of differences across ordinal or binomial data for two or more independent groups. For example, the Pearson chi-square test was used to determine if there were significant differences between Landcare members and non-Landcare members on the adoption of CRP.

The sign test was used to identify significant differences in the rating of a number of related variables. For example this test was used to compare the level of concern about the economic and environmental impacts of pest animals and plants. Higher Z values indicate a larger difference.

Binomial logistic regression was used to better determine the extent to which a number of independent variables or factors identified by correlation or chi-square tests contributed to the presence or absence of a dependent variable, in this instance adoption of CRP. The Wald statistic provides a measure of the effect of each independent variable on the dependent variable, with higher scores indicating a greater effect. The Exp(B) or odds ratio represents the change in the odds of adoption given a unit increase in the independent variable. Odds ratios above one indicate a positive relationship, while scores below one represent a negative relationship or decreased likelihood of adoption.

In all analyses the p statistic represents the significance level where a value below 0.05 is considered to be statistically significant. A p value below 0.05 means that it is unlikely (probability of less than 5%) that the observed relationship or difference has occurred purely by chance.

## Guide to interpreting results from binary logistic regression

Example of results:

*Using binary logistic regression, adoption of the CRP fenced to allow management by land classes was significantly linked to respondents who:*

- *said the property was their primary place of residence (Wald=11.536,  $p=0.001$ ,  $\text{Exp}(B)=1.902$ );*
- *said they had work funded by government undertaken on their property in the last five years (Wald=21.888,  $p<0.001$ ,  $\text{Exp}(B)=2.174$ );*
- *were involved or further advanced in preparing a whole farm plan (Wald=28.579,  $p<0.001$ ,  $\text{Exp}(B)=1.311$ );*
- *were more confident that action at the property level could improve the environment (Wald=8.493,  $p=0.004$ ,  $\text{Exp}(B)=1.628$ ); and*
- *had higher knowledge about the benefits of ground cover in maintaining soil health and productivity (Wald=10.905,  $p=0.001$ ,  $\text{Exp}(B)=1.405$ ).*

*These variables accounted for approximately 19% of the variation in adoption of the CRP fenced to allow management by land classes (Nagelkerke pseudo  $R^2=0.191$ ).*

1. Wald (or the Wald statistic) represents the strength of the relationship between two variables with higher values indicating a stronger relationship. That is, the variable that is most strongly linked to adoption of a particular CRP is the one with the highest Wald statistic.
2.  $p$  (or the probability) represents the probability that the observed relationship occurred purely by chance. For example, a  $p$  value of 0.001 indicates that the observed relationship has a one in a thousand chance of occurring purely by chance. Typically a  $p$  value of below 0.050 (or a 95% confidence interval) is used to indicate a significant relationship.
3.  $\text{Exp}(B)$  (or the odds ratio) represents the odds of a one unit change in the binary variable (in this instance non-adoption to adoption) given a one unit increase in the other variable. A value above one reflects an increased likelihood of adoption while a value below one indicates a reduced likelihood of adoption. For example, respondents who had government funded work on their property were 2.174 times more likely to adopt the CRP fenced to allow management by land classes. That is, the odds of adoption increased by 117.4%. Where the other variable has more than two levels (e.g. ranges from strongly agree to strongly disagree) the odds ratio reflects the likelihood of adoption versus non-adoption for each unit change on the other variable. For example, respondents who agreed that action at the property level could improve the environment were 1.628 times more likely to report adopting the CRP fenced to allow management by land classes than those who gave a neutral response. In turn, the odds of adoption for those who agreed strongly were 1.628<sup>2</sup> or 2.650 times higher than those who gave a neutral response.
4. The Nagelkerke pseudo  $R^2$  value is an approximation of combined explanatory power of all the individual variables in the model to the adoption of a CRP. In the example above the three variables account for approximately 19% of the difference between respondents who adopted the CRP and those that did not.

## **Limitations of this research**

No single instrument is able to collect data on all possible variables and therefore, some variables were not addressed in this research. Ultimately, professional judgement was used to determine the variables included in the survey.

Every research instrument has its strengths and weaknesses. A mail survey allows researchers to collect information across a large number of respondents and at a much lower cost than would be possible with face-to-face interviews. However, the mail survey does not allow for researchers to use follow-up questions to explore respondents' motivations or decision-making processes.

In this research it was not possible to collect information across time. This is an important limitation given the results of Barr *et al.* (2000) that identified important temporal trends. The 2003 Glenelg Hopkins survey should be followed by another, say in three to five years time. It would then be possible to identify trends over time.



## 5. Findings by research topic

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### Assessment of issues

Landholders were asked to assess the importance of a range of social, environmental and economic issues in their local district or on their property. The issues covered in the survey were identified through discussions with the project steering committee and at the survey pre-test workshops. Respondents were asked to rate the importance of each issue listed in the survey as either “very important”, “important”, “of some importance”, “minimal importance” and “not important”. To simplify the presentation of this data, these five responses have been collapsed into three categories – “important” (combining very important and important), “some” (of some importance) and “unimportant” (combining not important and minimal importance).

### Key findings

- Social issues such as the movement of young people out of the district, availability of important services and the decline of small towns were rated as the most important issues affecting respondents’ local district.
- The cost of managing weeds and pest animals was the highest rated natural resource management issue with just over two thirds of respondents reporting this was an important issue in their district.
- The majority of respondents also rated the availability of surface or groundwater for agriculture as an important issue.
- Uncertain or low returns limiting investment in the long-term health of their property and the management of pest plants and animals on Crown land affecting their property were the only two issues most respondents said were important on their property.
- Dryland salinity, native vegetation decline, water quality and lack of awareness about Aboriginal cultural heritage were not rated as important issues by most landholders surveyed.

### Issues affecting the local district

Only six of the 19 issues included in the mail survey were rated as important issues affecting the local district by more than half of all respondents.

Findings from the survey highlighted considerable concern about the viability of rural communities in the Glenelg Hopkins region with four of the top five issues related to community decline. The highest rated issue was the movement of young people out of the district, followed by the availability of important services. Over half of all respondents also rated the decline of small towns and reduced employment opportunities as important issues. Property amalgamation appears to be part of the explanation for community decline with just under half of all respondents indicating this was an important issue in their district [Figure 5].

The identification of weeds and pest animals and water allocation as key issues in the Regional Catchment Strategy was confirmed by survey data. The cost of managing weeds and

pest animals and the availability of surface or groundwater for agriculture were rated as important issues affecting the local district by the majority of respondents [Figure 5].

While not rated as important issues by most respondents, at least one third said soil acidity, plantations reducing beneficial groundwater recharge, decline in soil health, dryland salinity, regulations limiting landuse options, nutrient and chemical runoff affecting water quality, and altered flows threatening the health of waterways were important issues in the district [Figure 5].

Less than one third of respondents said that dryland salinity undermining productive capacity, removal of native vegetation, property subdivision, the spread of urban development in coastal areas and lack of awareness about Aboriginal cultural heritage sites were important issues in their district [Figure 5].

These findings have important implications for efforts to engage landholders from the Glenelg Hopkins region in natural resource management activities. Firstly, it is important to note that many landholders are unlikely to be interested in activities aimed solely at addressing some of the priority issues identified in the Regional Catchment Strategy including dryland salinity, water quality, decline in biodiversity and cultural heritage management. Secondly, to the extent that the decline of rural communities continues, the capacity of landholders within the Glenelg Hopkins regions to implement strategic and coordinated action will be undermined.

While targeted education and awareness raising activities may help raise the profile of natural resource management issues, efforts to engage landholders should draw on innovative approaches that not only outline the environmental and/or economic advantages of new practices and production systems but highlight links to the social wellbeing of rural communities.

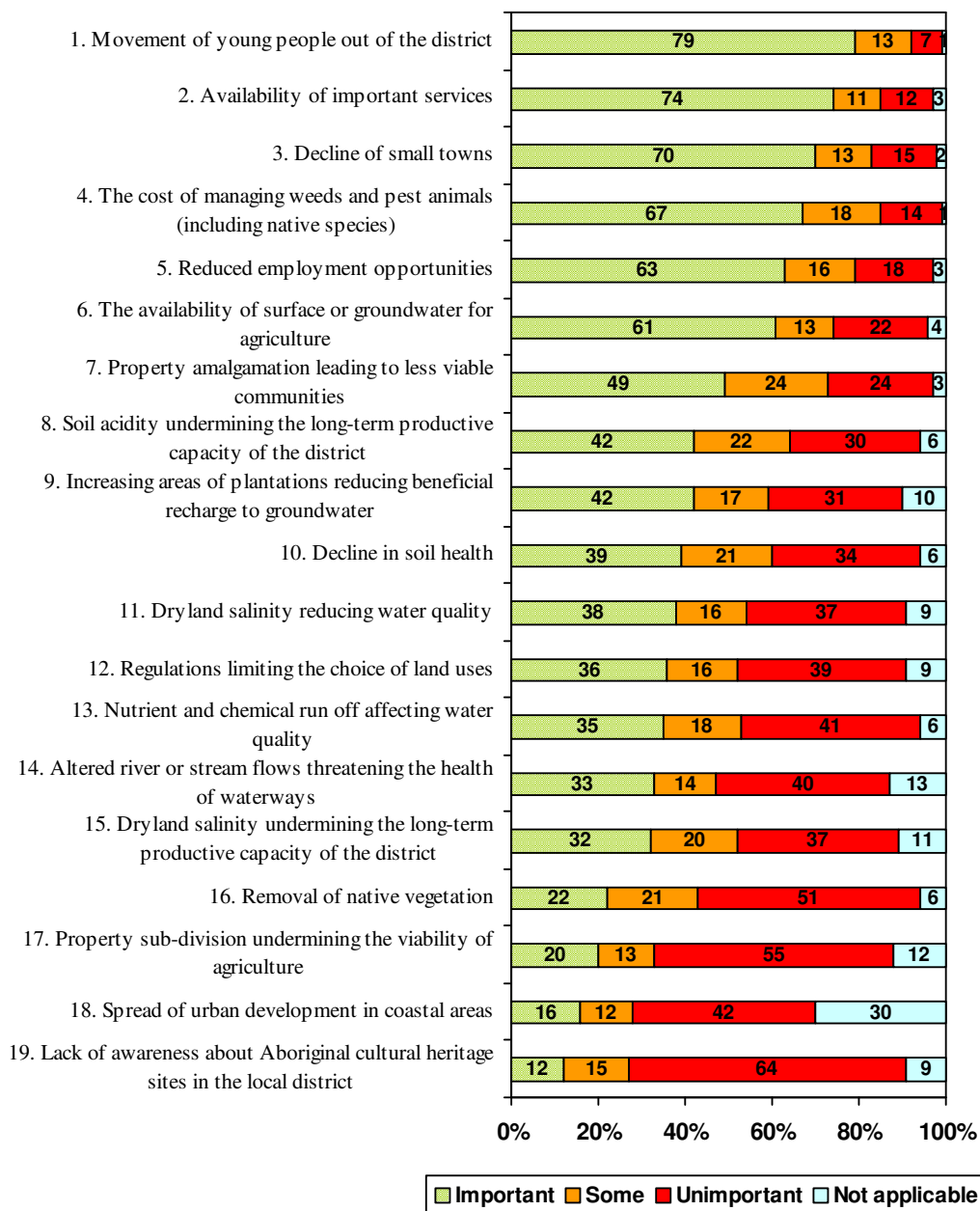
There were a number of significant differences in respondents' assessment of issues affecting their local district across the 32 sub-catchments in the Glenelg Hopkins region [Appendix 1 & 2].

#### **Box 1 – Assessment of issues in district and adoption of CRP**

There were two significant links between respondents' assessment of issues on their property and adoption of CRP.

- Respondents who said that dryland salinity was an important issue undermining the productive capacity of their district were significantly more likely to adopt the CRP encouraged regrowth of native vegetation.
- Respondents who said the cost of managing weeds and pest animals was an important issue were significantly more likely to adopt the CRP conducted work to control pest animals and non-crop weeds.

FIGURE 5 – ASSESSMENT OF ISSUES AFFECTING THE DISTRICT



### Issues affecting respondents' property

When asked about the issues affecting their property, uncertain or low returns limiting investment in the long-term health of the property and the management of pest plants of Crown land were the highest rated issues with approximately half of all respondents indicating they were important issues on their property. Just under half of all respondents also said that regulations affecting the employment of labour on their property and government “red tape” limiting their interest in applying for assistance to undertake onground works were important issues at the property level. Over half of all respondents said that each of these issues was an important factor affecting their property [Figure 6].

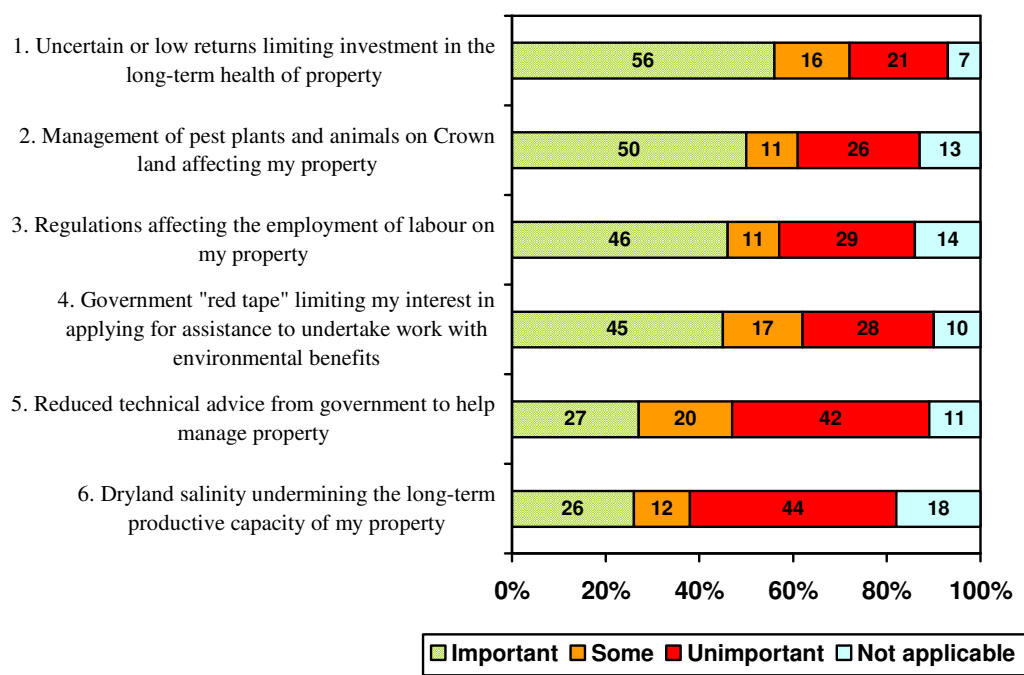
Survey respondents indicated limited concern about the impacts of dryland salinity on the productive capacity of their property and reduced technical advice available from government [Figure 6].

There were some significant differences across the 32 sub-catchments with respect to landholders' assessment of issues affecting their property [Appendix 1 & 2].

### Box 2 – Assessment of issues on-property and adoption of CRP

Respondents who said that reduced technical advice from government to help manage their property was **not** an important issue were significantly more likely to have adopted the CRP cropped using minimum tillage.

FIGURE 6 – ASSESSMENT OF ISSUES AFFECTING RESPONDENTS' PROPERTY



## Comparison of landholder identified salinity and salinity discharge maps

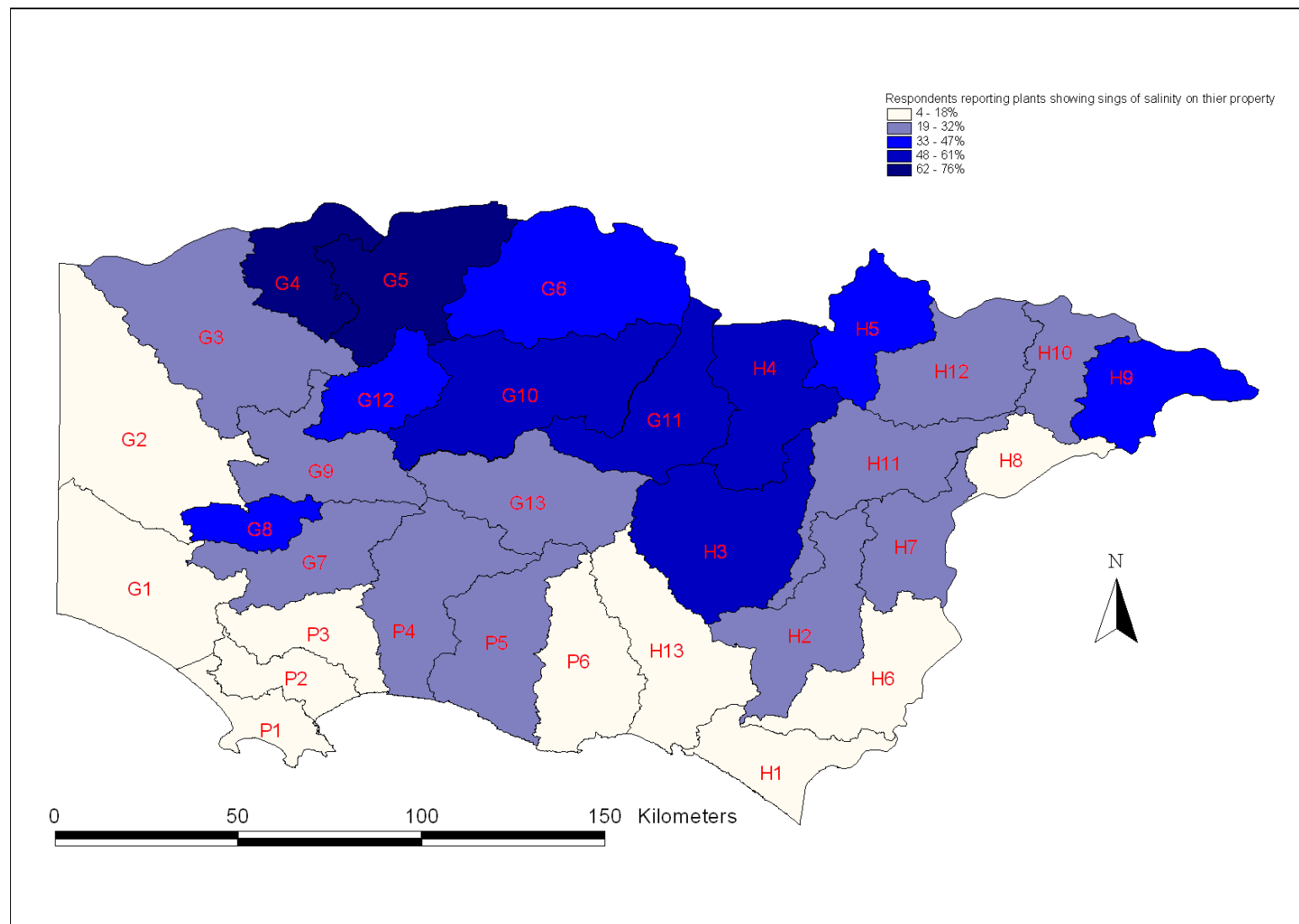
The mail survey asked respondents if they had any areas on their property where plants were showing signs of salinity. Respondents who said there were areas on their property affected by salinity were then asked to indicate the area of land affected.

Just under 300 respondents (292) or 29% of the landholders surveyed reported areas on their property where plants were showing signs of salinity [Figure 8]. The median area reported as showing signs of salinity was 5 ha with a total area of just over 7,000 ha or approximately 1.3% of the total area surveyed.

Landholders who identified areas affected by salinity on their property were significantly more likely to report that salinity reducing water quality in their district (46% compared to 35%;  $\chi^2 = 38.524$ ,  $p < 0.001$ ), undermining the productive capacity of their district (41% compared to 28%;  $\chi^2 = 53.538$ ,  $p < 0.001$ ), and undermining the productive capacity and their property were important issues (47% compared to 18%;  $\chi^2 = 156.557$ ,  $p < 0.001$ ).

As highlighted in Figure 7 and Appendix 1, there were significant differences in the proportion of respondents who identified signs of salinity on their property across the 32 sub-catchments ( $\chi^2 = 166.488$ ,  $p < 0.001$ ). The proportion of landholders who identified signs of salinity ranged from 76% in G4 and G5 to 4% in H1 and P1.

FIGURE 7 – RESPONDENTS’ ASSESSMENT OF SALINITY ACROSS SUB-CATHMENTS



Information on respondents' assessment of salinity was entered into a geographic information system (GIS) where it was overlaid and compared with salinity discharge sites identified using the Groundwater Flow Systems. For more information about the salinity discharge maps please refer to Dahlhaus et al. (2002). A one kilometre buffer was used around the discharge sites to provide some margin of error when comparing the location of these sites with landholder identified salinity sites.

Of the 292 landholders who reported areas on their property where plants were showing signs of salinity, only 22% (63) were located within one kilometre of a discharge site. That is, 78% of the landholder identified salinity sites were not predicted by the salinity discharge map [Figure 9]. While it is unlikely that landholders have deliberately overstated the extent of salinity, some landholders may have failed to distinguish between waterlogged and saline affected areas. To the extent that landholders have correctly identified areas affected by salinity, the salinity discharge map failed to predict the majority of sites affected by salinity in the Glenelg Hopkins region.

When looking at just those respondents whose property was within one kilometre of a discharge site (133) only 47% (63) said there were areas on their property where plants showed signs of salinity [Figure 10]. That is, just over half of the respondents whose property was within one kilometre of a discharge site said that there were no areas on their property where plants showed signs of salinity.

There are a number of possible explanations for these discrepancies including, the discharge map overestimates the extent of salinity in some areas and underestimates it in others, landholders outside discharge sites are more likely to falsely identify areas affected by salinity and those near discharge sites are more likely to be unaware of salinity on their property or a combination of both of these factors. The discrepancies between landholder identified saline areas and the discharge map appears to warrant further investigation.

### **Box 3 – Respondents assessment of salinity and adoption of CRP**

Respondents who said that there were areas on their property where plants showed signs of salinity were significantly more likely to adopt the CRP:

- Conducted work to control pest animals and non-crop weeds; and
- Fenced to manage stock access to waterways.

FIGURE 8 – RESPONDENTS' ASSESSMENT OF SALINITY ON THIER PROPERTY

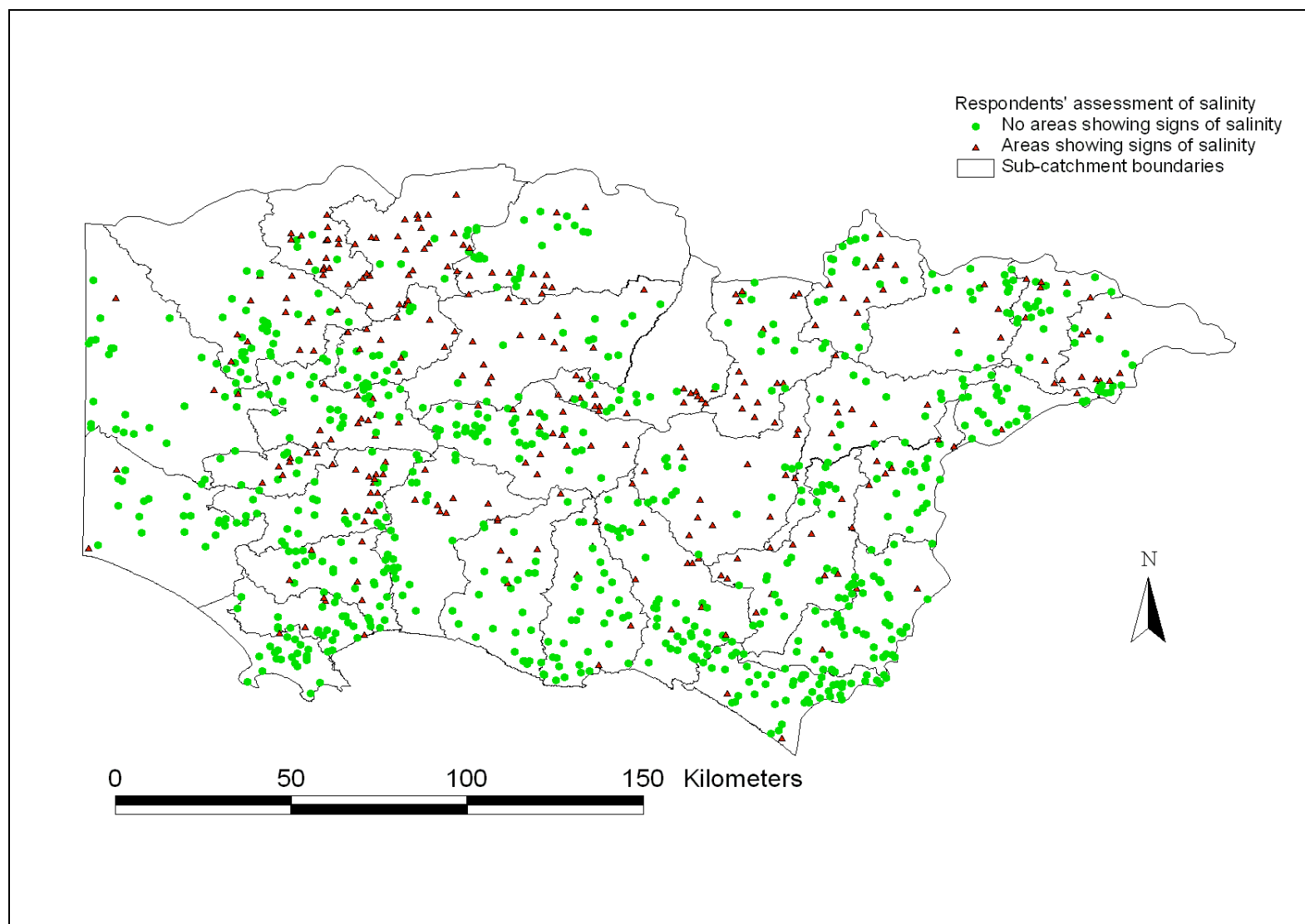




FIGURE 9 – LANDHOLDER IDENTIFIED SALINITY SITES COMPARED AGAINST DISCHARGE MAPS

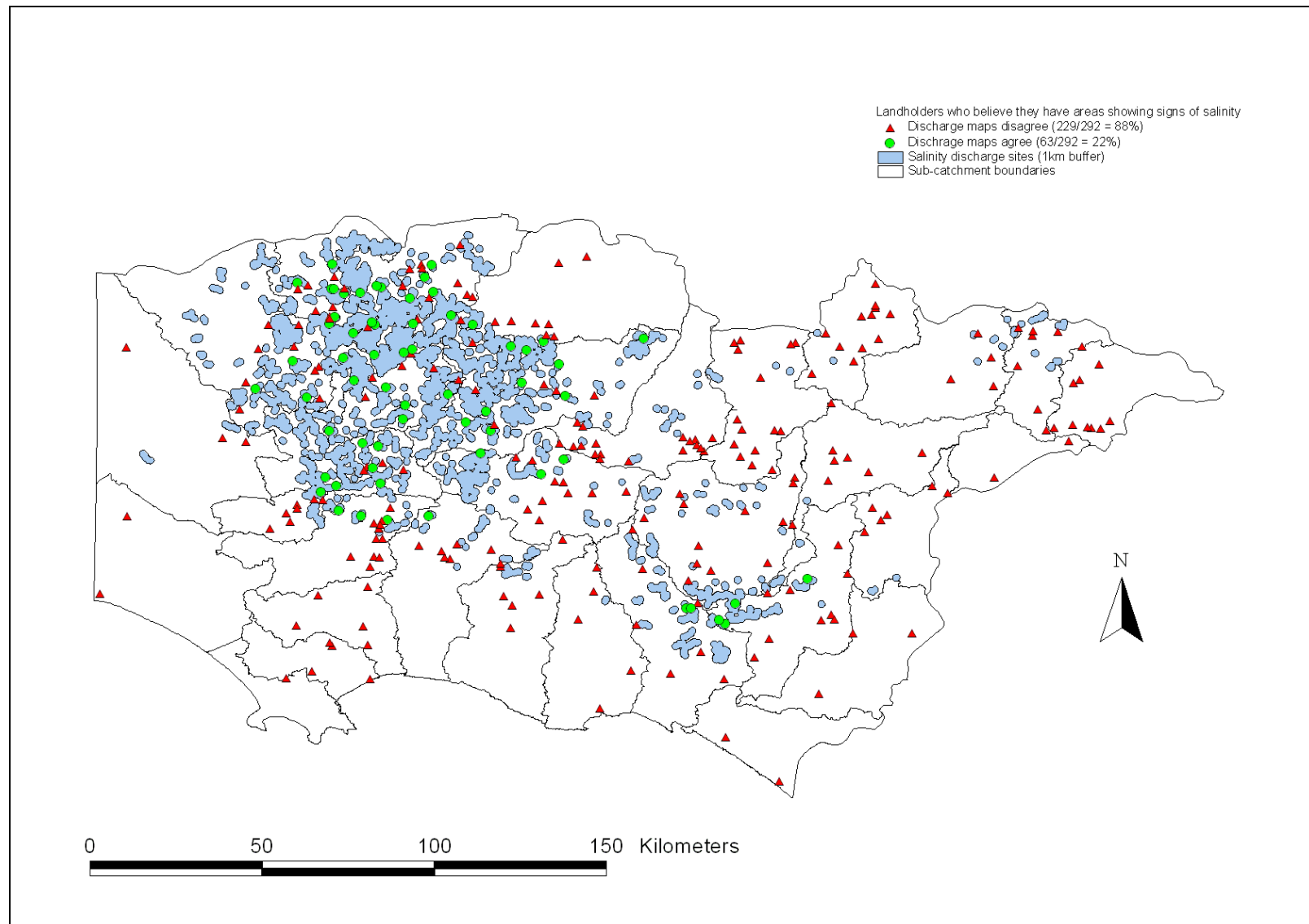
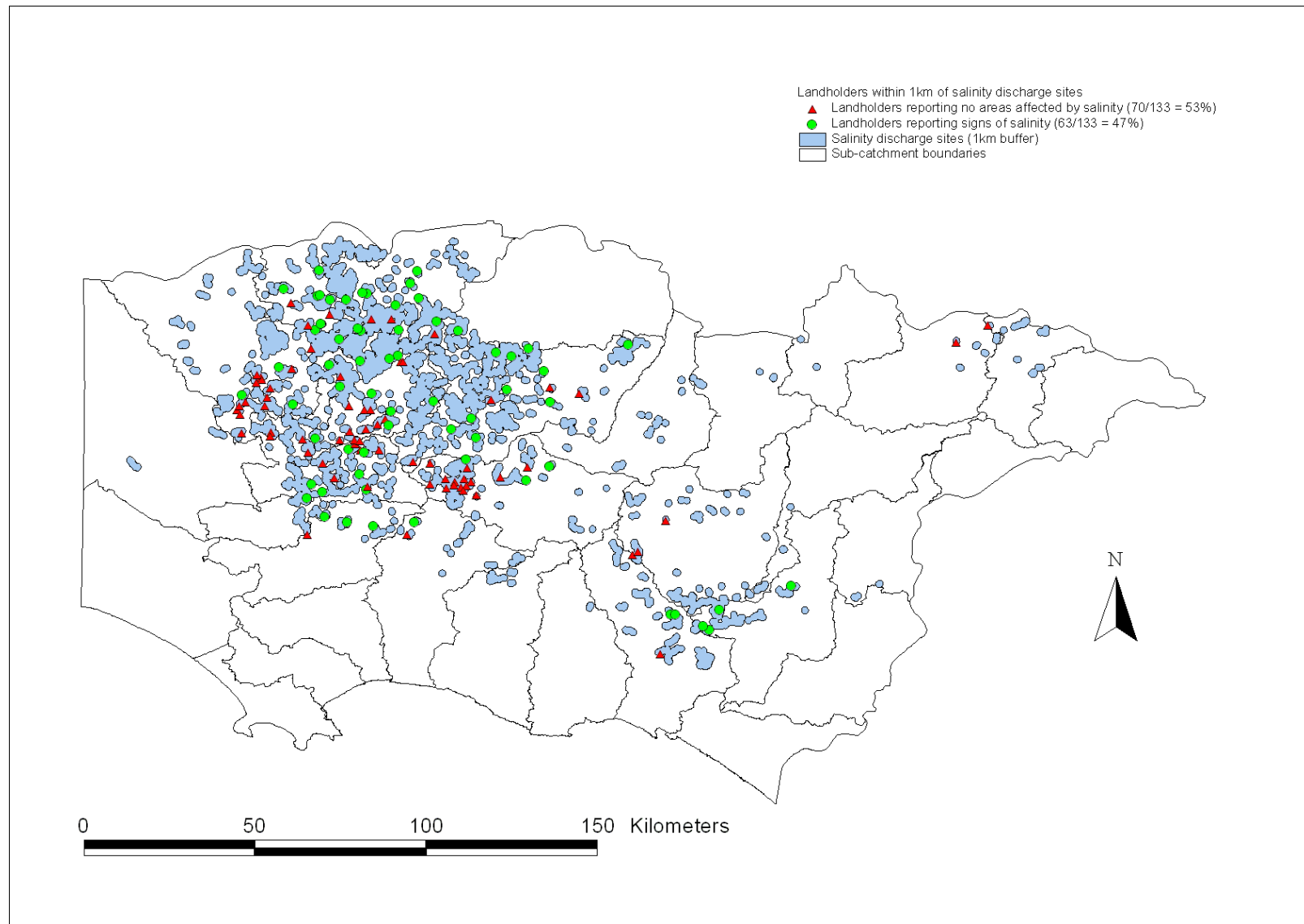


FIGURE 10 – LANDHOLDERS AWARENESS OF SALINITY COMPARED TO DISCHARGE MAPS



## Values attached to property

The mail survey included a range of statements exploring the values landholders in the Glenelg Hopkins region attached to their property. Respondents were asked to indicate the importance of a range of potential values using a five-point scale. The response options were “very important”, “important”, “of some importance”, “minimal importance” and “not important”. As in the previous section these options have been collapsed into three categories to simplify presentation – “important” (combining very important and important), “some” (of some importance) and “unimportant” (combining not important and minimal importance).

### Key findings

- A very wide range of social, environmental, and economic values were attached to respondents’ property. Being able to pass the property on in better condition, being an attractive place to live and providing a sense of accomplishment from building/maintaining a viable business were all equally rated as the most important values of respondents’ properties.
- A range of other lifestyle values were highly rated by respondents with around three quarters of respondents indicating that being able to work for themselves, providing the lifestyle they want, being a great place to raise a family, being an attractive place to live, and being part of a rural community were important values attached to their property.
- Most respondents also said that providing a sound long-term economic investment, providing most of the household income, contributing to the local economy, being an asset that will fund retirement were important aspects of their property.
- Contributing to the environmental health of the district was also a value most respondents attached to their property.
- Providing a break from their normal occupation and providing the only job they have ever done were not rated as important aspects of their property for most respondents.

Landholders in the Glenelg Hopkins region attributed a wide range of environmental, economic, and social values to their property. The three values that were all equally rated as the most important value highlight this diversity. Survey data highlighted that most landholders in the Glenelg Hopkins have a stewardship ethic with over three quarters of respondents (81%) saying that being able to pass their property on in better condition was an important value of their property. Eighty-one percent of respondents also said that being an attractive place to live and providing a sense of accomplishment from building/maintaining a viable business were important values attached to their property [Figure 11].

The lifestyle benefits of living and working on a rural property appear to be one of the most important set of values attached to respondents’ properties. Over 70% of respondents also reported that the freedom of being self employed, providing the lifestyle they want, being a great place to raise a family and being part of a rural community were important values of their property [Figure 11].

A range of other economic values were also attached to landholders’ property with over half of all respondents indicating that providing a sound long-term economic investment, providing most of their household income, contributing to the local economy and being an asset that will fund their retirement were important [Figure 11].

Survey data also highlighted that most respondents (56%) said that contributing to the environmental health of the district was an important function of their property [Figure 11].

Providing a break from their normal occupation and being the only job they had ever done were the least important values attributed to respondents' properties in the Glenelg Hopkins region [Figure 11].

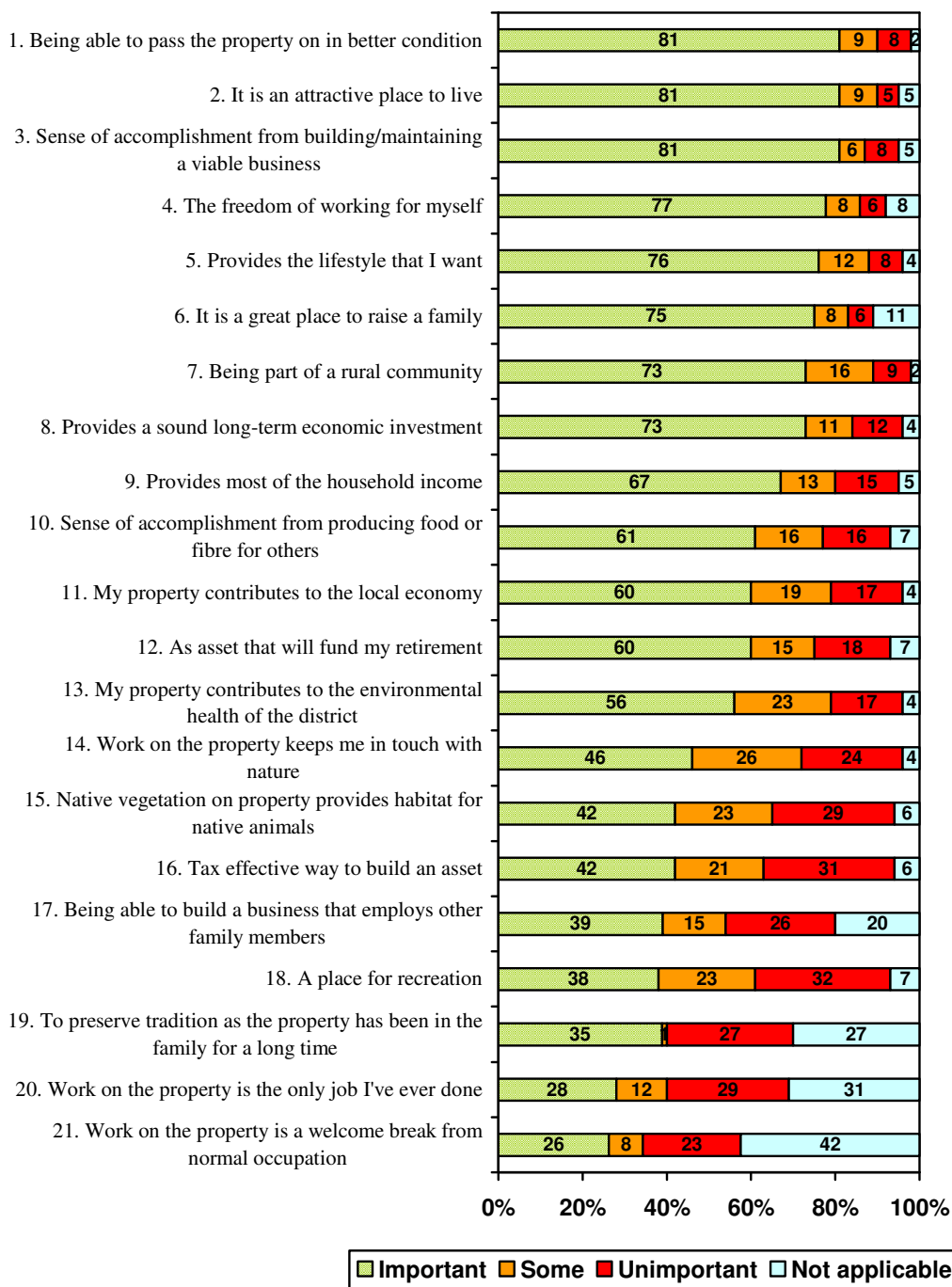
Attempts to appeal to landholders in the Glenelg Hopkins region need to consider the broad range of social, economic and environmental values attached to property. In particular there needs to be careful consideration about the potential impacts to landholders' lifestyle when promoting or developing natural resource management practices and strategies. While often the focus of attempts to improve natural resource management will be on the potential benefits to productivity and the environment, findings from this survey highlight that any impacts (either perceived or real) on the lifestyle of landholders are likely to have an important bearing on any decision making process. That is, even if a particular practice is seen as being economically and environmentally advantageous, landholders will be less likely to implement this practice if they think it will have an adverse impact on their lifestyle. On the other hand, the likelihood of respondent adopting a practice will be enhanced where potential lifestyle benefits of that practice can be demonstrated.

There were a number of significant differences across the 32 sub-catchments in terms of the values respondents attached to their property [Appendix 1 & 2].

#### **Box 4 – Values attached to property and adoption of CRP**

There were no significant links between the values respondents attached to their property and the adoption of CRP included in this survey.

FIGURE 11 – VALUES ATTACHED TO PROPERTY



## Knowledge

Self-assessment is a widely accepted approach to gathering information about people's knowledge of natural resource management (Shindler and Wright 2000). In this study, respondents were asked to rate their knowledge about 20 topics relating to major natural resource management issues in the Glenelg Hopkins region. For each statement included in the survey respondents were asked to select the best response option from "very sound knowledge (could give a detailed description to others)", "sound knowledge", "some knowledge", "very little knowledge" and "no knowledge". For presentation purposes, these five options have been assigned into three categories, "sound knowledge" (combining sound knowledge and very sound knowledge), "some knowledge" and "limited knowledge" (combining no knowledge and very little knowledge). A not applicable option was included for instances where knowledge about a specific topic was not relevant to respondents (for example topics related to specific land uses or enterprises).

### Key findings

- The only natural resource management topic where at least half of the respondents said they had sound knowledge was legislation about the on-property handling of chemicals.
- Respondents reported more moderate knowledge about the effects of unrestricted stock access, the benefits of ground cover to maintain soil health, the benefits of pastures in crop rotation, benefits of establishing local native plants, the benefits of vegetation in waterways, how to recognise salinity, and the benefits of retaining native vegetation.
- The survey highlighted limited knowledge about Aboriginal land management activities, who to contact for advice about managing Aboriginal cultural heritage sites, the major NRM strategies of the Glenelg Hopkins CMA, and the processes leading to soil acidification.

There was only one topic where at least half of all respondents said they had a sound level of knowledge. That topic was legislation about the on-property handling of chemicals [Figure 12].

Respondents reported more moderate knowledge about the effects of unrestricted stock access on waterways and native vegetation, the benefits of ground cover to maintain soil health, the benefits of pastures in crop rotation, the environmental benefits of establishing local native plants, the ability of vegetation in waterways to improve water quality, how to recognise the signs of salinity, and the benefits of retaining or improving the condition of native vegetation [Figure 12].

For all other topics less than one third of respondents indicated that they had a sound level of knowledge. Landholders in the Glenelg Hopkins reported particularly low levels of knowledge about:

- the land management activities of Aboriginal communities in the district (68% said little or no knowledge);
- who to contact for advice about managing Aboriginal cultural heritage sites on private property (65% said little or no knowledge);

- the major NRM strategies of the Glenelg Hopkins CMA (58% said little or no knowledge); and
- the processes leading to soil acidification (45% said little or no knowledge) [Figure 12].

Given the earlier finding that most respondents reported only limited concern about the potential impacts of many natural resource management issues it is encouraging that most landholders in the Glenelg Hopkins region said they had at least some knowledge across many of the topics covered in the survey. At the same time, the finding that there was only one natural resource management issue where at least half of the respondents reported a sound level of knowledge highlights the need for further investment in targeted education and awareness raising activities. An important part of these strategies should be to provide more convincing evidence of the current and potential risks and the need to undertake mitigating action before a crisis point is reached. As outlined earlier in this report, these education and awareness raising activities should also attempt to highlight benefits across the broad range of social, economic and environmental values.

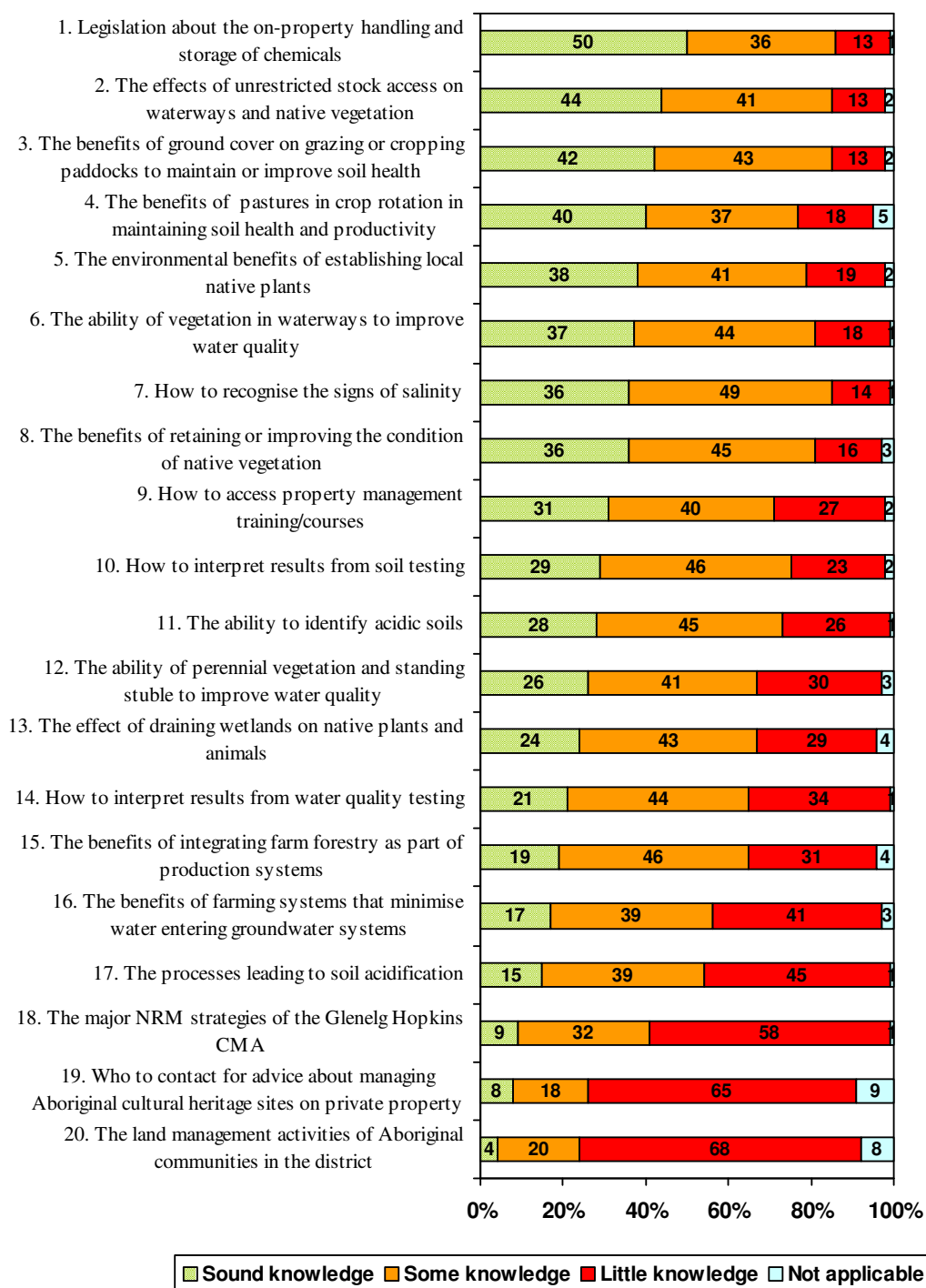
There were significant differences in respondents' assessment of their knowledge about a range of natural resource management topics across the 32 sub-catchments [Appendix 1 & 2].

#### **Box 5 – Knowledge and adoption of CRP**

Analysis highlighted some links between knowledge and adoption of CRP.

- Higher knowledge about how to interpret results from soil testing was significantly linked to adoption of the CRP record of soil test results for paddocks.
- Higher knowledge about how to interpret results from water quality testing was significantly linked to adoption of the CRP tested water quality of main water sources.
- Higher knowledge about the benefits of ground cover in maintaining soil health and productivity was significantly linked to adoption of the CRP fenced to allow management by land classes.
- Higher knowledge about the benefits of vegetation in waterways and gullies to improve water quality was significantly linked to adoption of the CRP encouraged regrowth of native vegetation.
- Higher knowledge about the ability of perennial vegetation and standing stubble to improve water quality was significantly linked to adoption of the CRP cropped using minimum tillage.
- Higher knowledge about how to identify acidic soils was significantly linked to adoption of the CRP cropped using a rotation based on soil test results.
- Higher knowledge about the effects of draining wetlands on native plants and animals was significantly linked to adoption of the CRP native bush fenced to manage stock access.

FIGURE 12 – KNOWLEDGE ABOUT NATURAL RESOURCE MANAGEMENT





## Attitudes towards natural resource management

A series of 10 statements explored landholders' attitudes to the management of natural resources in the Glenelg Hopkins region. For each statement respondents were asked to choose a response option from "strongly agree", "agree", "not sure", "disagree" and "strongly disagree". These response options have been collapsed into three groups for presentation of data in Figure 13.

### Key findings

- Overall survey data highlighted very positive attitudes across a range of natural resource management topics.
- The most strongly reflected attitude towards natural resource management was that action at the property level can improve the environmental health of the district.
- While the availability of water was an important issue, over three quarters of respondents also acknowledged that diverting water flow could cause problems for other landholders and the environment.
- Most respondents said they thought landholders should be paid for providing environmental services. At the same time, respondents in the Glenelg Hopkins also appeared willing to make a significant individual contribution with over half of all respondents agreeing that a short-term loss in production could be justified by long-term improvements to the environment.
- Survey findings highlighted an opportunity to improve the management of Aboriginal cultural heritage sites on private property with over 40% of respondents agreeing that landholders and Aboriginal communities should work together to manage these sites.

Findings from the survey in the Glenelg Hopkins region demonstrated a strong acknowledgement of the capacity of individual landholders to contribute to the environmental health of their district. Over 80% of respondents said that they thought action at the property level could improve the health of the environment. While the availability of water for agriculture was rated as an important issue by many respondents, over three quarters acknowledged the potential impacts of diverting flows on other landholders and the environment [Figure 13].

Survey findings also highlighted that landholders in the Glenelg Hopkins region were aware that they are increasingly being asked to undertake works with wider community benefits. Seventy-two percent of respondents said they thought that landholders should be paid for providing environmental services that benefit the wider community. However, it is important to note that the majority of respondents were also prepared to make a significant individual contribution towards improved environmental outcomes with 55% saying a short-term loss in productive capacity could be justified where there were long-term benefits to the environment [Figure 13].

Approximately two thirds of respondents also agreed that it is reasonable for funding to be directed to issues identified in government/community plans [Figure 13].

Just under half of all respondents (46%) also thought that landholders would benefit from Quality Assurance measures that require them to adopt improved practices and that clearing

had substantially reduced the existence and diversity of native plants and animals in their district [Figure 13].

Despite the earlier finding of limited knowledge about managing Aboriginal cultural heritage sites on private property, 42% of respondents in the Glenelg Hopkins region said that Aboriginal communities and landholders should work together to protect cultural heritage sites on private property [Figure 13]. These findings suggest that a significant opportunity exists to improve the management of these sites through providing information about the options for managing these sites and important people to contact for advice. This information also needs to highlight the potential for landholders and Aboriginal communities to work together to develop management strategies.

Only a small minority of respondents to the survey said it was difficult to obtain expert advice about natural resource management and that landholders should not be expected to manage their property in expectation of drought [Figure 13].

Considered collectively these findings highlight very positive attitudes towards natural resource management in the Glenelg Hopkins region and highlight the opportunity for a range of natural resource management strategies and actions.

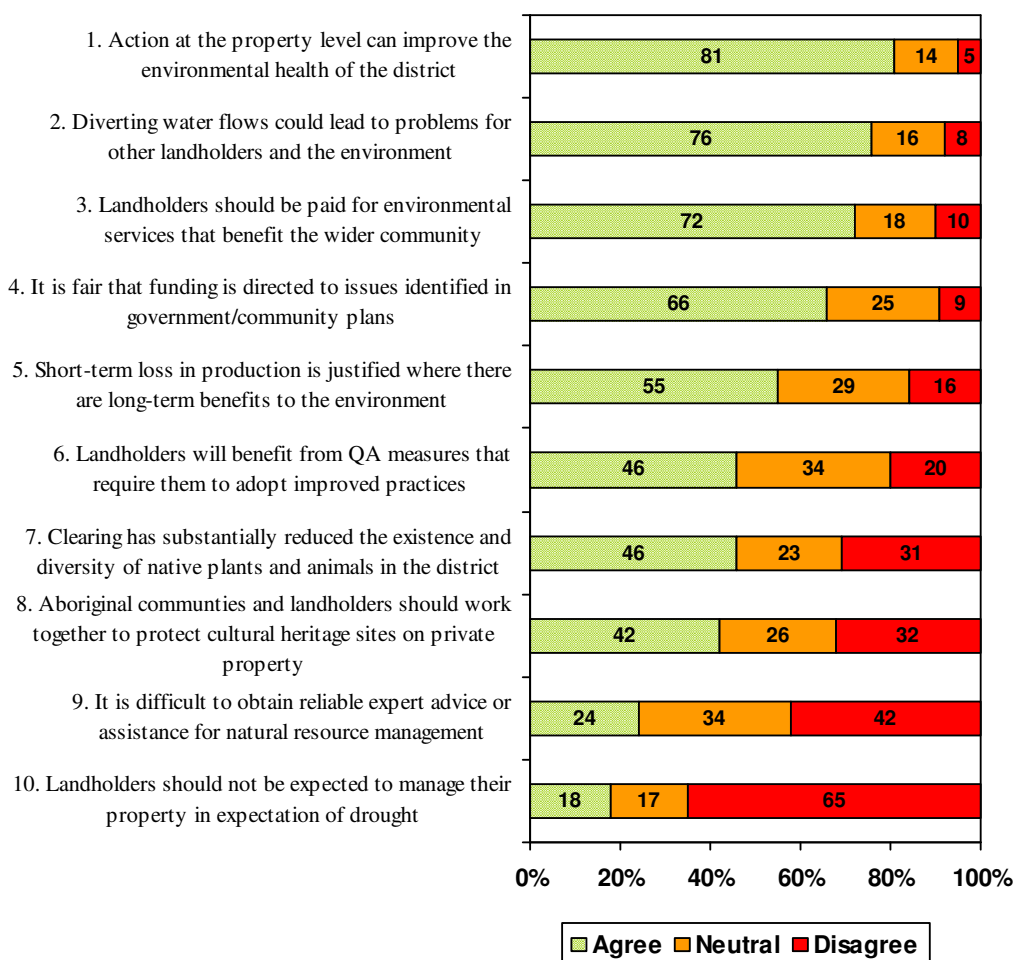
There were a small number of significant differences in respondents' attitudes towards natural resource management across the 32-subcatchments [Appendix 1 & 2].

#### **Box 6 – Attitudes to natural resource management and adoption of CRP**

Survey data highlighted several links between respondents' attitudes towards natural resource management and adoption of CRP.

- Respondents who said that action at the property level could improve the environment were significantly more likely to adopt the CRP:
  - fenced to allow management by land classes;
  - encourage regrowth of native vegetation;
  - cropped using a rotation with pasture; and
  - used time controlled or spell grazing.
- Respondents who said landholders will benefit from quality assurance measures that require them adopt improved practices were significantly more likely to adopt the CRP conducted work to control pest animals and non-crop weeds.
- Respondents who said that clearing had substantially reduced the existence and diversity of native vegetation were significantly more likely to adopt the CRP encouraged regrowth of native vegetation.

FIGURE 13 – ATTITUDES TOWARDS NATURAL RESOURCE MANAGEMENT



### Preferred funding arrangements for involving landholders in natural resource management

Through its Regional Catchment Strategy, the Glenelg Hopkins CMA is largely responsible for managing government investments in natural resource management throughout the region. The survey asked respondents to indicate their interest in a number of arrangements for involving landholders in natural resource management activities using the following five-point scale: “definitely interested”, “strong interest”, “interested”, “some interest”, “not interested”. To simplify presentation these options were grouped into three categories “strong interest” (combining strong interest and definitely interested), “moderate interest” (interested), and “limited interest” (combining not interested and some interest).

## Key findings

- Reduction in rates was the only funding arrangement in which at least half of all survey respondents reported a strong interest.
- Just under half of survey respondents were strongly interested in tax rebates and almost a third in grant schemes administered by the CMA or government.
- The majority of respondents had only limited interest all other options including annual payments for environmental services, coordinated labour, tenders in response to government advertisements, and annual lease payments for land managed by others.

There was only one funding arrangement included in the mail survey where at least half of all respondents reported a strong level of interest. This option was reduction in rates levied by local government. Just under half of all respondents (47%) had a strong level of interest in tax rebates. Respondents reported some interest in grant schemes administered by the Glenelg Hopkins CMA or the government with just under a third (32%) indicating a strong interest in this option [Figure 14].

For all other options including annual payments for environmental services, coordinated labour to undertake on-ground work, a tender to undertake work in response to an advertised call, and annual lease payments for land managed by others, the majority of respondents reported limited interest [Figure 14].

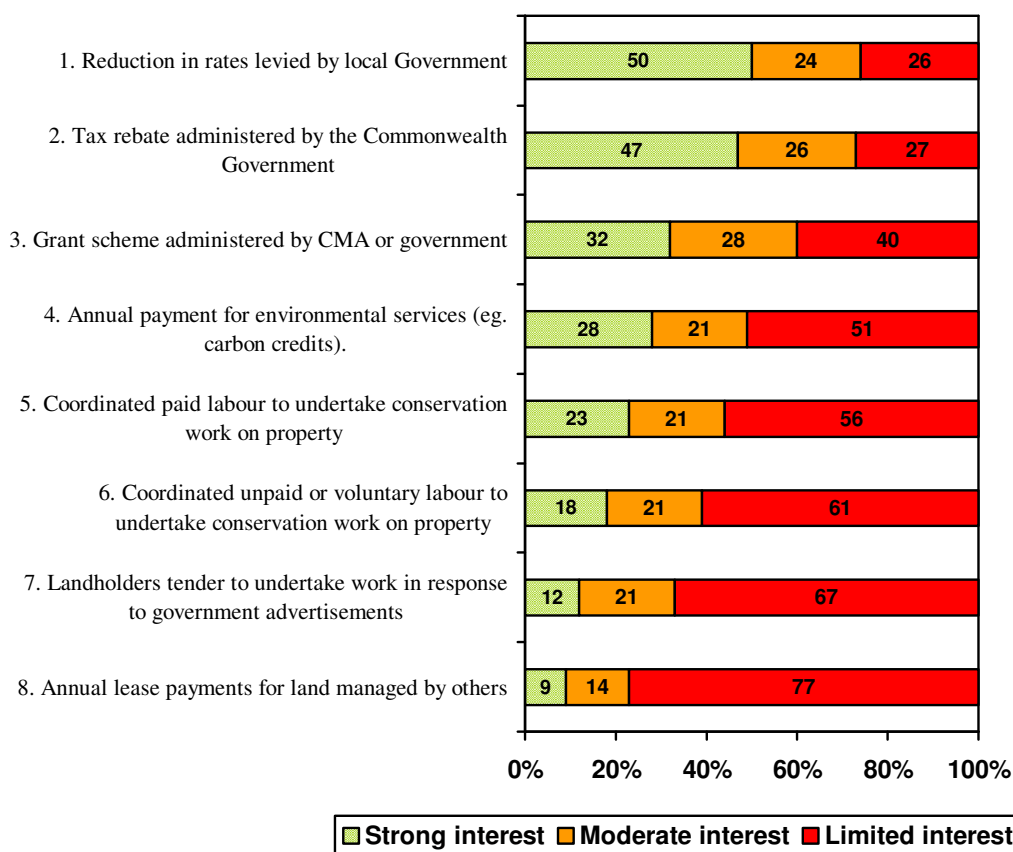
These findings suggest that despite the earlier finding that most landholders thought they should be paid for providing environmental services, there is no single funding approach that is likely to appeal to the majority of landholders in the Glenelg Hopkins region. That is, a variety of funding opportunities and arrangements will be needed to meet the requirements of landholders. The extent that any funding arrangement can minimise government “red tape” is also likely to be an important factor affecting landholder interest.

There were no significant differences in respondents’ interest in funding arrangements for natural resource management across the 32 sub-catchments.

### Box 7 – Interest in funding arrangements for NRM and adoption of CRP

There were no significant links between respondents preferred funding arrangements for natural resource management activities and adoption of any CRP included in the mail survey.

FIGURE 14 – INTEREST IN FUNDING ARRANGEMENTS FOR NATURAL RESOURCE MANAGEMENT



## Sources of information about natural resource management

The mail survey included a question that asked respondents to indicate where they sourced information about natural resource management issues in the Glenelg Hopkins region using a list of 17 potential information sources. Respondents were then asked to indicate which three of the information sources they had used were the most useful in providing the sort of information they required.

## Key findings

- Newspapers were the most common source of information about natural resource management in the Glenelg Hopkins region, and were used by almost three quarters of respondents. Almost all of these respondents also said that they felt this information was useful.
- Just under half of all respondents said they had used mail brochures and leaflets and Landcare groups as a source of information about natural resource management. Information from these sources was widely considered to be useful.

- The least used source of information about natural resource management were universities, training courses, and the internet.

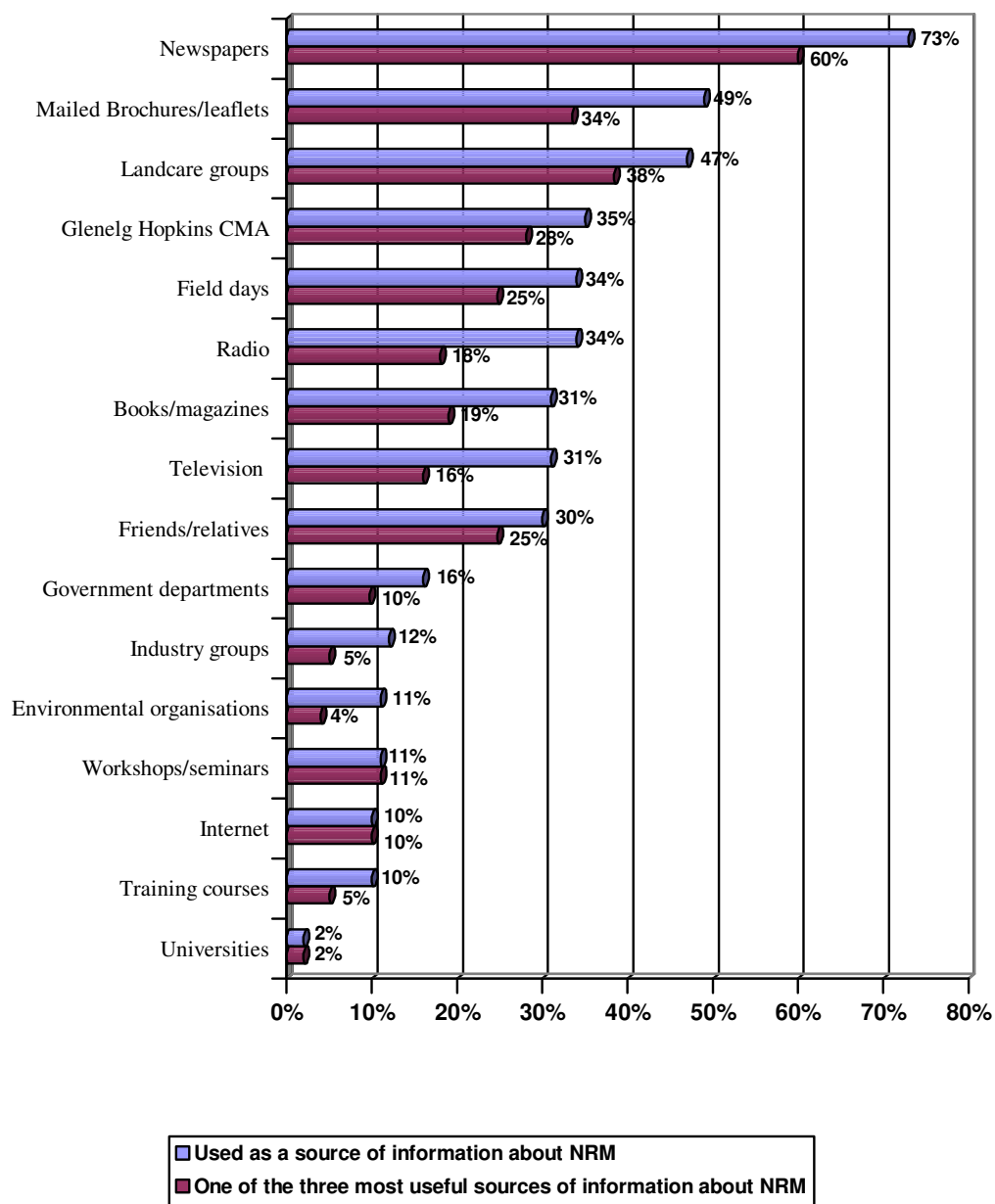
Figure 9 shows that newspapers were the most commonly used source of information about natural resource management by landholders in the Glenelg Hopkins region (used by 75% of respondents), followed by mailed brochures/leaflets (used by 49% of respondents) and Landcare groups (used by 47% of respondents). Furthermore, almost all respondents who used these sources of information said that they were amongst the most useful sources in providing the sort of information they required. The Glenelg Hopkins CMA, field days and radio were also used as a source of information about natural resource management by at least one third of respondents. With the exception of radio, most respondents who used these sources of information also thought they were useful. While only a small minority of respondents used information from workshops/seminars, the internet and universities everyone who had used information from these sources reported this information was useful. Respondents were less convinced about the usefulness of information from groups considered to have a strong vested interest, with less than half of those who received information from industry or environmental groups indicating these sources were useful [Figure 15].

There were no significant differences in the sources of information used about natural resource management across the 32 sub-catchments.

#### **Box 8 – Sources of information about NRM and adoption of CRP**

There were no significant links between where respondents sourced their information about natural resource management and adoption of CRP.

FIGURE 15 – SOURCES OF INFORMATION ABOUT NATURAL RESOURCE MANAGEMENT



## Stage of life and long term plans

Respondents to the mail survey were asked to indicate their age at the time of the survey. In addition, 13 statements explored the likelihood that each respondent's long-term plans would involve a range of options [Figure 16].

These data were expected to contribute to a better understanding of the potential for change in the management and ownership of land in the Glenelg Hopkins region.

### Key findings

- The average age of landholders in the Glenelg Hopkins region was 52 years.
- Over half of all respondents said it was likely that they would continue to live on their property and that ownership of the property was likely to stay within the family.
- Just over one third of respondents said that their long-term plans were likely to involve expanding the area of land they managed. These respondents already owned/managed significantly larger properties than other respondents.
- Just over a third of respondents said that they were likely to sell or lease all or most of their property in the long-term.
- Of those properties that are likely to be sold the median year that the transfer was likely to occur was 2010.
- The median year of likely transfer for all properties surveyed was 2016 with 29% likely to change hands in the next decade.

### Age

Most of rural Australia has an aging population and this trend is expected to have important implications for efforts to improve natural resource management.

The mean age of property owners in the Glenelg Hopkins was 52 years. Fifteen percent of respondents were under the age of 40, while 25% were over the age 65. The over 65 years of age group managed just over 9% of all land surveyed with a median property size of 160 ha.

There was no significant difference in the age of respondents across the 32 sub-catchments.

### Box 9 – Age and adoption of CRP

Data analysis indicated only one significant link between age and adoption of the CRP included in the mail survey. Younger respondents were significantly more likely to adopt the CRP conducted work to control pest animals and non-crop weeds. The common perception that age represents an important barrier to the adoption of CRP was not widely supported by survey findings in the Glenelg Hopkins region.



### **Long-term plans**

Thirteen statements explored the likelihood that each respondent's long-term plans would involve a range of options. This data was expected to contribute to a better understanding of the potential for change in the management and ownership of land in the Glenelg Hopkins region. The response options for these statements were "highly likely", "likely", "not sure", "unlikely", and "highly unlikely". These choices were not considered as being mutually exclusive, that is, any single respondent could indicate that more than one option was likely to occur. For presentation purposes, in Figure 16 these response options have been collapsed into three groups – "likely" (combining highly likely and likely), "not sure", and "unlikely" (combining highly unlikely and unlikely).

### **Continue to live on property**

Responses to the survey question exploring landholders' long-term plans indicated that about half of the rural properties in the Glenelg Hopkins region are likely to continue under their current management. Over half of all respondents (58%) thought it was either highly likely or likely that they would continue to live on their property in the long-term [Figure 16]. This group of respondents managed almost 300,000 ha or 55% of all the land surveyed.

### **Ownership of the property will stay within the family**

Fifty-six percent of respondents also indicated that it was highly likely/likely that ownership of their property would stay within the family [Figure 16]. These respondents managed approximately 250,000 ha or 46% of land surveyed. Forty-four percent of those who said the property would remain in the family indicated that it was likely someone else in the family would make management decisions. That is, in just over half of the instances where family transfer is thought likely to occur, the current property manager is likely to maintain their decision making authority for some period of time.

### **Plans for expansion**

Just over one third of respondents said it was likely that their long term plans would involve increasing the land they managed by purchasing, leasing or share farming additional land [Figure 16]. This small group of respondents managed 58% of all the land surveyed. Those who said they were likely to expand already owned significantly larger properties than all other respondents with a median property size of 370 ha compared to 193 ha for other respondents ( $\chi^2=10.532$ ,  $df=1$ ,  $p=0.001$ ). One possible explanation for this finding is that larger property owners are more likely to have the equipment needed to operate a large-scale enterprise. These larger landholders are also more likely to have the capital resources needed to purchase additional land or equipment.

### **Plans to sell or lease all or most of the property**

When analysing data from across the Glenelg Hopkins region it appears that the proportion of respondents likely to expand their property holding will be closely matched by the properties likely to become available for lease or sale. Twenty-nine percent of respondents said that they were likely to sell the entire property. A further 13% said that they were likely to lease all or most of the property to someone else and 5% thought they were likely to subdivide and sell a large part of their property [Figure 16]. Combining these groups, over one third of respondents reported that they were likely to sell or lease all or most of their property in the long-term. These respondents owned approximately 29% of the land surveyed or just over 160,000 ha.

When comparing the percentage of respondents who indicated they planned to expand by acquiring additional land and those likely to sell all or most of their property the demand for land appears likely to roughly match that likely to become available. To explore the likely

availability and demand for land in greater detail Figure 17 represents a break down across the 32 sub-catchments of the proportion of respondents who planned to increase the area of land they managed and those likely to sell all or most of their property. This comparison was made by subtracting the proportion of respondents in each sub-catchment likely to expand from the proportion likely to sell. Adopting this approach a negative figure for a sub-catchment indicates the proportion of respondents planning to expand their holding is greater than those likely to sell their property. A value close to zero indicates the proportion likely to expand matches those likely to sell. A positive value indicates there are more respondents planning to sell than planning to expand. As highlighted in Figure 17 this approach suggests that the areas where property sales are least likely to meet the demand for expansion are in H11 and H8. On the other hand, availability of land for expansion appears most likely to exceed demand from current landholders in P1, P6, H6 and H7.

There were several significant differences in respondents' long-term plans for their property across the 32 sub-catchments [Appendix 1 & 2].

#### **Box 10 – Long-term plans and adoption of CRP**

The adoption of two CRP was significantly linked to respondents' long-term plans for their property.

- Respondents who said they were likely to increase the area of land they managed were significantly more likely to adopt the CRP used time controlled or spell grazing.
- Respondents who said they were likely to continue to undertake much of the physical on-property work were significantly more likely to adopt the CRP conducted work to control pest animals and non-crop weeds.

FIGURE 16 – LONG-TERM PLANS

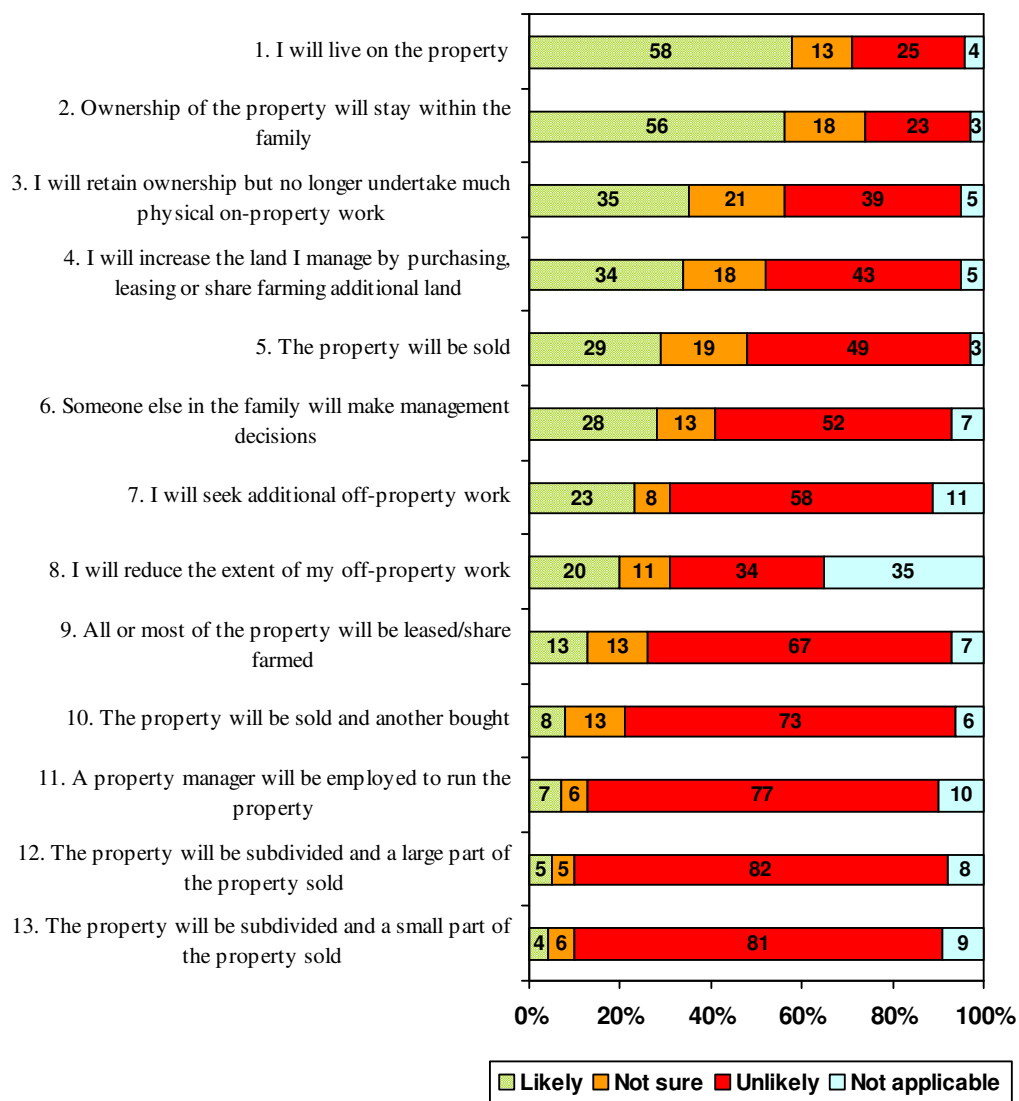
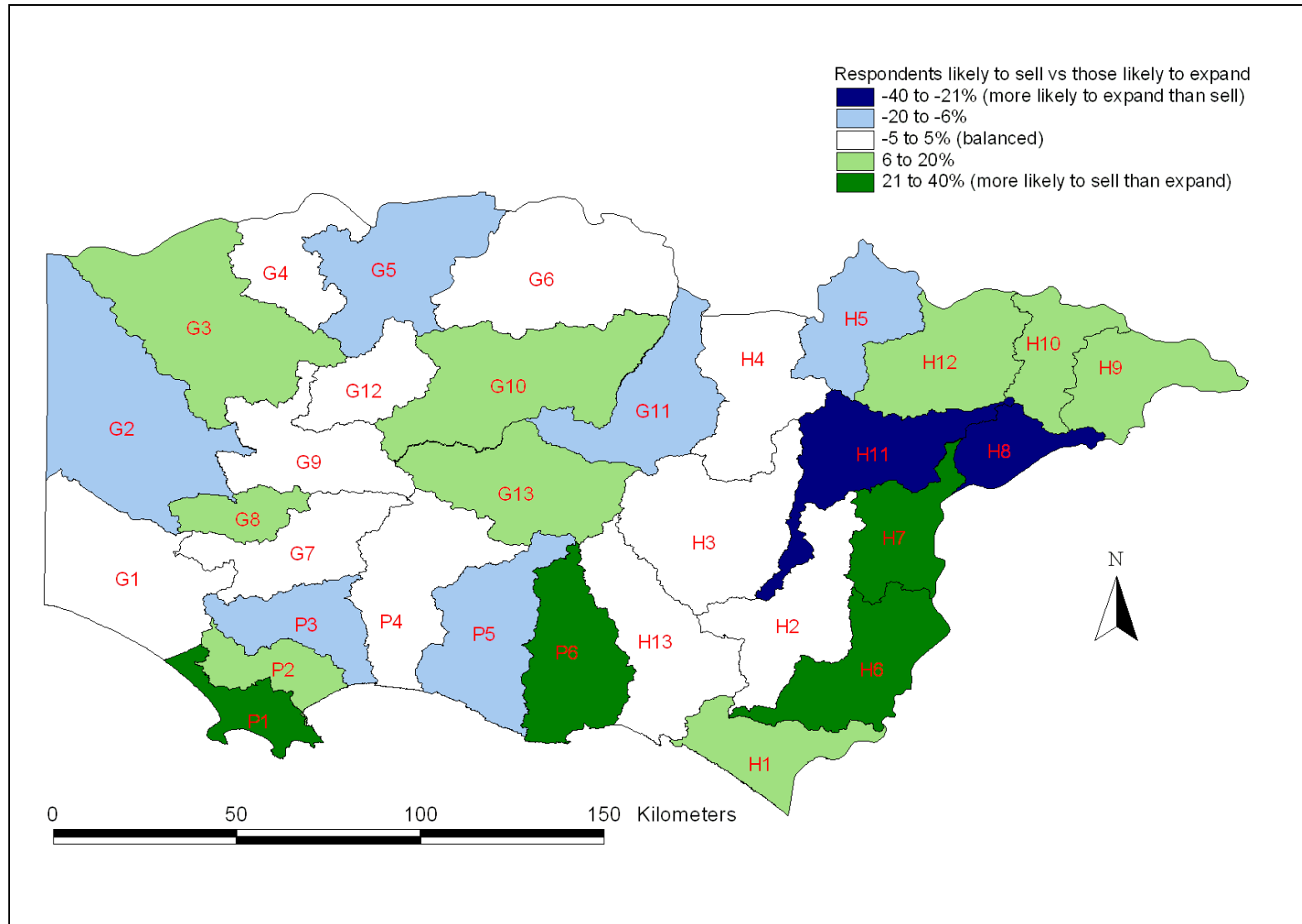


FIGURE 17 – LONG-TERM PLANS



### **Method and timing of property transfer**

Respondents were allocated to one of three long-term options if they selected highly likely/likely for any of the options in Figure 16. Those who did not place highly likely/likely on any option (n=39) were removed from the sample for this analysis.

- Sell all or a large part of the property.
- Retain property in the family.
- Other plans, including continue to live on the property.

Where respondents indicated that it was highly likely or likely that their property would be sold or subdivided and a large part sold, they were asked to indicate the year they thought this sale might occur.

Those indicating highly likely/likely for only one long-term option were allocated to that option. Other respondents were allocated to one of the three options on the following basis and in the order shown:

- if they had a succession plan, then they were allocated to retain property in the family;
- if they nominated a date when they expected to sell the property, they were assumed to be likely to sell;
- if they planned to transfer the property in the family but did not have a succession plan they were still allocated to retain in the family as long as they had not indicated they were likely to sell; and
- those indicating highly likely/likely for both selling the property and retaining it in the family, had no succession plan and did not nominate a date to sell, were assumed to be likely to sell.

The date of property transfer was assumed to occur in the year nominated on the survey. Where respondents had not nominated a date, it was assumed that transfer would occur on retirement at age 65 years for those under 65 years, and at death for those over 65 years. For the latter set, the Australian Bureau of Statistics (ABS) Life Tables (ABS 2001) were used to calculate the remaining life expectancy and provide the expected date of property transfer.

All other respondents were assumed to be planning to continue living on and retaining ownership of their properties until death required the transfer of their properties. Obviously, transfer could then be within the family or to others. Again the ABS Life Tables (ABS 2001) were used to calculate remaining life expectancy and provide the expected date of property transfer.

The mean age (52 years) was assigned to those respondents (n = 47) who hadn't provided their age.

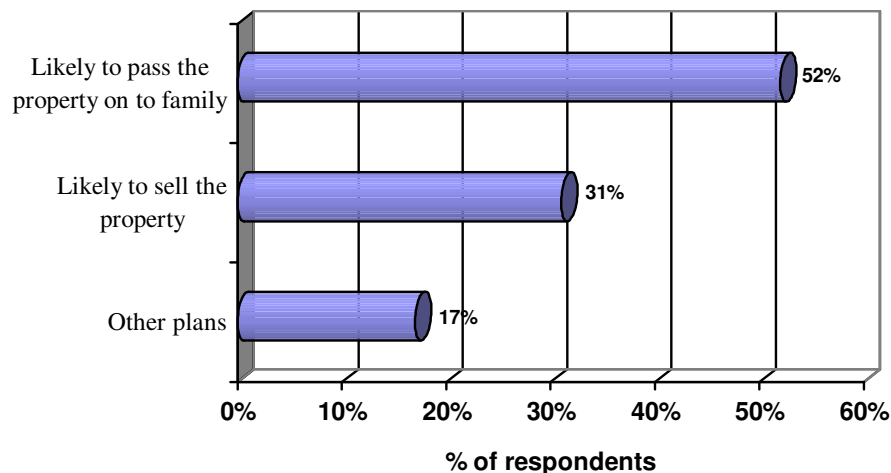
Adopting the approach outlined above:

- 52% of respondents appear likely to pass their property on to someone else in the family;
- 31% appear likely to sell their property; and
- 17% had other plans, mostly to stay on the property in the long term [Figure 18].

Respondents who were classed as likely to sell using the method outlined above owned approximately 90,000ha or 16% of the total land surveyed. The median year of sale for those likely to sell was 2010 with only approximately 9% of the all land surveyed likely to be sold during this period. Fifty-nine percent of properties likely to be sold, representing just over 9% of the total area surveyed, will change hands by 2013. The remaining 7% of the total area surveyed that is likely to be sold, will not be sold for at least 10 years.

The median year of transfer for all properties including those likely to be sold, passed on to other family members or those with other long-term plans was 2016 (transfer is assumed to occur in the year nominated, at retirement age or upon death). Thirty-seven percent of all properties, representing 29% of the total area surveyed, are likely to change hands over the next decade.

FIGURE 18 – PROPERTY TRANSFER



### Involvement in planning processes

For this topic respondents were asked to indicate the extent of their involvement in a number planning processes, including whole farm planning, having a long-term plan or vision for improvements to the property, succession planning and local action planning.

#### Key findings

- Just under half of all respondents were involved in whole farm planning. Just over 10% had a completed or on-going whole farm plan.
- Over three quarters of respondents said they had a plan or vision about the improvements they would like to make on their property and over a quarter of these respondents said they were well advanced in implementing those changes on their property.
- Despite the finding that most landholders said ownership of their property was likely to stay within the family most respondents had not begun to plan the transfer of their property to the next generation.

- Just under half of all respondents said they had been involved in local action planning (e.g. with Landcare, community development or industry associations).

### **Whole farm planning**

The mail survey asked respondents to indicate if they had developed or were currently developing a written whole farm plan that included a map or other documents that addressed the existing property situation and included future management and development plans. The response options were “completed/ongoing”, “well advanced”, “halfway”, “early stages”, and “not started”.

Just under half of all respondents to the mail survey (46%) said that they were currently involved in or had completed a whole farm plan. Only 14% of respondents, covering 39% of the survey area, had a completed or ongoing whole farm plan [Figure 19]. As this finding suggests, larger property owners were significantly more likely to have completed a whole farm plan ( $\chi^2 = 92.617$ ,  $df = 4$ ,  $p < 0.001$ ). The median property size for respondents who had a completed whole farm plan was 440 ha compared to 152 ha for those who had not yet started a plan.

With over half of all respondents not involved in whole farm planning, ongoing promotion and greater support to assist landholders to implement plans appears likely to facilitate greater uptake of property planning in the future. In particular, there appears to be a need for greater attention to promoting and supporting property planning with managers of smaller properties. Involving the managers of smaller properties in property planning will be especially important in sub-catchments dominated by smaller property owners [Appendix 1].

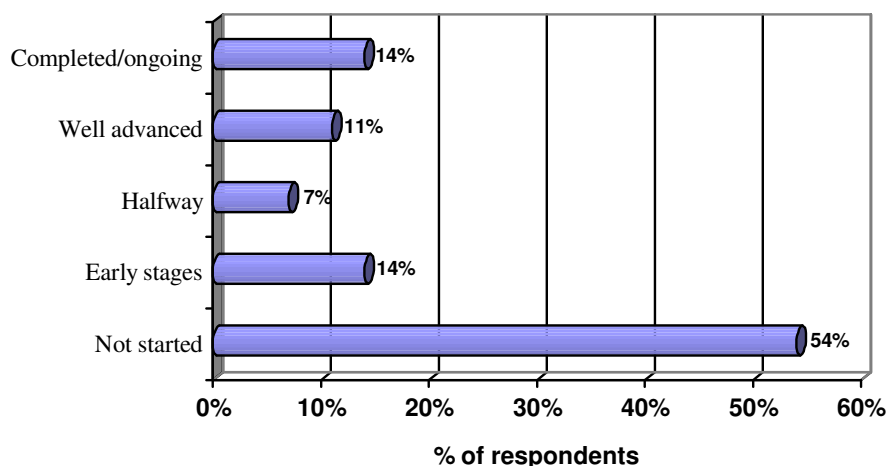
Involvement in whole farm planning across the 32 sub-catchments ranged from 67% in G1 to 25% in H9 [Appendix 2].

#### **Box 11 – Whole farm planning and adoption of CRP**

Involvement in whole farm planning was significantly linked to adoption of the CRP:

- record of soil test results for paddocks;
- tested water quality of the main water sources on the property;
- fenced to allow management by land classes; and
- used time controlled or spell grazing.

FIGURE 19 – INVOLVEMENT IN WHOLE FARM PLANNING



#### Long-term plan or vision for improvements to property

Survey respondents were asked about the extent to which they had a long-term plan or vision about the improvements they would like to make to their property, and if so, how much of that vision they had achieved. Those respondents who said they had a long-term plan or vision were asked to use the following options to rate their performance against this plan: “completed/ongoing”, “well advanced”, “halfway”, “early stages”, and “not started”.

Almost all respondents to the survey said that they had a long-term plan or vision about the improvements they would like to make on their property. Furthermore, 93% of these respondents said they had made at least some progress towards making these improvements and over a quarter were well advanced [Figure 20].

Although respondents reported limited involvement in formal whole farm planning it is important to note that almost all respondents had some sort of a plan or vision about the improvements they wanted to make on their property and had started to implement these changes on their property.

The proportion of respondents across the 32 sub-catchments who said they had a plan or vision about the improvements they wanted to make on their property ranged from 93% in P3 to 47% in G8 [Appendix 2].

#### Box 12 – Having a plan or vision about improvements and adoption of CRP

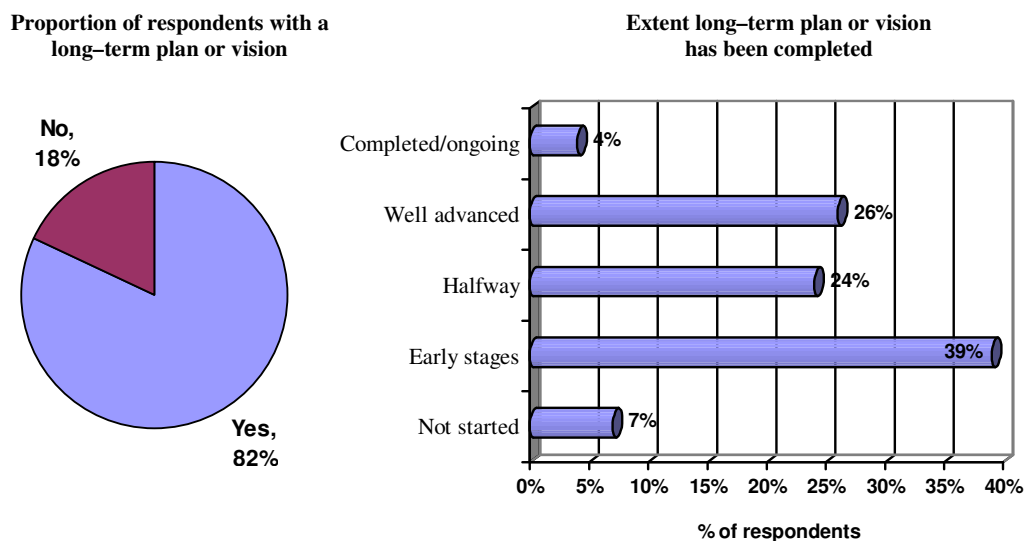
Respondents who had or were further advanced in achieving a plan or vision about the improvements they wanted to make on their property were significantly more likely to adopt the CRP:

- conducted work to control pest animals and non-crop weeds;
- planted trees and shrubs;



- recorded soil test results for paddocks;
- sown perennial pasture;
- applied lime;
- only water stock from a trough/tank/dam; and
- fenced to manage stock access to waterways.

FIGURE 20 – LONG TERM PLAN OR VISION FOR IMPROVEMENTS TO PROPERTY



### Succession planning

Respondents were asked if their family had agreed on a plan to manage the transfer of their property to the next generation. The possible response options were “completed/ongoing”, “well advanced”, “halfway”, “early stages”, and “not started”.

Despite the earlier finding that most landholders in the Glenelg Hopkins region said their long-term plans were likely to involve passing their property on to another family member, 54% of respondents said they had not started to plan the transfer of their property to the next generation. Only 10% of respondents had a completed or ongoing plan in place to manage the transfer of their property to the next generation [Figure 21]. However, it is encouraging to note that those who said ownership of the property was likely to remain in the family were significantly more likely to have started to plan, yet even 43% of these respondents had not started the planning processes ( $\chi^2 = 92.617$ ,  $df = 4$ ,  $p < 0.001$ ). Older respondents were also significantly more likely to have started to plan the transfer of their property to the next generation (median age of those with a completed succession plan was 58 compared to 50 for those who have not yet started ( $\chi^2 = 16.107$ ,  $df = 3$ ,  $p = 0.003$ )).

Family succession planning is often a complex processes that may require legal and financial advice and a large investment of time, energy and money. It is possible that part of the explanation for limited involvement in succession planning is that many landholders do not

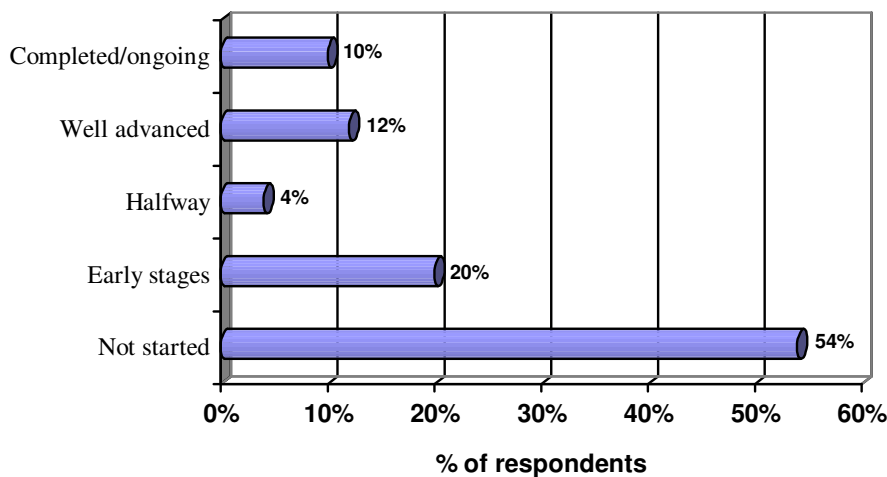
know how to begin the process or the steps involved. Establishing an information package that outlines the common steps required to undertake a succession plan and a list of people to contact for advice may be an approach that can help facilitate greater uptake of succession planning. At the very least, such an information package could make the planning process easier for those involved. To the extent that the average age of landholders in the Glenelg Hopkins continues to increase, the demand for information about succession planning is also likely to increase.

The proportion of respondents across the 32 sub-catchment that were involved in succession planning ranged from 64% in H11 to 25% in P1 [Appendix 2].

### Box 13 – Succession planning and adoption of CRP

There were no significant links between succession planning and adoption of CRP in this study.

FIGURE 21 – INVOLVEMENT IN SUCCESSION PLANNING



### Local action planning

The mail survey asked respondents to indicate their level of involvement in local action planning using examples such as Landcare, community development or industry associations. The possible response options were “no involvement”, “little involvement”, “some involvement”, and “highly involved”.

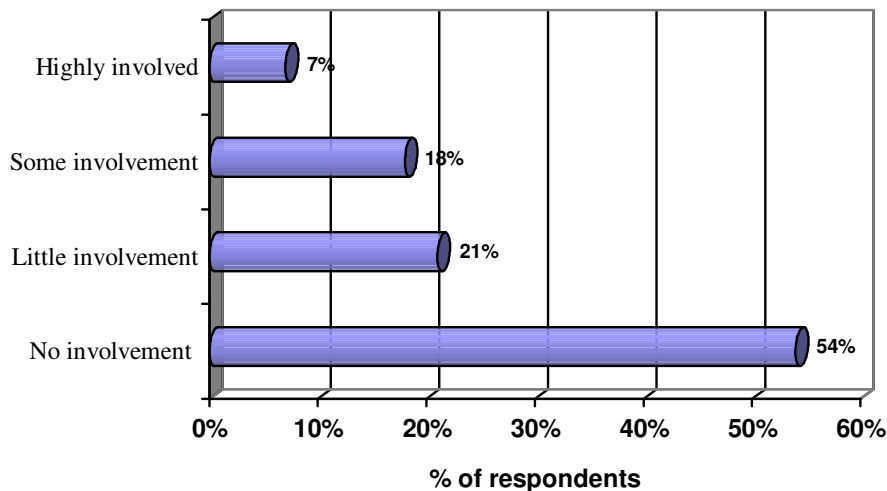
As was the case with other planning activities just under half of all respondents (46%) said they were involved in local action planning activities. A small proportion of these respondents (7%) said they were highly involved in local action planning activities [Figure 22].

Involvement in local action planning across the 32 sub-catchments ranged from 73% in G12 to 26% in H13 [Appendix 2].

#### Box 14 – Local action planning and adoption of CRP

There were no significant links between involvement in local action planning and adoption of CRP.

FIGURE 22 – INVOLVEMENT IN LOCAL ACTION PLANNING



#### Involvement in government funded programs

The survey asked respondents to indicate their involvement in government funded programs that amongst other things, aim to assist landholders to implement improved land management practices. Respondents were asked three questions:

- had there been work undertaken on their property in the last five years that was funded by government programs;
- were they currently a member of a Landcare group; and
- were they currently a member of any other local commodity group.

#### Key findings

- Just under a third of respondents said that they had work undertaken on their property in the past five years that was at least partially funded by government programs.
- Over a third of respondents said they were currently a member of a Landcare group. This group of respondents owned or managed 52% of the area surveyed.
- Less than a quarter of respondents were a member of a local commodity group.

### **Work funded by government on their property**

Data indicated that most landholders in the Glenelg Hopkins had not received government funding to undertake work on their property. Only 29% of respondents said that work had been undertaken on their property in that last five years that was partially funded by State or Federal Government programs.

Having government funded work undertaken on their property was significantly linked to respondents who:

- had completed a short course relevant to property management in the past 5 years (Wald=5.848,  $p=0.016$ , Exp(B)=1.897);
- were a member of a Landcare group (Wald=32.670,  $p<0.001$ , Exp(B)=4.959);
- were involved or more highly involved in local action planning (Wald=8.128,  $p=0.004$ , Exp(B)=1.505); and
- owned or managed larger properties (Wald=6.717,  $p=0.010$ , Exp(B)=1.223).

These four factors accounted for approximately 38% of the variation between those who had work funded by government programs on their property and those who had not (Nagelkerke pseudo  $R^2=0.375$ ).

The proportion of respondents from the 32 sub-catchment who had work undertaken on their property funded by government ranged from 69% in H5 to 4% in G1 and H10 [Appendix 1].

### **Box 15 – Work funded by government on property and adoption of CRP**

Having work funded by government on property was significantly linked to adoption of the CRP:

- planted trees and shrubs;
- recorded soil test results for paddocks;
- sown perennial pasture;
- tested water quality of the main water sources on the property;
- fenced to allow management by land classes;
- encouraged regrowth of native vegetation;
- fenced to manage stock access to waterways; and
- native bush fenced to manage stock access.

### **Landcare membership**

Thirty-nine percent of respondents to the survey said that they were currently a member of a Landcare group. Landcare members owned or managed just over 280,000 ha or 52% of the area surveyed.

Membership of a Landcare group was significantly associated with respondents who:

- had completed or were further advanced in the preparation of a whole farm plan (Wald=17.334,  $p<0.001$ ,  $\text{Exp}(B)=1.508$ );
- were farmers by occupation (Wald=17.290,  $p<0.001$ ,  $\text{Exp}(B)=4.348$ ); and
- had work undertaken on their property in the past five years that had been funded by government (Wald=36.621,  $p<0.001$ ,  $\text{Exp}(B)=6.309$ ).

These variables accounted for just under 43% of the variation between Landcare members and non-members (Nagelkerke pseudo  $R^2=0.428$ ).

Landcare membership across the 32 sub-catchments ranged from 72% in H3 to 4% in G1 [Appendix 1].

#### **Box 16 – Landcare membership and adoption of CRP**

There were no significant links between Landcare membership and adoption of CRP in this research. However, it is important to note that there was a strong link between respondents who had government funded work on their property and Landcare membership. As a result when modelling adoption of CRP using binary logistic regression these variables performed very similar roles and Landcare membership often dropped out of the final model. At the same time, Landcare membership was strongly associated with respondents who had work funded by government on their property, which was in turn linked to the adoption of a range of CRP.

#### **Membership of local commodity group**

Twenty percent of respondents said they were a member of a local commodity group.

Membership of a local commodity group was significantly linked to respondents who:

- worked longer hours on property (Wald=7.064,  $p=0.008$ ,  $\text{Exp}(B)=1.022$ );
- had completed a short course in property management (Wald=9.893,  $p<0.001$ ,  $\text{Exp}(B)=3.299$ );
- had employed a consultant to provide advice on property management (Wald=7.788,  $p=0.005$ ,  $\text{Exp}(B)=4.004$ ); and
- had achieved more of their plan or vision of the improvements they wanted to make on their property (Wald=3.862,  $p=0.049$ ,  $\text{Exp}(B)=1.380$ );

These factors explained approximately 28% of the variation between members of a commodity group and non-members (Nagelkerke pseudo  $R^2=0.281$ ).

Respondents involved in cropping enterprises appeared slightly more likely to be involved in a commodity group (35%) compared to those with stock related enterprises (21%) and all other enterprises (9%).

Membership of a commodity group across the 32 sub-catchments ranged from 53% in H11 to 3% in G2 [Appendix 1].

#### **Box 17 – Commodity group membership and adoption of CRP**

Respondents who were a member of a commodity group were significantly more likely to adopt the CRP applied lime.

### **Property size and farming as an occupation**

This section of the report focuses on a number of topics related to property size and occupation, including:

- property size;
- occupational grouping that best describes main area of paid/unpaid work; and
- level of on-property and off-property work.

### **Key findings**

- The median property size of landholders surveyed in the Glenelg Hopkins region was 230 ha.
- Less than one tenth of respondents owned or managed a property over 1,000 ha yet this small group of respondents managed over half of the total area surveyed.
- Seventeen percent of respondents owned or managed a property that was under 50 ha in size.
- Almost two thirds of respondents said that farming was their primary occupation. Just over one third of landholders that said farming was not their primary occupation and this group of respondents managed almost 40% of the total area surveyed.

### **Property size**

Survey respondents were asked to indicate the total area of land that was owned or managed by them or their immediate family in their local district. This area varied widely, ranging from the lower limit of 10 ha right up to properties in excess of 40,000 ha. The median property size for respondents to the survey was 230 ha. Survey data suggested that a small number of large property owners manage the vast majority of land in the Glenelg Hopkins. Only 8% of respondent reported that they owned or managed a property in excess of 1,000 ha. However, these respondents managed over 280,000 ha or approximately 53% of the total area surveyed.

The survey also asked respondents to indicate the area of their property that they leased, share farmed or agisted from others. Just under a third of respondents (29%) said that they leased, share farmed or agisted land from other people ranging from an area of 1 ha up to 20,000 ha. The median area leased, share farmed or agisted from others was 74 ha.

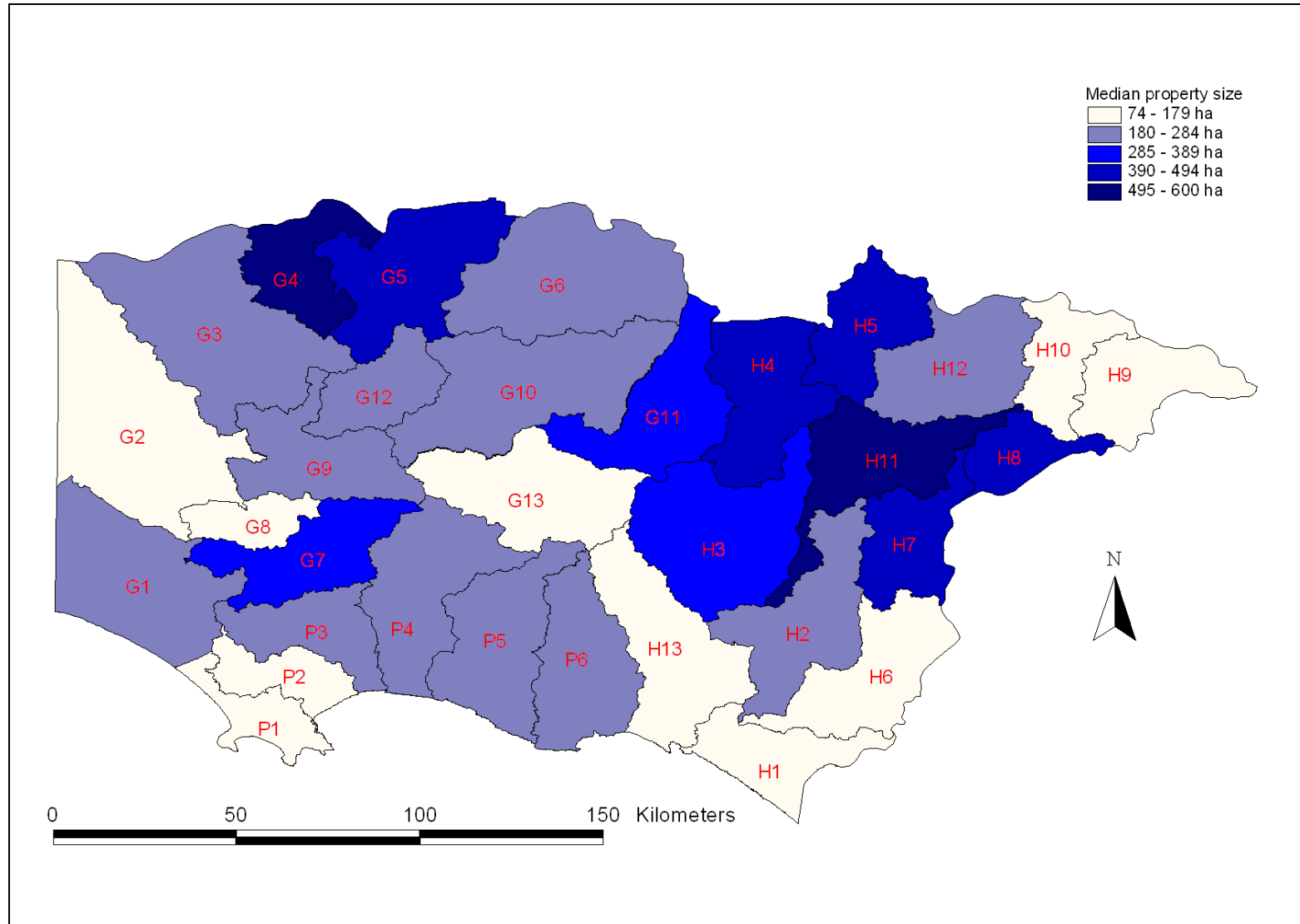
There was a significant difference in the median size of properties across the 32 sub-catchments ranging from 600 ha in H11 to 74 ha in P2 ( $\chi^2 = 158.757$ ,  $df = 31$ ,  $p < 0.001$ ) [Figure 23, Appendix 1].

#### **Box 18 – Property size and adoption of CRP**

Respondents with larger properties were significantly more likely to adopt the CRP:

- conducted work to control pest animals and non-crop weeds; and
- cropped using minimum tillage.

FIGURE 23 – MEDIAN PROPERTY SIZE ACROSS SUB-CATCHMENTS





**Table 1**  
**Proportion of respondents by property size for each sub-catchment**

Sub-catchment	n	% respondents in each property size category (ha)								Median (ha)
		10 – 50	51- 100	101- 200	201 - 400	401 - 600	601 - 800	801 - 1000	> 1000	
G1	23	9%	9%	22%	39%	9%	8%	0%	4%	240 ha
G2	30	7%	20%	40%	7%	7%	3%	3%	13%	138 ha
G3	41	15%	17%	19%	15%	20%	5%	2%	7%	200 ha
G4	24	0%	4%	0%	21%	34%	8%	8%	25%	598 ha
G5	30	7%	7%	6%	20%	23%	10%	3%	24%	463 ha
G6	32	19%	12%	19%	16%	9%	3%	9%	13%	197 ha
G7	34	3%	15%	14%	29%	18%	3%	3%	15%	292 ha
G8	15	7%	33%	27%	13%	0%	0%	7%	13%	125 ha
G9	38	18%	13%	16%	24%	8%	8%	5%	8%	209 ha
G10	25	24%	8%	20%	8%	12%	8%	12%	8%	200 ha
G11	30	13%	7%	10%	24%	20%	3%	13%	10%	386 ha
G12	28	22%	14%	14%	14%	11%	14%	4%	7%	203 ha
G13	52	37%	15%	17%	15%	0%	2%	10%	4%	95 ha
H1	52	21%	13%	29%	27%	2%	4%	2%	2%	160 ha
H2	40	10%	18%	20%	27%	7%	5%	0%	13%	222 ha
H3	26	11%	4%	8%	35%	15%	4%	11%	12%	380 ha
H4	27	0%	4%	7%	26%	37%	0%	15%	11%	464 ha
H5	27	22%	4%	11%	11%	22%	4%	19%	7%	430 ha
H6	43	21%	18%	21%	26%	2%	5%	5%	2%	160 ha
H7	26	0%	4%	11%	35%	15%	23%	4%	8%	403 ha
H8	25	16%	8%	12%	16%	8%	20%	8%	12%	390 ha
H9	21	38%	14%	5%	14%	19%	10%	0%	0%	100 ha
H10	25	44%	16%	4%	20%	4%	4%	0%	8%	75 ha
H11	30	3%	3%	7%	17%	23%	20%	10%	17%	600 ha
H12	22	14%	9%	18%	32%	9%	5%	4%	9%	269 ha
H13	44	23%	11%	25%	21%	16%	0%	0%	4%	145 ha
P1	22	23%	41%	32%	4%	0%	0%	0%	0%	80 ha
P2	28	25%	46%	18%	4%	0%	0%	0%	7%	74 ha
P3	29	21%	14%	14%	38%	10%	0%	0%	3%	205 ha
P4	31	6%	19%	16%	19%	19%	7%	3%	10%	240 ha
P5	34	20%	9%	18%	35%	9%	0%	6%	3%	225 ha
P6	36	20%	11%	22%	16%	11%	14%	3%	3%	195 ha
<b>Total*</b>	1001	17%	14%	17%	21%	12%	6%	5%	8%	230 ha

*\* Totals calculated by adding sub-catchment data will differ slightly from these figures. There were a small number of respondents who removed the identification number from the survey and could not be allocated to a sub-catchment.*

## Occupation

Respondents were asked to indicate the occupational grouping that they thought best described their main area of paid/unpaid work in terms of the time and energy they put into that activity. Examples provided in the questionnaire included farmer, teacher, investor or retiree.

Responses to this open-ended question were grouped into five occupational categories: farmer, professional, trades, retired and other. Farmers were the largest occupational grouping and comprised the majority of all respondents (64%). Thirty-six percent of all respondents were not farmers and these respondents owned or managed 39% of all land surveyed.

There was a significant difference across the 32 sub-catchments in the proportion of respondents who said that farming was their primary occupation ranging from 90% in H11 to 31% in G8 ( $\chi^2 = 85.367$ ,  $df = 31$ ,  $p < 0.001$ ) [Figure 24, Appendix 1].

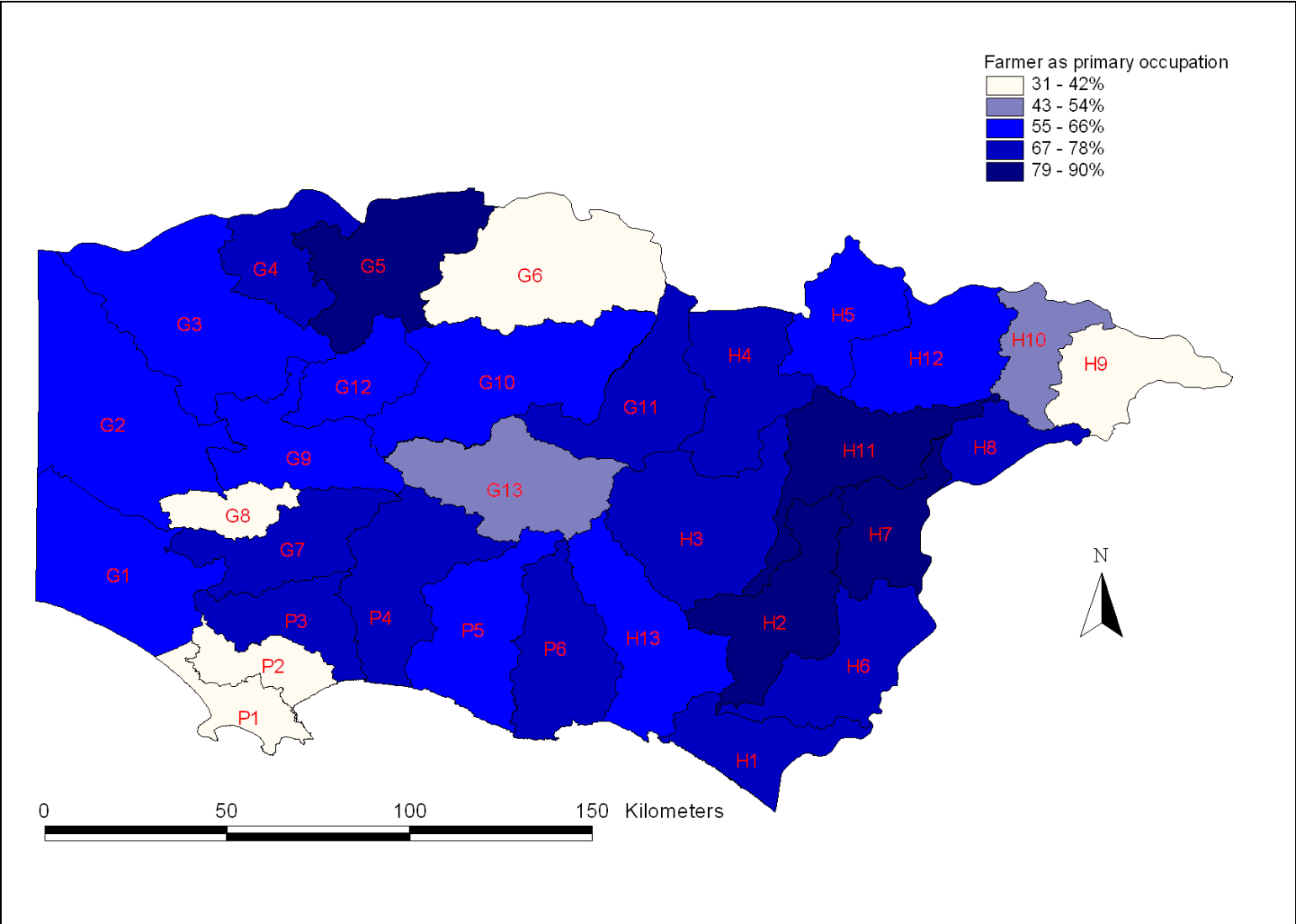
### Box 19 – Occupation and adoption of CRP

Respondents whose primary occupation was farming were significantly more likely to adopt the CRP:

- recorded soil test results for paddocks;
- applied lime;
- tested water quality of the main water sources on the property; and
- only watered stock from a trough/tank/or dam.

Respondents who said farming was **not** their primary occupation were significantly more likely to adopt the CRP native bush fenced to manage stock access.

FIGURE 24 – FARMER AS PRIMARY OCCUPATION ACROSS SUB-CATCHMENTS



**Table 2**  
**Landholder occupations**

Sub-catchment	n	Farmer	Professional	Trades	Other: clerical, admin, retail, home duties	Retired
G1	11	60%	16%	8%	12%	4%
G2	29	59%	21%	3%	14%	3%
G3	43	60%	9%	5%	19%	7%
G4	23	78%	13%	0%	0%	9%
G5	30	80%	10%	7%	0%	3%
G6	32	38%	31%	3%	9%	19%
G7	34	67%	6%	3%	15%	9%
G8	16	31%	38%	0%	19%	12%
G9	40	58%	17%	3%	5%	17%
G10	25	56%	24%	4%	4%	12%
G11	33	70%	12%	0%	12%	6%
G12	30	63%	13%	0%	17%	7%
G13	52	48%	19%	6%	12%	15%
H1	52	73%	6%	0%	6%	15%
H2	42	81%	14%	0%	2%	3%
H3	25	76%	16%	0%	8%	0%
H4	26	77%	23%	0%	0%	0%
H5	26	66%	15%	0%	0%	19%
H6	43	75%	9%	2%	9%	5%
H7	26	88%	8%	0%	4%	0%
H8	26	69%	19%	4%	0%	8%
H9	22	41%	27%	9%	5%	18%
H10	22	46%	36%	4%	0%	14%
H11	29	90%	0%	0%	3%	7%
H12	23	57%	13%	0%	13%	17%
H13	51	63%	15%	4%	8%	10%
P1	23	39%	17%	13%	9%	22%
P2	23	39%	9%	13%	26%	13%
P3	30	70%	10%	6%	10%	3%
P4	31	71%	16%	0%	7%	6%
P5	32	59%	22%	0%	16%	3%
P6	37	78%	8%	0%	8%	6%
<b>Total*</b>	1012	64%	15%	3%	9%	9%

*\* Totals calculated by adding sub-catchment data will differ slightly from these figures. There were a small number of respondents who removed the identification number from the survey and could not be allocated to a sub-catchment.*

## Levels of income and property equity

The survey included six questions exploring levels of income and levels of equity in the property. A profit was defined as a situation where the amount of income from the property exceeded all expenses before tax. Respondents who indicated a profit were then asked to select the amount of profit from one of eight ranges. For the purpose of data analysis, each respondent was allocated the mid-point of the chosen dollar interval. These questions were completed by the vast majority of respondents with responses from 85% to 90% of the total sample.

### Key findings

- Almost three quarters of respondents in the Glenelg Hopkins region made an on-property profit for the 2001/2002 financial year and the average on-property income was \$18,000.
- Almost three quarters of respondents also reported an off-property profit for the 2001/2002 financial year with an average off-property income of just over \$18,000.
- The average total household income for all respondents was \$36,000 and only just over one quarter of respondents reported a combined income in excess of \$50,000.
- There was an almost even split between the contribution of off-property income and on-property income to the combined total household income for landholders in the Glenelg Hopkins for the 2001/2002 financial year.
- Most respondents had more than 80% equity in their property. At the same time, just over a fifth of respondents had less than 60% equity.

### On-property income

Survey data indicated that almost three quarters of all respondents (73%) made a profit for the 2001/2002 financial year. The mean on-property profit for all respondents was approximately \$18,000. Only 16% of all respondents exceeded the \$50,000 profit threshold considered necessary to sustain a household and invest in a farm's natural and capital resources (Rendell *et al.* 1996). The \$50,000 threshold was set as a result of research exploring the financial viability of cropping enterprises in Victoria in 1996 (Rendell *et al.* 1996). It is important to note that this threshold is now eight years old and may have shifted since publication. Nevertheless, this threshold represents one of the most commonly applied benchmarks and provides a useful reference point for exploring farm incomes.

It is important to note that in many cases on-property incomes for the year 2001/2002 will have been affected by un-seasonally dry conditions. As a consequence the figures outlined above may not be an accurate reflection of the longer-term profitability of on-property enterprises in the Glenelg Hopkins region. To help clarify any changes, respondents were asked to indicate how their on-property income in 2001/2002 compared to their average return over the past five years. Just under half of the survey respondents said their on-property income in 2001/2002 was similar to the average over the last five years (46%), 35% said it was lower, and 19% said it was higher.

The proportion of respondents who returned an on-property profit across the 32 sub-catchments ranged from 92% in G1, G4 and H3 to 37% in G6 [Appendix 1].

#### **Box 20 – On-property profit and adoption of CRP**

There were not significant links between on-property profitability and adoption of CRP in this study.

#### **Off-property income**

Almost three quarters of respondents (72%) reported an off-property profit for the 2001/2002 financial year. The mean off-property profit for all respondents for this period was approximately \$18,000.

The proportion of respondents who reported an off-property profit across the 32 sub-catchment s ranged from 96% in H5 and H10 to 52% in P4 [Appendix 1].

#### **Box 21 – Off-property profit and adoption of CRP**

There were not significant links between off-property profitability and adoption of CRP in this study.

#### **Total household income**

The mean total household income for all respondents (calculated by combining on-property and off-property income) was approximately \$36,000. Only 27% of respondents had a total household income above the \$50,000 threshold considered to necessary to maintain a household and to fund improvements in a farm's natural and capital resources (Rendell *et al.* 1996). The combined total household income for all respondents was just under \$35 million. Of this, on-property income accounted for just over \$17 million or 49% of all income. The combined off-property income was just under \$18 million or 51% of the total income for the 2001/2002 financial year. To the extent that on-property profitability increases when the drought breaks, the balance of on-property and off-property income may shift. Nevertheless, information presented earlier suggests that the proportion of people seeking off-property income is likely to remain constant and therefore off-property income can be expected to remain as a very important contributor to household incomes.

#### **Box 22 – Total household income and adoption of CRP**

There were not significant links between respondents total household income and adoption of CRP in this study.

#### **Level of property equity**

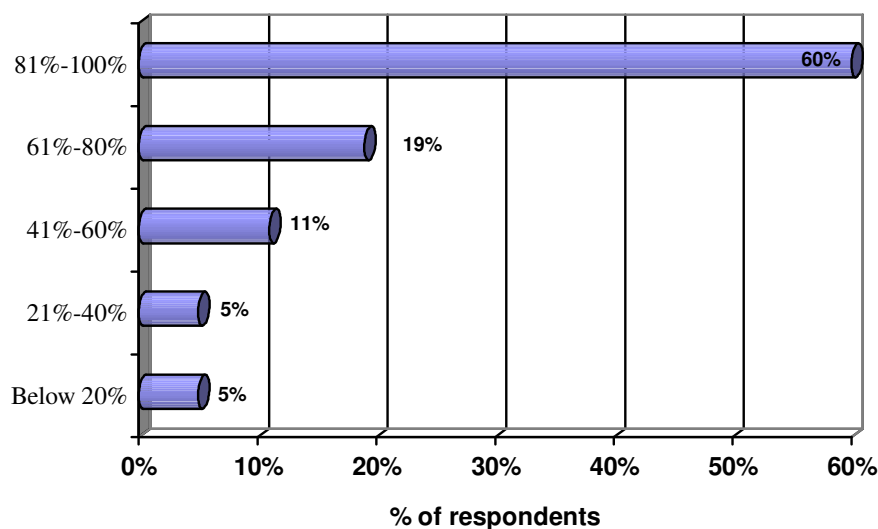
Respondents were asked to indicate the level of equity in their property (including land, machinery, buildings and livestock) using five options, each covering a 20% range.

Most respondents had high levels of equity with over half (60%) of all respondents indicating 81%-100% equity. About one fifth of respondents (21%) had less than 60% equity in their property [Figure 25].

### Box 23 – Equity and adoption of CRP

Respondents who reported higher equity in their property were significantly more likely to have adopted the CRP watered stock from a trough/tank/dam.

FIGURE 25 – LEVEL OF EQUITY



### Land use and enterprise mix

The survey asked respondents to indicate land uses/enterprises undertaken on their property and the approximate area under each enterprise from a list of 19 options.

### Key findings

- Dryland pasture and other trees for shade and shelter, erosion control or recharge control were the dominant enterprises/land uses and the only ones to be reported by the majority of respondents.
- The only other enterprises/land uses to be reported by at least a third of respondents were beef cattle, sheep for wool, native remnant vegetation, and sheep for meat.

Dryland pasture was the most common land use/enterprise reported by landholders in the Glenelg Hopkins region with 73% of respondents reporting this enterprise on their property. Keeping in mind that respondents could nominate more than one enterprise on any area of their property it is important to note that 84% of respondents with dryland pasture also

reported either sheep for wool, sheep for meat and/or beef cattle on their property. Other tree planting for shade and shelter, erosion control, or recharge control was the only other land use/enterprise reported on the majority of properties surveyed (52%). Just under half of all respondents also reported beef cattle (46%) and sheep for wool (44%) on their property. Remnant native vegetation and sheep for meat enterprises were reported by just over one third of respondents (39% for both). Broadacre cropping (24%), raised bed cropping (13%) and dairying (13%) were the only other enterprises reported on more than 10% of properties surveyed. A small proportion of respondents were involved in alternative enterprises including farm forestry (7%), intensive livestock (5%), other livestock (5%), grapes (2%), other horticulture (2%), and eco-tourism (1%). A small proportion of respondents to the mail survey also owned or managed pine plantations (6%) and blue gum plantations (5%) [Figure 26].

Dryland pasture accounted for 58% of the total area surveyed. The total area of other trees planted was just over 12,000 ha or 2% of the survey area. Beef cattle and sheep for wool covered 41% and 22% of the survey area respectively. Remnant vegetation covered just over 30,000 ha or approximately 6% of the combined area of properties surveyed, and sheep for meat just under 100,000 ha or 18%. Broadacre cropping enterprises accounted for 7% of the survey area, raised bed cropping less than 1%, and dairying just under 5%. When considered collectively, alternative enterprises covered almost 35,000 ha or approximately 6% of the survey area and 18% of respondents had at least one of these enterprises on their property. Pine plantations covered approximately 44,000 ha or 8% of the survey area and blue gum plantations 83,000 ha or 15%.

The total area under remnant vegetation, farm forestry or other tree plantings was approximately 33,000 ha or 8% of the area surveyed. The median area of respondents' property under remnant vegetation, other tree plantings or farm forestry across sub-catchments ranged from 57% in G8 to 2% in P6 [Figure 27].



FIGURE 26 – LANDUSES AND ENTERPRISE MIX

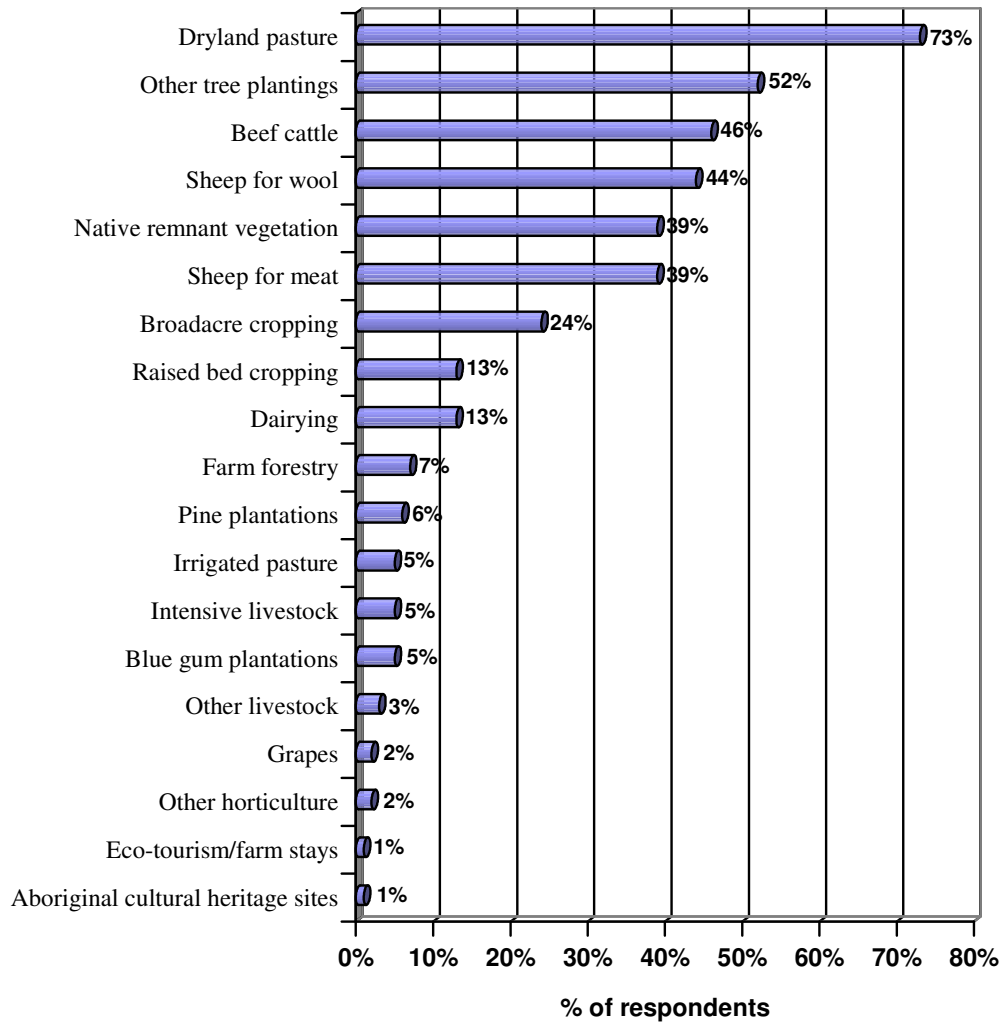
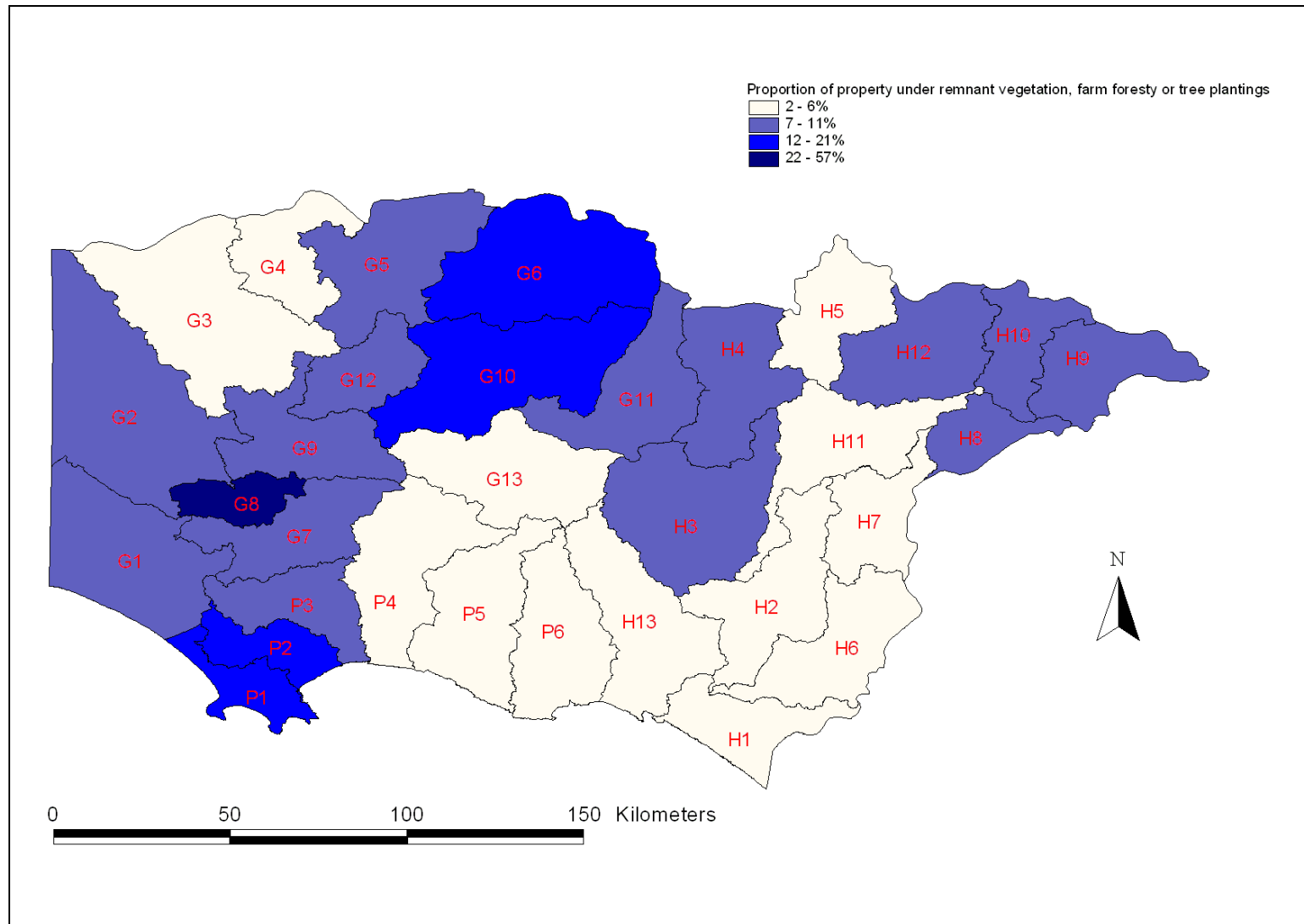


FIGURE 27 – AREA UNDER REMNANT VEGETATION, FARM FORESTRY OR OTHER TREE PLANTINGS



## Constraints to change

The survey explored the importance of 20 factors that our previous research and industry partners thought were likely to influence landholder decision making about taking on new practices. Practices suggested in the preamble included increasing the area under lucerne or native trees, using time controlled grazing, fencing to manage stock access to waterways, adopting minimum tillage, or applying lime to address soil acidity. The response options were “very important”, “important”, “some importance”, “minimal importance”, and “not important”. These response options have been collapsed into three categories – “important” (very important and important), “some” (some importance) and “unimportant” (minimal importance and not important).

### Key findings

- Over three quarters of respondents said that cash flow, suitability of soils, cost of machinery and the existence of long-term markets were or would be important constraints to changing management practices on their property.
- Availability of surface or groundwater, stage of life, extent the practice will increase property values, and the level of commitment and support from family were also among a range of other factors considered important by the majority of respondents.
- The only two factors that were not considered important in influencing respondents decision making about changing management practices were: the extent there were other people in the district undertaking the practice, and the returns available from off-property investments.

Responses to the mail survey highlighted a wide range of economic, environmental and social constraints likely to influence landholder decision making about changing management practices on their property. Indeed 18 of 20 topics listed in the survey were rated as an important constraint by at least half of all respondents in the Glenelg Hopkins region [Figure 28].

The highest rated constraint to implementing changed land management practices was cash flow with over 80% of respondents saying this would be an important factor affecting their decision making. Suitability of soils and the cost of machinery/equipment were also rated as important factors by over 80% of landholders [Figure 28].

The existence of long-term markets, availability of surface or groundwater, stage of life, extent that the practice will increase the property value, and the extent there is support from the family were also highlighted as important constraints by over two thirds of respondents [Figure 28].

The only two factors that were not considered important constraints to change were the extent there are other people in the district undertaking the new practice and the returns available from off-property investments [Figure 28].

Survey data suggesting that cash flow and cost of machinery/equipment were important constraints to the adoption of changed management practices, in combination with the earlier finding that landholders thought they should be paid for environmental services that benefit the wider community, indicate the potential for stronger cost sharing arrangements to

contribute to greater adoption. Rural landholders are becoming increasingly aware that they are often being asked to implement works with wider community benefit. At the same time, most landholders in the Glenelg Hopkins region had not received any government funding to undertake works on their property over the last five years.

One of the assumptions underlying adjustment pressure towards larger more “viable” production units has been that larger and more profitable enterprises will be better placed to implement improved management practices. However, findings from this survey indicated the respondents who reported an on-property profit were actually more likely to report that cash flow and the cost of machinery were important constraints. Eighty-seven percent of those who returned an on-property profit said cash flow was an important constraint compared to 76% of those who did not make a profit ( $\chi^2 = 25.675$ ,  $df = 1$ ,  $p < 0.001$ ). Eighty-two percent of those who returned an on-property profit also said the cost of machinery/equipment was an important constraint compared to 75% of those who did not make a profit ( $\chi^2 = 24.091$ ,  $df = 1$ ,  $p < 0.001$ ).

While at first this finding may seem counter-intuitive, the strong link between returning a profit and larger property size appears to provide part of the explanation for this finding. Despite being more profitable, respondents with larger properties were significantly more likely to indicate that cash flow and the cost of machinery/equipment were important constraints to implement changed management practices. The median property size of those who said cash flow was an important constraint was 273 ha compared to 113 ha for those who said it was not important ( $\chi^2 = 41.848$ ,  $df = 2$ ,  $p < 0.001$ ), and the median property size of those who said the cost of machinery/equipment was an important constraint was 269 ha compared to 171 ha for those who said it was not important ( $\chi^2 = 13.721$ ,  $df = 2$ ,  $p = 0.002$ ). One possible explanation for this finding is that the scale of investment required by a single landholder to implement change across a larger property will be increased. This finding has important implications for efforts to adjust agricultural enterprises towards larger production units.

There were a number of significant differences in respondents’ assessment of factors likely to influence their decision making about changing management practices across the 32 sub-catchments [Appendix 1 & 2].

#### **Box 24 – Constraints to change and adoption of CRP**

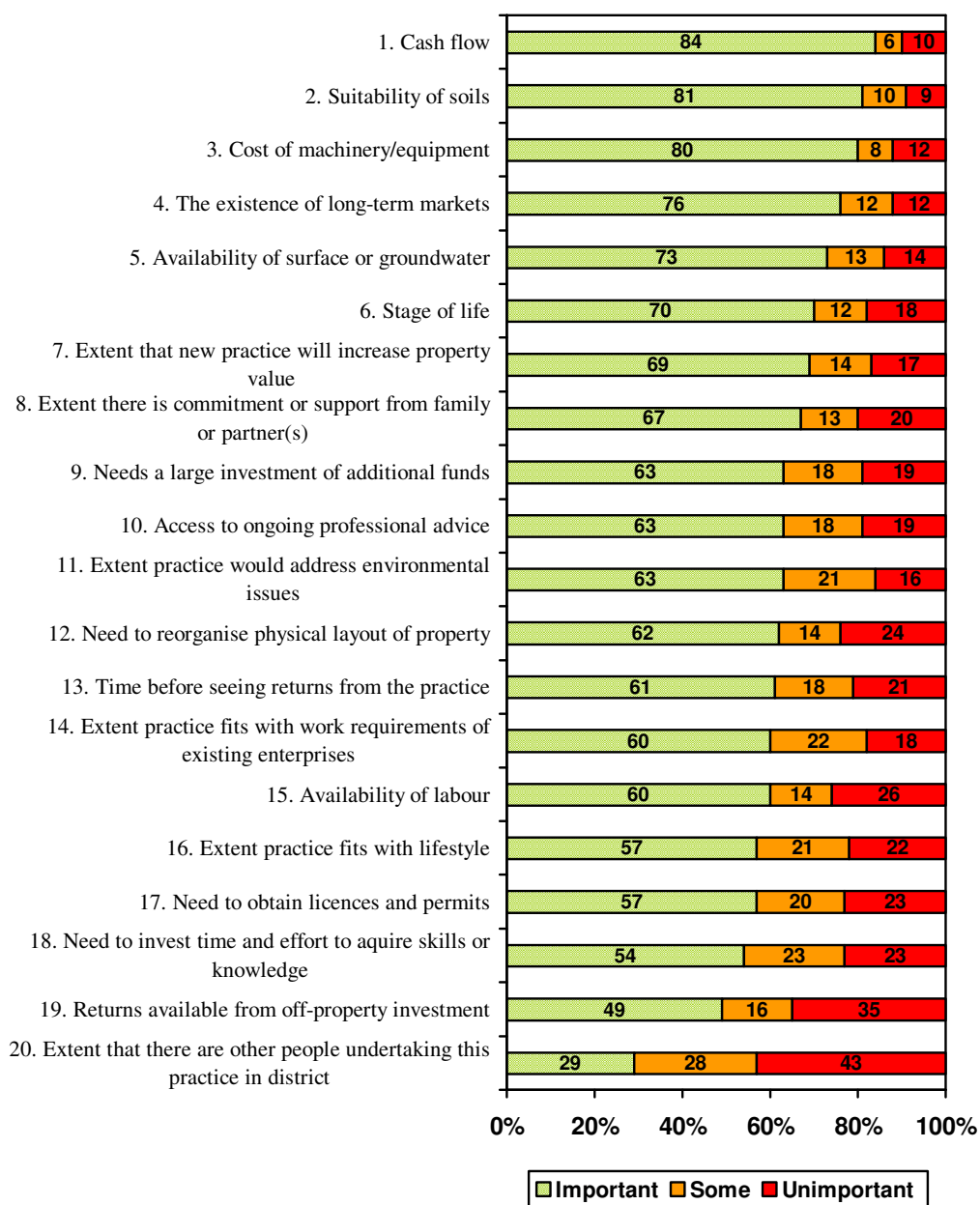
There were some significant links between the perceived constraints to change and adoption of CRP.

- Respondents who said the extent a practice would address environmental issues was important were significantly more likely to adopt the CRP:
  - planted trees and shrubs; and
  - recorded soil test results for paddocks.
- Respondents who said the extent a practice would increase the value of their property was important were significantly more likely to adopt the CRP sown perennial pasture.
- Respondents who said access to on-going professional advice was important were significantly more likely to adopt the CRP;
  - tested water quality of main water sources on the property; and

cropped using minimum tillage practices.

- Respondents who said the extent a new practice fits with the work requirements of their existing enterprises were significantly more likely to adopt the CRP:  
cropped using minimum tillage; and  
used time controlled or spell grazing.
- Respondents who said the returns available from off-property investments were important were significantly more likely to adopt the CRP cropped using minimum tillage.
- Respondents who said the availability of surface or ground water was important were significantly more likely to adopt the CRP cropped using minimum tillage.
- Respondents who said the extent there was support from their family was important were significantly more likely to adopt the CRP native bush fenced to manage stock access.

FIGURE 28 – CONSTRAINTS TO ADOPTING NEW LAND MANAGEMENT PRACTICES



## **Adoption of current recommended practices**

The mail survey included questions relating to the uptake of 15 current recommended practices (CRP) identified as likely to contribute to improved productivity and natural resource management outcomes in the Glenelg Hopkins region. Survey respondents were asked to indicate the area of their property under each practice. As some CRP relate to specific enterprises, only individuals who reported those enterprises on their property were included in calculations. For example, only respondents who reported that they cropped on their property were included in the analysis exploring the adoption of the CRP minimum tillage. As a result the 15 CRP have been grouped into three categories:

1. Non-specific CRP (including all respondents).
  - a. Planted trees and shrubs (including direct seeding).
  - b. Encouraged regrowth of native vegetation.
  - c. Record of soil test results for paddocks.
  - d. Sown perennial pasture or lucerne.
  - e. Property fenced to allow management by land classes.
  - f. Applied lime.
  - g. Conducted work to control pest animal and non-crop weeds.
  - h. Tested water quality of main water sources on property.
2. Cropping CRP (including only those respondents who reported cropping enterprises on their property).
  - a. Cropped using a rotation that was varied based on soil test results.
  - b. Cropped using a rotation with pasture (e.g. lucerne).
  - c. Cropped using minimum tillage practices.
3. Stock CRP (including only those respondents who reported stock on their property).
  - a. Fenced to manage stock access to waterways.
  - b. Fenced to manage stock access to native bush.
  - c. Only watered stock from a trough or tank.
  - d. Used time controlled or spell grazing.

## Key findings

- Survey data highlighted high levels of adoption of some CRP including only watering stock from a trough or tank (90% with stock adopted practice), undertaking pest animal and non-crop weed control (81% adopted), planted trees and shrubs (69% adopted), used minimum tillage (67% with cropping adopted), and had a record of soil test results (64% adopted).
- Fenced to manage stock access to waterways (59%), sown perennial pasture (59%), and cropped using a rotation with pasture (52%) were also adopted by the majority of respondents.
- Findings demonstrated moderate uptake of the CRP applied lime, cropped with a rotation based on soil test results, tested the quality of main water sources, used time controlled grazing, and fenced to allow management by land classes.
- Only two CRP were adopted by less than 40% of respondents: fenced to manage stock access to native bush (20% with stock adopted); and encouraged regrowth of native vegetation (37% adopted).

### Non-specific CRP

Finding from the survey of landholders in the Glenelg Hopkins regions highlighted high levels of adoption of a number of CRP.

#### *Conducted work to control pest animals and non-crop weeds*

Eighty-one percent of respondents had adopted the CRP conducted work to control pest animals and non-crop weeds over the past five years with a median of 30 days work. The combined total number of days spent on controlling pest animals and non-crop weeds by respondents to the survey over the past five years was 45,856 days. Using binary logistic regression, adoption of the CRP conducted work to control pest animals and non-crop weeds was significantly linked to respondents who:

- said they had a long-term vision or plan about the improvements they would like to make on their property (Wald=15.218,  $p<0.001$ , Exp(B)=2.358);
- owned or managed larger properties (Wald=8.310,  $p=0.004$ , Exp(B)=1.252);
- said the cost of managing weeds and pest animals was an important issue (Wald=4.497,  $p=0.034$ , Exp(B)=1.279);
- said their long-term plans were **unlikely** to involve no longer undertaking much of the physical on-property work (Wald=8.610,  $p=0.003$ , Exp(B)=0.797);
- said landholder will benefit from quality assurance measure that require them to adopt improved practices (Wald=8.570,  $p=0.003$ , Exp(B)=1.445);
- said they had areas on their property where plants were showing signs of salinity (Wald=8.388,  $p=0.004$ , Exp(B)=2.171); and
- were younger (Wald=5.205,  $p=0.023$ , Exp(B)=0.982).

These variables explained approximately 17% of the variation in adoption of the CRP conducted work to control pest animals and non-crop weeds (Nagelkerke pseudo  $R^2=0.168$ ).



### *Planted trees and shrubs*

Over two thirds of respondents (69%) had adopted the CRP planted trees and shrubs with a median of 5 ha replanted. The combined area of trees and shrubs planted was just over 39,000 ha or approximately 7% of area surveyed. Using binary logistic regression, adoption of the CRP planted trees and shrubs was significantly linked to respondents who:

- said the property was their primary place of residence (Wald=16.834,  $p<0.001$ ,  $\text{Exp(B)}=2.384$ );
- said fencing is an essential part of the work required to revegetate waterways (Wald=8.940,  $p=0.003$ ,  $\text{Exp(B)}=1.522$ );
- said the extent the practice would address environmental issues was an important factor in their decision making about changing management practices (Wald=13.795,  $p<0.001$ ,  $\text{Exp(B)}=1.619$ );
- said they had work funded by government undertaken on their property in the last 5 years (Wald=22.519,  $p<0.001$ ,  $\text{Exp(B)}=3.186$ ); and
- said they were further advanced in accomplishing the plan or vision they had about the improvements they wanted to make on their property (Wald=21.422,  $p<0.001$ ,  $\text{Exp(B)}=1.590$ ).

These five variables accounted for approximately 23% of the variation in adoption of the CRP planted trees and shrubs (Nagelkerke pseudo  $R^2=0.232$ ).

### *Recorded soil test results for paddocks*

Just under two thirds of all respondents (64%) had adopted the CRP recorded soil test results for a median of 50% of the paddocks on their property. Using binary logistic regression, adoption of the CRP recorded soil test results was significantly linked to respondents who:

- said they had sound knowledge about how to interpret results from soil testing (Wald=34.904,  $p<0.001$ ,  $\text{Exp(B)}=2.554$ );
- said the extent the a practice would address environmental issues was an important factor in their decision making about changing management practices (Wald=14.419,  $p<0.001$ ,  $\text{Exp(B)}=1.768$ );
- had employed a consultant to provide advice on property management in the last year (Wald=18.569,  $p<0.001$ ,  $\text{Exp(B)}=4.831$ );
- said they had work funded by government undertaken on their property in the last 5 years (Wald=11.450,  $p=0.001$ ,  $\text{Exp(B)}=2.415$ );
- were involved or further advanced in preparing a whole farm plan (Wald=11.137,  $p=0.001$ ,  $\text{Exp(B)}=1.344$ );
- said they were further advanced in accomplishing the plan or vision they had about the improvements they wanted to make on their property (Wald=18.401,  $p<0.001$ ,  $\text{Exp(B)}=1.662$ ); and
- said farming was their primary occupation (Wald=26.958,  $p<0.001$ ,  $\text{Exp(B)}=3.124$ ).

These variables explained approximately 48% of the variation in adoption of the CRP recorded soil test results (Nagelkerke pseudo  $R^2=0.476$ ).

### *Sown perennial pasture*

Fifty-nine percent of respondents had adopted the CRP sown perennial pasture on their property. The median area sown to perennial pasture was 116 ha with a combined area of almost 150,000 ha or 27% of the area surveyed. Using binary logistic regression, adoption of the CRP sown perennial pasture was significantly linked to respondents who:

- said farming was their primary occupation (Wald=35.131,  $p<0.001$ ,  $\text{Exp}(B)=3.076$ );
- said they had work funded by government undertaken on their property in the last 5 years (Wald=10.834,  $p=0.001$ ,  $\text{Exp}(B)=1.921$ );
- said they were further advanced in accomplishing the plan or vision they had about the improvements they wanted to make on their property (Wald=19.034,  $p<0.001$ ,  $\text{Exp}(B)=1.478$ );
- had completed a short course relevant to property management in the past 5 years (Wald=5.484,  $p=0.019$ ,  $\text{Exp}(B)=1.534$ ); and
- said the extent the practice would increase the value of their property was an important factor in their decision making about changing management practices (Wald=4.862,  $p=0.027$ ,  $\text{Exp}(B)=1.298$ ).

These variables explained almost 23% of the variation in adoption of the CRP sown perennial pasture (Nagelkerke pseudo  $R^2=0.226$ ).

### *Applied lime*

Just under half of all respondents to the mail survey (46%) had adopted the CRP applied lime. The median area of respondents' property where lime had been applied was 100 ha with a total area of nearly 84,000 ha or 15% of the combined area of properties surveyed. Using binary logistic regression, adoption of the CRP applied lime was significantly linked to respondents who:

- were a member of a local commodity group (Wald=14.592,  $p<0.001$ ,  $\text{Exp}(B)=2.268$ );
- had employed a consultant to provide advice on property management in the last year (Wald=8.544,  $p=0.003$ ,  $\text{Exp}(B)=1.786$ );
- said they were further advanced in accomplishing the plan or vision they had about the improvements they wanted to make on their property (Wald=5.940,  $p=0.015$ ,  $\text{Exp}(B)=1.216$ );
- said farming was their primary occupation (Wald=24.498,  $p<0.001$ ,  $\text{Exp}(B)=2.482$ ); and
- said their long-term plans were **unlikely** to involve seeking additional off-property work (Wald=6.283,  $p=0.012$ ,  $\text{Exp}(B)=0.865$ ).

These five factors accounted for approximately 19% of the variation in adoption of the CRP applied lime (Nagelkerke pseudo  $R^2=0.189$ ).

### *Tested water quality of main water sources on the property*

Forty-two percent of respondents had adopted the CRP tested water quality of the main water sources on-property. Using binary logistic regression, adoption of the CRP tested water quality of the main water sources on-property was significantly linked to respondents who:

- said they had work funded by government undertaken on their property in the last 5 years (Wald=7.783, p=0.005, Exp(B)=1.884);
- were involved or further advanced in preparing a whole farm plan (Wald=14.357, p<0.001, Exp(B)=1.316);
- said farming was their primary occupation (Wald=4.583, p=0.032, Exp(B)=1.735);
- said access to ongoing professional advice was an important factor in their decision making about implementing changed management practices (Wald=10.160, p=0.001, Exp(B)=1.642); and
- had greater knowledge about how to interpret results from water testing (Wald=23.553, p<0.001, Exp(B)=2.229).

These variables explained almost 29% of the variation in adoption of the CRP tested water quality of the main water sources on property (Nagelkerke pseudo  $R^2=0.285$ ).

#### *Fenced to allow management by land classes*

Forty percent of respondents said they had adopted the CRP fenced to allow management by land classes for a median of 100 ha. The total area under this CRP was over 100,000 ha or approximately 21% of the area surveyed. Using binary logistic regression, adoption of the CRP fenced to allow management by land classes was significantly linked to respondents who:

- said the property was their primary place of residence (Wald=11.536, p=0.001, Exp(B)=1.902);
- said they had work funded by government undertaken on their property in the last five years (Wald=21.888, p<0.001, Exp(B)=2.174);
- were involved or further advanced in preparing a whole farm plan (Wald=28.579, p<0.001, Exp(B)=1.311);
- were more confident that action at the property level could improve the environment (Wald=8.493, p=0.004, Exp(B)=1.628); and
- had higher knowledge about the benefits of ground cover in maintaining soil health and productivity (Wald=10.905, p=0.001, Exp(B)=1.405).

These variables accounted for approximately 19% of the variation in adoption of the CRP fenced to allow management by land classes (Nagelkerke pseudo  $R^2=0.191$ ).

#### *Encouraged regrowth of native vegetation*

Encouraged regrowth of native vegetation was the least commonly adopted CRP with 37% of respondents reporting this practice on their property. The median area respondents reported where regrowth of native vegetation had been encouraged was 6.8 ha with a total of 28,000 ha or 5% of the area surveyed under this CRP. When combining both the area of trees and shrubs planted and the area where regrowth had been encouraged, about 12% of the area surveyed had seen improvements in its vegetation status.

Using binary logistic regression, adoption of the CRP encouraged regrowth of native vegetation was significantly linked to respondents who:

- said they had work funded by government undertaken on their property in the last five years (Wald=46.059,  $p<0.001$ ,  $\text{Exp}(B)=2.849$ );
- were more confident that action at the property level could improve the environment (Wald=20.939,  $p<0.001$ ,  $\text{Exp}(B)=2.345$ );
- said that clearing of native vegetation has reduced the existence and diversity of native plants and animals (Wald=11.699,  $p=0.001$ ,  $\text{Exp}(B)=1.346$ );
- said that fencing waterways **does not** make it more difficult to manage these areas (Wald=6.429,  $p=0.011$ ,  $\text{Exp}(B)=0.807$ );
- had higher knowledge about the benefits of vegetation in waterways and gullies to improve water quality (Wald=11.555,  $p=0.001$ ,  $\text{Exp}(B)=1.360$ ); and
- said dryland salinity was an important issue undermining the productive capacity of their district (Wald=4.863,  $p=0.027$ ,  $\text{Exp}(B)=1.112$ ).

These variables accounted for approximately 19% of the variation in adoption of the CRP encouraged regrowth of native vegetation (Nagelkerke pseudo  $R^2=0.188$ ).

### **Cropping CRP**

Respondents involved in cropping enterprises reported relatively high levels of adoption of cropping CRP with over half of all respondents adopting two of the three cropping CRP.

#### *Cropped using minimum tillage*

Just over two thirds of all respondents with cropping enterprises on their property had adopted the CRP cropped using minimum tillage. The median area cropped using this practice was 100 ha. Using binary logistic regression, adoption of the CRP minimum tillage was significantly linked to respondents who:

- owned or managed larger properties (Wald=12.329,  $p<0.001$ ,  $\text{Exp}(B)=1.422$ );
- said that reduced technical advice from the government to help manage their property was **not** an important issue (Wald=5.579,  $p=0.018$ ,  $\text{Exp}(B)=1.334$ );
- said the extent a new practice fits with the work requirements of existing enterprises was an important factor in decision making about adopting new practices (Wald=5.376,  $p=0.020$ ,  $\text{Exp}(B)=1.767$ ); and
- said access to ongoing professional advice was an important factor in their decision making about implementing changed management practices (Wald=7.002,  $p=0.008$ ,  $\text{Exp}(B)=1.728$ ).

These variables explained approximately 20% of the variation between respondents (involved in cropping) who had and had not adopted minimum tillage practices (Nagelkerke pseudo  $R^2=0.201$ ).

#### *Cropped using a rotation with pasture*

Fifty-two percent of respondents also adopted the CRP cropped using a rotation with pasture with a median of 80 ha cropped under this practice. Using binary logistic regression, adoption of the CRP cropped using a rotation with pasture was significantly linked to respondents who:

- were more confident that action at the property level could improve the environment (Wald=5.571, p=0.018, Exp(B)=2.123);
- higher knowledge about the ability of perennial vegetation and standing stubble to improve water quality (Wald=5.187, p=0.023, Exp(B)=1.520);
- said the returns available from off-property investments was **not** an important factor in their decision making about changing management practices (Wald=7.877, p=0.005, Exp(B)=0.637); and
- said the availability of surface or ground water was an important factor in their decision making about changing management practices (Wald=4.542, p=0.033, Exp(B)=1.586).

These four factors explained approximately 14% of the variation between respondents (involved in cropping) who had and had not adopted minimum tillage practices (Nagelkerke pseudo  $R^2=0.143$ ).

#### *Cropped using a rotation based on soil test results*

Less than half of all respondents with cropping enterprises used a rotation based on soil test results. Forty-two percent of respondents adopted this practice on a median of 100 ha. Results from binary logistic regression indicated that the adoption of a cropping rotation varied according to soil test results was significantly linked to respondents who:

- said that fencing waterways makes it more difficult to manage these areas (Wald=6.559, p=0.010, Exp(B)=1.486);
- had higher knowledge about how to identify acidic soils (Wald=6.945, p=0.008, Exp(B)=1.632); and
- said the extent a new practice fits with their lifestyle was an important factor in decision making about implementing new management practices (Wald=9.640, p=0.002, Exp(B)=1.927).

These three factors explained approximately 13% of the variation in the adoption of the CRP cropped using a rotation varied according to soil test results (Nagelkerke pseudo  $R^2=0.130$ ).

### **Stock CRP**

Findings regarding the adoption of stock related CRP highlighted mixed results across the four CRP included in the survey.

#### *Only watered stock from a trough/tank/dam*

Almost all respondents involved in stock related enterprises in the Glenelg Hopkins region adopted the CRP only watered stock from a trough/tank/dam for all paddocks on their property. Using binary logistic regression adoption of the CRP stock only watered from a trough/tank/dam was significantly linked to respondents who:

- said they had a higher level of equity in their property (Wald=8.777, p=0.003, Exp(B)=1.350);
- said they had a plan or vision about the improvements they wanted to make on their property (Wald=13.809, p<0.001, Exp(B)=3.019); and

- said farming was their primary occupation (Wald=4.094, p=0.041, Exp(B)=1.764).

These factors explained approximately 8% of the variation between those who had and had not adopted the CRP only watered stock from a trough/tank/dam (Nagelkerke pseudo  $R^2=0.084$ ).

#### *Fenced to manage stock access to waterways*

Over half of all respondents (59%) with stock related enterprises had adopted the CRP fenced waterways to manage stock access with a median length of 3 km of fencing. The combined length of fencing erected to manage stock access to waterways in the Glenelg Hopkins region was nearly 4,000 km. Using binary logistic regression adoption of the CRP fenced to manage stock access to waterways was significantly linked to respondents who:

- said they had work funded by government undertaken on their property in the last five years (Wald=32.747, p<0.001, Exp(B)=4.382);
- said they were further advanced in accomplishing the plan or vision they had about the improvements they wanted to make on their property (Wald=12.137, p<0.001, Exp(B)=1.535);
- said fencing was an essential part of the work required to revegetate waterways (Wald=19.090, p<0.001, Exp(B)=2.628);
- thought the time and expense of watering stock off-stream or off-wetlands was justified by improvements in bank stability, water quality or stock condition (Wald=4.056, p=0.044, Exp(B)=1.441); and
- said they had areas on their property where plants were showing signs of salinity (Wald=6.561, p=0.010, Exp(B)=1.938).

These factors explained approximately 34% of the variation between those who had and had not adopted the CRP fenced to manage stock access to waterways (Nagelkerke pseudo  $R^2=0.342$ ).

#### *Used time controlled or spell grazing*

Forty percent of respondents with stock related enterprises had adopted the CRP used time controlled or spell grazing. The median uptake of the practice was 90 ha with a total area of approximately 61,000 ha or 16% of all grazing land surveyed. Binary logistic regression showed that adoption of the CRP used time controlled or spell grazing was significantly linked to respondents who:

- reported that their long-term plans were likely to involve increasing the area of land they managed (Wald=6.331, p=0.012, Exp(B)=1.188);
- were more confident that action at the property level could improve the environment (Wald=4.866, p=0.027, Exp(B)=1.420);
- were involved or further advanced in preparing a whole farm plan (Wald=9.861, p=0.002, Exp(B)=1.166); and
- said the extent a new practice fits with the work requirements of existing enterprises was an important factor in decision making about adopting new practices (Wald=10.472, p=0.001, Exp(B)=1.411).

This variables accounted for just under 7% of variation in the adoption of the CRP used time controlled or spell grazing (Nagelkerke pseudo  $R^2=0.068$ ).

#### *Native bush fenced to manage stock access*

Only 20% of respondents with stock had adopted the CRP fenced to manage stock access to native bush. Of those who adopted this practice the median area fenced was 7 ha with a combined area of 2,652 ha or less than 1% of the total survey area with stock related enterprises. Using binary logistic regression, adoption of the CRP native bush fenced to manage stock access was significantly linked to respondents who:

- had higher knowledge about the effects of draining wetlands on native plants and animals (Wald=12.833,  $p<0.001$ , Exp(B)=1.412);
- said the extent there was support from their family was an important factor in decision making about implementing new management practices (Wald=7.636,  $p=0.006$ , Exp(B)=1.514);
- said they had work funded by government undertaken on their property in the last five years (Wald=7.753,  $p=0.005$ , Exp(B)=1.770);
- said farming was **not** their primary occupation (Wald=16.414,  $p<0.001$ , Exp(B)=0.417); and
- said fencing waterways did not make it more difficult to manage these areas (Wald=5.058,  $p=0.025$ , Exp(B)=0.774).

These factors explained approximately 10% of the variation in adoption of the CRP fenced to manage stock access to native bush (Nagelkerke pseudo  $R^2=0.100$ ).

### **Discussion of major factors influencing adoption of CRP**

The single variable most commonly linked to the adoption of CRP included in the mail survey was having work on the property in the past five years that had been at least partially funded by government. Respondents who had government funded work on their property were significantly more likely to adopt over half of the CRP including planting trees and shrubs, recording soil test results for paddocks, establishing perennial pasture, testing water quality, fencing to allow management by land classes, encouraging regrowth of native vegetation, fencing to manage stock access to waterways, and fencing native bush to manage stock access.

The importance of government funded work in facilitating adoption is consistent with the finding that the majority of respondents thought that landholders should be paid for providing environmental services that benefit the wider community. At the same time, over 70% of landholders in the Glenelg Hopkins region said they had not had any work funded on their property in the last five years. The perceived complexity of application processes to access government funding appears to be part of the explanation for limited government funded work on private property in the region. Just under half of all respondents reported that red tape limited their interest in applying for government assistance. Access to government funding can clearly help facilitate higher adoption of CRP, however, careful consideration needs to be paid to ensuring any application process is as streamlined as possible. When respondents were asked how they would like to be involved in funding arrangements to support improved natural resource management, the most popular alternatives were reduction in rates levied by local government (50% interested) and tax rebates (47% interested).

Analysis of survey data also highlighted that the nature of respondents' property and their relationship to their property were important factors linked to the adoption of CRP. For example, respondents who said farming was their primary occupation were significantly more likely to adopt a number of CRP including recorded soil test results, sown perennial pasture, applied lime, tested the water quality of main water sources, and watered stock from a trough/tank/dam. There was an exception to the trend towards higher adoption of CRP for farmers with respondents who said farming was their primary occupation significantly less likely to adopt the CRP native bush fenced to manage stock access. Respondents with larger properties were also more likely to adopt the CRP conducted work to control pest plants and animals and cropped using minimum tillage. These findings suggest that farmers and larger property owners are significantly more likely to adopt CRP aimed at sustainable production. This is likely to represent an important issue particularly in sub-catchments where there are a high proportion of non-farmers and small property owners [Appendix 1]. To a larger extent this trend reflects the fact that much of the focus on attempting to foster higher rates of adoption has been directed to the traditional farming enterprises. However, in sub-catchments with many non-farmers and smaller property owners, education and awareness raising activities need to be targeted to meet the needs and interests of these people. As highlighted earlier in this report, non-farmers managed almost 40% of the area surveyed.

The extent to which respondents were involved in a range of property planning activities were also linked to the adoption of a number of CRP. While involvement in whole farm planning was linked to the adoption of some CRP (see below) it is interesting to note that the most common planning activity to be linked to the adoption of CRP was the extent to which respondents had a plan or vision about the improvements they wanted to make on their property. Respondents who said that they had a plan or vision of the improvements that wanted to make on their property and those who said they were further advanced in implementing these changes, were significantly more likely to adopt the CRP conducted work to control pest plants and animals, planted trees and shrubs, recorded soil test results, sown perennial pasture, applied lime, only watered stock from a trough/tank/dam, and fenced to manage stock access to waterways. Respondents who were involved or further advanced in whole farm planning were also more likely to have adopted the CRP recorded soil test results, tested water quality for main water sources, and used time controlled or spell grazing.

In light of the earlier finding that there was scope to increase the uptake of whole farm planning, on-going promotion and support for landholders to undertake these plans appears to be an important element in facilitating the adoption of CRP. Findings from this survey also highlight the importance of less formal and less structured planning processes and in fact these were linked to the adoption of a larger number of CRP. Given the earlier finding that smaller property owners were less likely to be involved in whole farm planning, providing a less structured and less formal alternative may help facilitate planning and ultimately adoption for smaller landholders. An information package outlining some simple planning steps and processes and people to contact for advice may provide a useful resource to help landholders plan the improvements they would like to make on their property.

The degree of confidence landholders had that action at the property level could contribute to improved environmental outcomes across the district was also linked to the adoption of several CRP including fenced to allow management by land classes, encouraged regrowth of native vegetation, cropped using a rotation with pasture, and used time controlled or spell grazing. One option to improve landholder confidence in CRP could be to establish local demonstration sites and field days designed to clearly test the on-ground benefits of implementing CRP.

Contrary to common perception, there were no links between on-farm profitability and adoption of CRP in this study. Respondents' age was also not an important factor linked to



the adoption of most CRP included in the survey. Indeed there was only one CRP (conducted work to control pest animals and plants) where older respondents had significantly lower levels of adoption. However, it is important to note that over half of respondents said that stage of life was an important factor in their decision making about new practices. If the average age of landholders in the Glenelg Hopkins region continues to increase, age may become a more important barrier to the adoption of CRP.

Tables 4, 5 and 6 outline the difference in adoption of CRP across the 32 sub-catchments in the Glenelg Hopkins region.

**Table 3**  
**Adoption of current recommended practices**

Current Recommended Practice		% of landholders adopting practice	Median uptake of practice per landholder surveyed
Non-specific	Planted trees and shrubs	69%	5 ha
	Encouraged regrowth of native vegetation	37%	6.8 ha
	Record of soil tests for paddocks	64%	50% of paddocks
	Sown perennial pasture (e.g. lucerne)	59%	116 ha
	Fenced to allow management by land classes	40%	100 ha
	Applied lime	46%	100 ha
	Control of pest animal and non-crop weeds	81%	30 days/year
	Tested water quality of main water sources	42%	NA
Cropping	Cropped using a rotation that was varied based on soil test results	43%	100 ha
	Cropped using a rotation with pasture	52%	80 ha
	Cropped using minimum tillage practices	67%	125 ha
Stock	Fenced to manage stock access to waterways	59% (a)	3 km
	Used time controlled or spell grazing	40%	90 ha
	Only watered stock from a trough or tank	90%	100% of paddocks
	Fenced to manage stock access to native bush	20% (b)	7 ha

*a – calculated by using only those respondents who had a natural waterway on their property (83%).*

*b – calculated by using only those respondents with areas of native bush on their property (58%).*

**Table 4**  
**Adoption of current recommended practices across sub-catchments in the Glenelg Basin**

CRP	Proportion of respondents adopting CRP for sub-catchments in the Glenelg Basin												
	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13
Planted trees and shrubs	52%	40%	67%	76%	70%	63%	58%	61%	68%	59%	77%	63%	68%
Encouraged regrowth of native vegetation	28%	53%	44%	48%	48%	59%	42%	33%	28%	62%	40%	43%	26%
Record of soil tests for paddocks	64%	47%	65%	68%	57%	44%	79%	39%	45%	62%	73%	53%	51%
Sown perennial pasture (eg. Lucerne)	52%	43%	58%	64%	78%	44%	67%	44%	60%	45%	50%	57%	51%
Fenced to allow management by land classes	48%	30%	49%	60%	33%	25%	67%	39%	23%	52%	40%	33%	38%
Applied lime	28%	30%	37%	60%	37%	28%	58%	17%	28%	52%	43%	57%	28%
Control of pest animal and non-crop weed	96%	83%	81%	96%	89%	78%	79%	67%	68%	83%	90%	77%	76%
Tested water quality of main water sources (a)	44%	40%	59%	65%	50%	43%	47%	15%	59%	53%	56%	70%	41%
Cropped using a rotation that was varied based on soil test results (b)	NA	0%	67%	42%	25%	60%	33%	NA	25%	20%	30%	0%	77%
Cropped using a rotation with pasture (b)	NA	0%	33%	50%	75%	60%	33%	NA	50%	20%	40%	20%	47%
Cropped using minimum tillage practices (b)	NA	100%	42%	67%	60%	67%	50%	NA	50%	40%	50%	20%	59%
Fenced to manage stock access to waterways (c)	29%	40%	64%	74%	71%	67%	60%	75%	50%	53%	50%	61%	50%
Used time controlled or spell grazing (d)	60%	30%	47%	48%	33%	48%	43%	44%	30%	39%	62%	48%	39%
Only watered stock from a trough or tank (d)	100%	78%	90%	78%	76%	91%	90%	100%	91%	83%	96%	85%	96%
Fenced to manage stock access to native bush (e)	41%	11%	16%	37%	29%	45%	27%	22%	15%	26%	14%	15%	12%

(a) = respondents with waterways on their property; (b) = respondents involved in cropping enterprises; (c) = respondents with stock and a waterway on their property; (d) = respondents with stock on their property; (e) respondents with stock and native bush on their property.

**Table 5**  
**Adoption of current recommended practices across sub-catchments in the Hopkins Basin**

CRP	Proportion of respondents adopting CRP for sub-catchments in the Hopkins Basin												
	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13
Planted trees and shrubs	65%	88%	93%	71%	82%	73%	85%	67%	71%	60%	81%	50%	71%
Encouraged regrowth of native vegetation	32%	20%	52%	39%	36%	25%	26%	37%	38%	36%	42%	25%	20%
Record of soil tests for paddocks	69%	74%	82%	89%	64%	59%	89%	63%	33%	20%	87%	45%	67%
Sown perennial pasture (eg. Lucerne)	61%	67%	82%	75%	59%	66%	78%	67%	52%	40%	68%	35%	61%
Fenced to allow management by land classes	44%	43%	67%	86%	54%	48%	63%	48%	67%	24%	71%	45%	45%
Applied lime	44%	48%	59%	46%	46%	48%	44%	37%	48%	24%	48%	25%	29%
Control of pest animal and non-crop weed	72%	83%	89%	96%	96%	75%	85%	82%	86%	64%	84%	65%	71%
Tested water quality of main water sources (a)	52%	56%	73%	54%	63%	40%	46%	30%	25%	27%	73%	13%	44%
Cropped using a rotation that was varied based on soil test results (b)	100%	18%	60%	50%	31%	70%	20%	38%	22%	50%	57%	56%	40%
Cropped using a rotation with pasture (b)	0%	55%	80%	45%	69%	60%	47%	44%	44%	75%	57%	33%	60%
Cropped using minimum tillage practices (b)	100%	64%	67%	90%	77%	70%	73%	56%	89%	25%	91%	78%	60%
Fenced to manage stock access to waterways (c)	48%	60%	75%	67%	53%	54%	82%	56%	25%	50%	80%	43%	53%
Used time controlled or spell grazing (d)	43%	41%	46%	36%	39%	39%	33%	25%	20%	31%	21%	20%	47%
Only watered stock from a trough or tank (d)	92%	95%	96%	91%	96%	88%	92%	95%	87%	88%	86%	87%	84%
Fenced to manage stock access to native bush (e)	24%	12%	4%	11%	26%	9%	5%	25%	25%	13%	16%	31%	18%

(a) = respondents with waterways on their property; (b) = respondents involved in cropping enterprises; (c) = respondents with stock and a waterway on their property; (d) = respondents with stock on their property; (e) respondents with stock and native bush on their property.

**Table 6**  
**Adoption of current recommended practices across sub-catchments in the Portland Coast Basin**

CRP	Proportion of respondents adopting CRP for sub-catchments in the Portland Coast Basin					
	P1	P2	P3	P4	P5	P6
Planted trees and shrubs	58%	64%	76%	65%	65%	70%
Encouraged regrowth of native vegetation	46%	52%	52%	39%	21%	27%
Record of soil tests for paddocks	79%	56%	76%	74%	71%	76%
Sown perennial pasture (eg. Lucerne)	54%	40%	69%	55%	62%	65%
Fenced to allow management by land classes	42%	48%	48%	29%	38%	46%
Applied lime	50%	44%	55%	23%	41%	30%
Control of pest animal and non-crop weed	92%	88%	97%	71%	82%	81%
Tested water quality of main water sources (a)	40%	36%	25%	43%	36%	28%
Cropped using a rotation that was varied based on soil test results (b)	0%	100%	100%	20%	0%	100%
Cropped using a rotation with pasture (b)	100%	0%	50%	60%	0%	0%
Cropped using minimum tillage practices (b)	0%	100%	100%	80%	0%	100%
Fenced to manage stock access to waterways (c)	50%	78%	59%	47%	58%	63%
Used time controlled or spell grazing (d)	52%	37%	58%	36%	35%	32%
Only watered stock from a trough or tank (d)	100%	95%	96%	88%	100%	84%
Fenced to manage stock access to native bush (e)	35%	18%	39%	26%	23%	13%

(a) = respondents with waterways on their property; (b) = respondents involved in cropping enterprises; (c) = respondents with stock and a waterway on their property; (d) = respondents with stock on their property; (e) respondents with stock and native bush on their property.

## Confidence in CRP

Respondents were asked to provide information about their level of confidence in fencing waterways, watering stock off-stream and wetlands, and cropping using stubble retention. This information was gathered using five statements. For each statement respondents were asked to indicate their level of agreement from the following options: “strongly agree”, “agree”, “not sure”, “disagree” and “strongly disagree”. To simplify presentation these categories have been collapsed into three groups: “agree” (strongly agree/agree), “not sure” and “disagree” (strongly disagree/disagree).

### Key findings

- The majority of survey respondents agreed that fencing waterways was an important part of the work required to revegetate these areas. At the same time, some respondents also acknowledged that fencing makes these areas more difficult to manage.
- Most respondents also indicated that the time and expense of watering stock off-stream was justified by improvements in bank stability and water quality.
- There was less certainty regarding the benefits and costs of stubble retention with of respondents uncertain if the benefits of stubble retention outweighed problems with disease and the difficulties/costs of seeding through stubble.

Over three quarters of survey respondents acknowledged that fencing was an important part of the work required to revegetate waterways and eroded gullies (78% agreed). At the same time, there was some concern about the efficacy of fencing waterways with 37% of respondents reporting that fencing these areas makes them more difficult to manage [Figure 29].

Over half of all respondents (57%) also thought that the time and expense of watering stock off-stream was justified by improvements in bank stability and water quality. Only 12% of respondents indicated that the benefits of watering stock off-stream did not out weigh the time and expense involved [Figure 29].

There was considerably more uncertainty regarding the efficacy of stubble retention with the majority of respondents (64%) indicating that they were not sure if the benefits of stubble retention outweighed the costs and difficulties associated with this practice [Figure 29].

Part of the logic in attempting to engage landholders in new land management practices has been that those who trial these practices will have a positive experience and therefore promote or advocate these practices within their local district. To test this assumption, analyses were conducted to compare the levels of confidence in CRP between those who adopted these practices and those who had not. These analyses confirmed that individuals who had adopted CRP were slightly more confident that the benefits of these practices outweighed any costs. Although these differences were only small and many of those adopting CRP were still unconvinced about the efficacy of these practices. These findings highlight the need to follow up with landholders adopting new practices and provide ongoing support to help them work through any issues associated with implementing the new practice.

- Respondents who had fenced waterways or eroded gullies to manage stock access were less likely to indicate that fencing made it difficult to manage these areas (33% of those who adopted compared to 40% of non-adopters).
- Respondents who only watered stock from a trough or tank were more likely to report that benefits in terms of improved water quality and bank stability outweighed the time and expenses involved (59% of those who adopted compared to 52% of non-adopters).
- Respondents who had adopted minimum tillage practices were more likely to indicate that the benefits of stubble retention outweighed the difficulties and costs (38% of those who adopted compared to 27% of non-adopters).

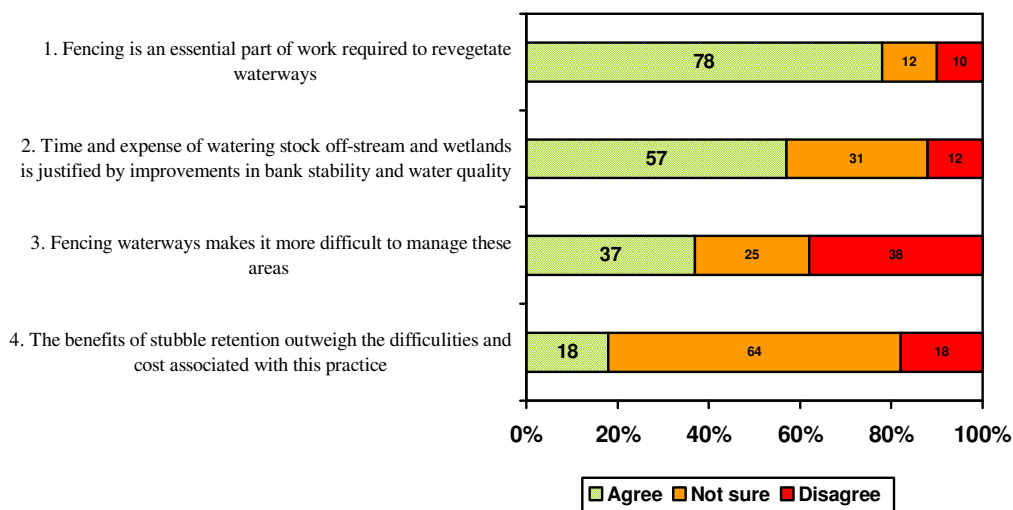
There were no significant differences in respondents' confidence in CRP across the 32 sub-catchments.

#### Box 25 – Confidence and adoption of CRP

There were a number of links between confidence and adoption of CRP.

- Respondents who said that fencing was as essential part of the work required to revegetate waterways were significantly more likely to adopt the CRP:
  - planted trees and shrubs; and
  - fenced to manage stock access to waterways.
- Respondents who **did not** think that fencing waterways made it more difficult to manage these areas were significantly more likely to adopt the CRP:
  - encouraged regrowth of native vegetation; and
  - fenced native bush to manage stock access.
- Respondents who said that fencing waterways made it more difficult to manage these areas were significantly more likely to adopt the CRP cropped using a rotation based on soil test results.
- Respondents who thought that the time and expense of watering stock off-stream or off wetlands was justified by improvements in bank stability, water quality, or stock condition were significantly more likely to adopt the CRP fenced to manage stock access to waterways.

FIGURE 29 – CONFIDENCE IN CURRENT RECOMMENDED PRACTICES



## Other social and demographic variables

### Gender

Women play an important role in decision-making in farming families but their voice is often not heard (Curtis *et al.* 1997). According to estimates by Elix and Lambert (2000) about 30% of Australia's farm work force is female and slightly less than 20% of agricultural decision-makers are women. The mailing list for this survey was compiled from lists of rural property owners provided by local councils [see earlier section on methodology]. No attempt was made to target women property owners or managers.

Of the 1,013 respondents who indicated their gender, 147 or approximately 15% were women. This value is slightly lower than the 20% reported by Elix and Lambert (2000).

### Box 26 – Gender and adoption of CRP

There were no significant links between the adoption of CRP covered in this research and respondents gender.

### Time lived in the local district

Most respondents to the mail survey had lived in their local district for the majority of their life with a median of 38 years. Only 13% of respondents had lived in the area for less than 10 years. The long period of residence in the district for landholders may partly explain the strong attachment to their community and concerns about community decline.

#### **Box 27 – Time lived in the local district and adoption of CRP**

There were no significant links between the adoption of CRP covered in this research and the time respondents had lived in their local district.

#### **Time lived on current property**

Seventy-six percent of respondents said that the property surveyed was their primary place of residence. These respondents indicated that they had lived on their current property for a median of 27 years.

#### **Box 28 – Time lived on current property and adoption of CRP**

Respondents who said that the property surveyed was their primary place of residence were significantly more likely to have adopted the CRP:

- planted trees and shrubs; and
- fenced to allow management by land classes.

#### **Employment of a consultant to provide advice on property management**

Twenty-two percent of respondents said that they had employed a consultant to provide advice on some aspect of property management in the past 12 months.

#### **Box 29 – Employment of a consultant and adoption of CRP**

Employment of a consultant to provide advice on management of their property was significantly linked to adoption of the CRP:

- recorded soil test results for paddocks; and
- applied lime.

#### **Completion of a short course relevant to property management**

Just under half of all respondents (47%) said they had completed a short course relevant to property management in the past five years.



**Box 30 – Use of rural counsellors and adoption of CRP**

Respondents who had completed a short course relevant to property management were significantly more likely to have adopted the CRP sown perennial pasture.

**Use of rural counselling services**

Only 5% of respondents had used the services of a rural counsellor in the past 12 months.

**Box 31 – Use of rural counsellors and adoption of CRP**

There were no significant links between the adoption of CRP covered in this research and use of rural counsellors.

**Number of family members supported by property**

On average, respondents to the survey indicated that income from their property contributed to supporting three family members.

**Box 32 – Family supported by property and adoption of CRP**

There were no significant links between the adoption of CRP covered in this research and the number of family members supported by respondents' property.

**Number of individuals employed on property**

Thirty-eight percent of respondents said that they had employed at least one person (either part-time or full-time) for a period of at least 3 months to work on-property in the past 12 months. The average number of persons employed per respondent was 1.5 or a total of 1,257 persons.

**Box 33 – Persons employed to work on property and adoption of CRP**

There were no significant links between the adoption of CRP covered in this research and the number of people employed to work on property.

## Conclusions and implications

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Findings from this research have provided fundamental baseline information about the attitudes, values, knowledge and behaviour of landholders in the Glenelg Hopkins region. These baseline data also present an opportunity to track changes over time and thus contribute to the monitoring and evaluation of natural resource management activities across the region. Ideally a follow up survey should be conducted in three to five years time in order to realise the full potential of this project. Data from the survey also highlights a number of potential challenges and opportunities for efforts to improve the management of natural resources across the Glenelg Hopkins region.

This project highlights that many of the key issues outlined in the Regional Catchment Strategy for the Glenelg Hopkins were not rated amongst the most important issues by landholders. The top three issues identified by landholders were the movement of young people out of the district, availability of services, and the decline of small towns. Comparatively few respondents reported that they thought dryland salinity, water quality, and decline of native vegetation represented important issues. The most important environmental and production issues identified by respondents were the cost of managing weeds and pest animals and the availability of surface and groundwater for agriculture.

Notwithstanding the finding that many natural resource management issues were not highly rated, landholders in the Glenelg Hopkins region appear to have a strong land stewardship ethic. Being able to pass the property on in better condition was one of the highest rated values attached to respondents' properties. Contributing to the environmental health of the district was also considered to be an important value by over half of all respondents. At the same time, respondents' properties were also highly valued for providing a range of social and economic benefits including providing their desired lifestyle and maintaining a viable business. Landholders in the Glenelg Hopkins region were clearly very conscious of the need to adopt an approach to natural resource management that considered environmental, social and economic outcomes. The majority of survey respondents also appeared confident that landholders in their region could achieve economic, environmental and social sustainability. Furthermore, over half of all respondents thought that improvements in environmental conditions could justify a short-term loss in productive capacity.

It appears that attempts to engage landholders in natural resource management activities that have a narrow focus on the priority issues outlined in the Regional Catchment Strategy may be of limited interest to many landholders. Even though most landholders appear to strongly value the environmental health of their property, these issues only represent one dimension of the raft of issues affecting land managers. To the extent that natural resource management activities can draw links and benefits across a range of environmental, social and economic issues, the chances for uptake will be greatly increased. In particular, any benefits to the wider community, lifestyle of the landholder, and productivity need to be considered.

The mail survey included a number of questions that asked respondents to assess their knowledge about a range of natural resource management topics. Responses to these questions highlighted only one topic (legislation relating to the handling and storage of chemicals) where at least half of the respondents said they had sound knowledge. In contrast, respondents reported more limited knowledge across many topics including those about salinity, water quality, soil acidity and traditional Aboriginal land management practices. The relatively low level of knowledge across these issues is likely to reflect the finding that most landholders did not consider these important issues in their region or on their property. While few respondents said they had sound knowledge about traditional Aboriginal land

management practices or who to contact for advice about managing Aboriginal cultural heritage sites on private property, almost half agreed that Aboriginal communities and landholders should work together to protect cultural heritage sites on private property. These findings highlight a significant opportunity to improve the management of Aboriginal cultural heritage sites on private property through a targeted education/awareness raising campaign.

The majority of landholders surveyed in this project said that farming was their primary occupation and a large proportion of the survey area was owned or managed by a small group of large property owners. Nevertheless, non-farmers owned or managed almost 40% of the area surveyed, and the activities of these landholders will have an important influence on the natural resource management landscape across the Glenelg Hopkins region. Farming as an occupation, and to a lesser extent property size, were important factors linked to the adoption of a number of CRP. In particular, farmers and larger property owners were significantly more likely to adopt the CRP recorded soil test results, sown perennial pasture, applied lime, tested the water quality of main water sources, watered stock from a trough/tank/dam, conducted work to control pest plants and animals, and cropped using minimum tillage. There was one exception to the trend towards higher adoption by farmers with non-farmers significantly more likely to adopt the CRP fenced native bush to manage stock access. In part these findings are likely to reflect the greater emphasis placed on encouraging adoption amongst traditional farming enterprises. These findings highlight a need for education and awareness raising activities designed specifically to appeal to non-farmers and smaller landholders. This will be especially critical in sub-catchments where the proportion of non-farmers and small property owners is high.

Almost three quarters of survey respondents said they returned a pre-tax profit for the 2001/2002 financial year. Almost three quarters of respondents also reported an off-property profit for the same year. When considering the combined total household incomes there was almost a 50/50 contribution of on-property and off-property income. There were no direct links between profitability and the adoption of CRP included in this survey.

At the same time, cash flow and the cost of machinery/equipment were rated amongst the most important factors likely to influence respondents' decision making about taking on new practices. A common assumption underlying adjustment pressure towards larger, profitable and more viable enterprises has been that these producers will be better placed to implement improved management practices. However, findings from this survey highlighted that respondents who returned an on-property profit were actually more likely to indicate that cash flow and the cost of machinery/equipment was likely to be an important constraint to implementing changed management practices. Part of the explanation for this finding is the link between on-property profit and larger properties. Despite being more profitable respondents with larger properties were significantly more likely to indicate that cash flow and the cost of machinery/equipment were important constraints to implement changed management practices. One possible explanation for this finding is that the scale of investment (both financial and in labour) required by a single landholder to implement change across a larger property will be increased. This finding has important implications for efforts to adjust agricultural enterprises towards larger production units and also to the nature of incentives or cost sharing arrangements that will be needed to offset costs.

Landholders in the Glenelg Hopkins region were also aware that they are increasingly being asked to implement works that have wider environmental benefits. Almost three quarters of survey respondents agreed that landholders should be paid for providing environmental services. Having works undertaken on their property that was at least partially funded by government in the past five years was the single variable most commonly linked to the adoption of CRP. Respondents who had received government funding for on-ground works were significantly more likely to adopt the CRP planted trees and shrubs, recorded soil test

results for paddocks, established perennial pasture, tested water quality, fenced to allow management by land classes, encouraged regrowth of native vegetation, fenced to manage stock access to waterways, and fenced native bush to manage stock access. Despite this finding, less than a third of respondents said they had received any government funding for on-ground work on their property over the past five years.

It seems that part of the explanation for the limited government funded work undertaken on private property (in addition to the limited funds available) was the perceived complexity of the application processes. Just under half of all respondents reported that red tape limited their interest in applying for government assistance. There is clearly considerable potential for government funding to facilitate the adoption of CRP. However, careful consideration needs to be paid to ensuring any application process is as streamlined as possible. When asked how they would like to be involved in funding arrangements to support improved natural resource management, the most popular alternatives were reduction in rates levied by local government and tax rebates. While these were the most favoured options, there was no single option that was likely to interest the vast majority of landholders, outlining the importance of providing a range of policy options for funding natural resource management outcomes on private property.

The median age of landholders in the Glenelg Hopkins region was 52 years. The common perception that older age represents an important barrier to the adoption of CRP was not widely supported in this research. There was only one link between respondents' age and the adoption of CRP.

Survey findings highlighted encouraging levels of involvement in whole farm planning with just under half of all respondents either currently developing or with a completed farm plan. Nevertheless, over half of all respondents had no involvement in whole farm planning and smaller landholders were significantly less likely to be involved. Respondents who were involved in whole farm planning were significantly more likely to adopt the CRP recorded soil test results, tested water quality for main water sources, and used time controlled/spell grazing. On-going promotion and support for landholders to undertake these plans appears to be an important element in facilitating the adoption of CRP.

The planning activity most commonly linked to the adoption of CRP was the extent to which respondents had a plan or vision about the improvements they wanted to make on their property. Respondents who said that they had a plan or vision of the improvements that wanted to make on their property and those who said they were further advanced in implementing these changes were significantly more likely to adopt the CRP conducted work to control pest plants and animals, planted trees and shrubs, recorded soil test results, sown perennial pasture, applied lime, only watered stock from a trough/tank/dam, and fenced to manage stock access to waterways. Encouraging participation in less formal and less structured planning processes appears to provide a useful alternative in terms of promoting the adoption of CRP. This strategy could be particularly useful for engaging those respondents less interested in whole farm planning, such as smaller property owners, in thinking about the ways they could improve their property and the region. An information package outlining some simple planning steps, processes and people to contact for advice may provide a useful resource to help landholders plan the improvements they would like to make on their property.

Overall findings from this research highlighted promising levels of adoption of CRP by landholders in the Glenelg Hopkins region. In particular the CRP only watered stock from a trough/tank/dam, conducted work to control pest animals and plants, planted trees and shrubs, and cropped using minimum tillage practices have been widely adopted. Part of the logic in promoting the adoption of CRP has been that those who have trialled these practices will

continue to use them and even promote them to other landholders in the region. When comparing respondents' level of confidence in the efficacy of CRP, this project highlighted that those who had adopted CRP were slightly more confident that the benefits of these practices outweighed the costs. Nevertheless, it is important to note many of the respondents who had adopted CRP were still not convinced about the efficacy of these practices. Providing ongoing support for landholders implementing CRP and learning from their experiences in adapting these techniques to suit local conditions are likely to help minimise the difficulties associated for landholders adopting new practices.

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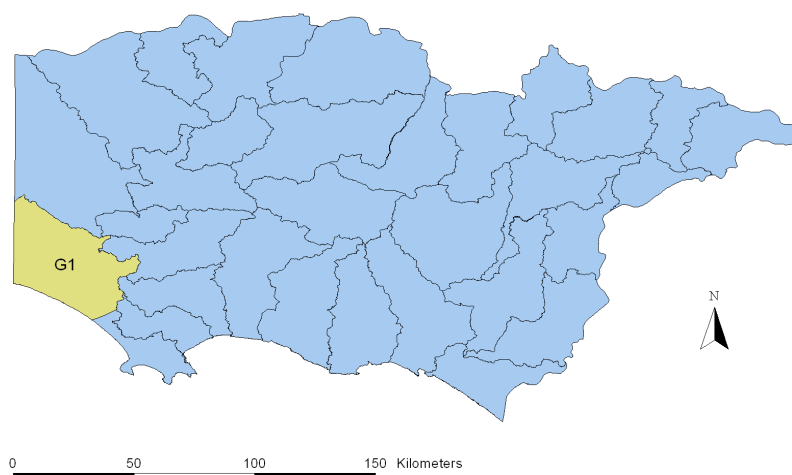
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## **Appendix 1 – Sub-catchment profiles**

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# Glenelg Estuary (G1)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 240 ha

### 3 most common land uses or enterprises:

- Dryland pasture-88%
- Beef cattle-79%
- Remnant vegetation-63%

**Proportion of respondents who reported areas showing signs of salinity:** 8%

**Proportion likely to sell property:** 24%

**Proportion likely to pass property on to a family member:** 68%

### Most commonly adopted CRP:

- Only watered stock from trough/tank/dam-100%
- Work to control non-crop weeds and pests-100%
- Soil test results for paddocks-64%

**On-property profit (2002/2003):** 92%

**Average on-property income (2002/2003):**  
\$19,000

**Off-property profit (2002/2003):** 80%

**Average off-property income (2002/2003):**  
\$32,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 53 years

**Farmer by occupation:** 60%

**Landcare membership:** 4%

**Commodity group membership:** 4%

**Proportion with government funded work on their property in the past 5 years:** 4%

### Top 3 issues:

- Movement of young people out of district-72%
- Availability of important services-64%
- Availability of water for agriculture-78%

### Top 3 values attached to property:

- Providing a sound economic investment-84%
- Providing the desired lifestyle-80%
- Able to pass property on in better condition-76%

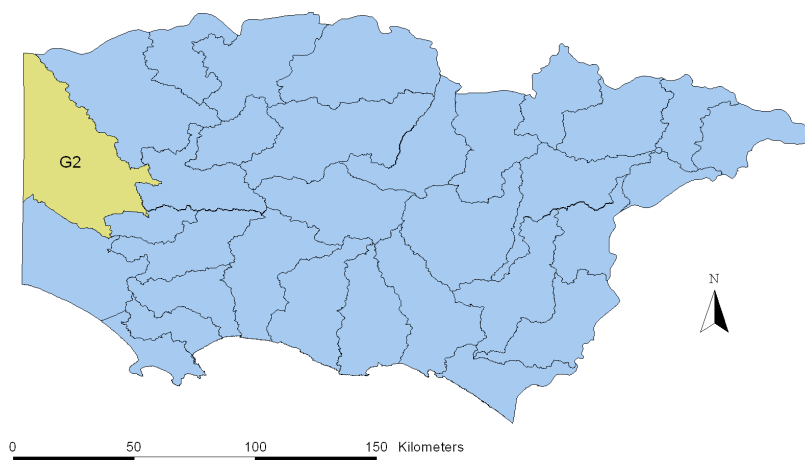
### NRM topics where respondents reported the highest knowledge (% with sound knowledge):

- Legislation about chemical storage/handling-44%
- Benefits of retaining native vegetation-36%
- Effects of unrestricted stock-36%

### Top 3 factors when considering changing land management practices:

- Cost of machinery and equipment-88%
- Availability of surface or groundwater -88%
- Cash flow-83%

## Lower Glenelg River (G2)



### CHARACTERISTICS OF PROPERTIES

**Median property size:** 138 ha

**3 most common land uses or enterprises:**

- Dryland pasture-67%
- Beef cattle-60%
- Remnant vegetation-50%

**Proportion of respondents who reported areas showing signs of salinity:** 7%

**Proportion likely to sell property:** 29%

**Proportion likely to pass property on to a family member:** 56%

**Most commonly adopted CRP:**

- Cropped using minimum tillage-100%\*
- Only watered stock from trough/tank/dam-80%
- Work to control non-crop weeds and pests-80%

**On-property profit (2002/2003):** 68%

**Average on-property income (2002/2003):**  
\$27,000

**Off-property profit (2002/2003):** 64%

**Average off-property income (2002/2003):**  
\$29,000

### CHARACTERISTICS OF RESPONDENTS

**Median age:** 52 years

**Farmer by occupation:** 60%

**Landcare membership:** 17%

**Commodity group membership:** 3%

**Proportion with government funded work on their property in the past 5 years:** 10%

**Top 3 issues:**

- Cost of managing weeds and pest animals-90%
- Movement of young people out of district-80%
- Availability of important services-76%

**Top 3 values attached to property:**

- Providing a sound economic investment-80%
- Freedom of working for themselves-73%
- Building/maintaining a viable business-73%

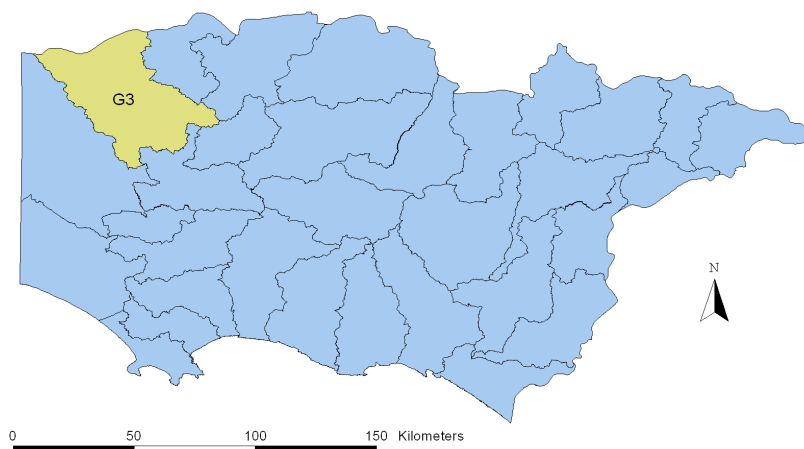
**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

- Effects of unrestricted stock-59%
- Legislation about chemical storage/handling-48%
- Vegetation improving water quality-48%

**Top 3 factors when considering changing land management practices:**

- Cash flow-86%
- Existence of long-term markets-79%
- Suitability of soils -78%

# Mid Glenelg River (G3)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 200 ha

### 3 most common land uses or enterprises:

- Dryland pasture-79%
- Beef cattle-65%
- Sheep for meat-61%

**Proportion of respondents who reported areas showing signs of salinity:** 32%

**Proportion likely to sell property:** 31%

**Proportion likely to pass property on to a family member:** 58%

### Most commonly adopted CRP:

- Only watered stock from trough/tank/dam-89%
- Work to control non-crop weeds and pests-82%
- Planted trees and shrubs-67%

**On-property profit (2002/2003):** 83%

**Average on-property income (2002/2003):**  
\$26,000

**Off-property profit (2002/2003):** 73%

**Average off-property income (2002/2003):**  
\$38,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 54 years

**Farmer by occupation:** 61%

**Landcare membership:** 56%

**Commodity group membership:** 16%

**Proportion with government funded work on their property in the past 5 years:** 35%

### Top 3 issues:

- Movement of young people out of district-79%
- Availability of important services-79%
- Decline of small towns-72%

### Top 3 values attached to property:

- Able to pass property on in better condition-92%
- Building/maintaining a viable business-85%
- Providing the desired lifestyle-78%

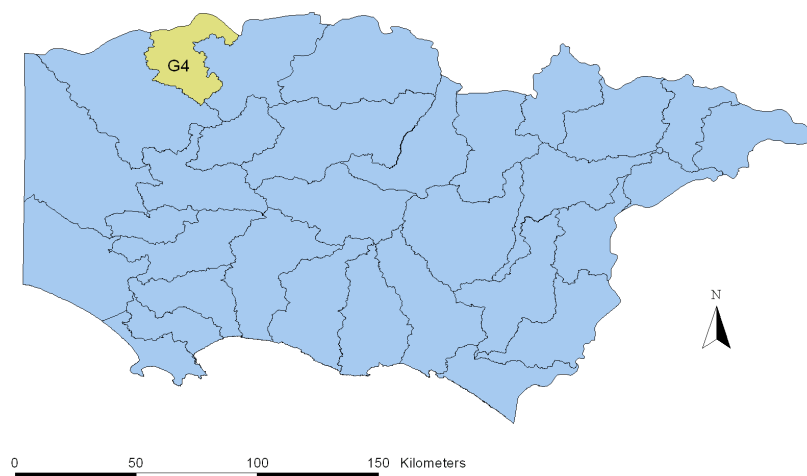
### NRM topics where respondents reported the highest knowledge (% with sound knowledge):

- Legislation about chemical storage/handling-68%
- Effects of unrestricted stock-54%
- Vegetation improving water quality-51%

### Top 3 factors when considering changing land management practices:

- Suitability of soils -87%
- Cash flow-82%
- Cost of machinery/equipment-80%

# Glenelg River-Dundas Tablelands (G4)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 598 ha

### 3 most common land uses or enterprises:

Sheep for wool-96%

Dryland pasture-75%

Sheep for meat-67%

**Proportion of respondents who reported areas showing signs of salinity:** 76%

**Proportion likely to sell property:** 28%

**Proportion likely to pass property on to a family member:** 52%

### Most commonly adopted CRP:

Work to control non-crop weeds and pests-100%

Only watered stock from trough/tank/dam-89%

Planted trees and shrubs-76%

**On-property profit (2002/2003):** 92%

**Average on-property income (2002/2003):**  
\$25,000

**Off-property profit (2002/2003):** 71%

**Average off-property income (2002/2003):**  
\$25,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 51 years

**Farmer by occupation:** 78%

**Landcare membership:** 71%

**Commodity group membership:** 25%

**Proportion with government funded work on their property in the past 5 years:** 50%

### Top 3 issues:

Movement of young people out of district-93%

Property amalgamation-82%

Decline of small towns-70%

### Top 3 values attached to property:

Providing most of the household income-89%

Being part of a rural community-78%

Being an attractive place to live-77%

### NRM topics where respondents reported the highest knowledge (% with sound knowledge):

Legislation about chemical storage/handling-68%

Effects of unrestricted stock-56%

Benefits of ground cover on soil health-54%

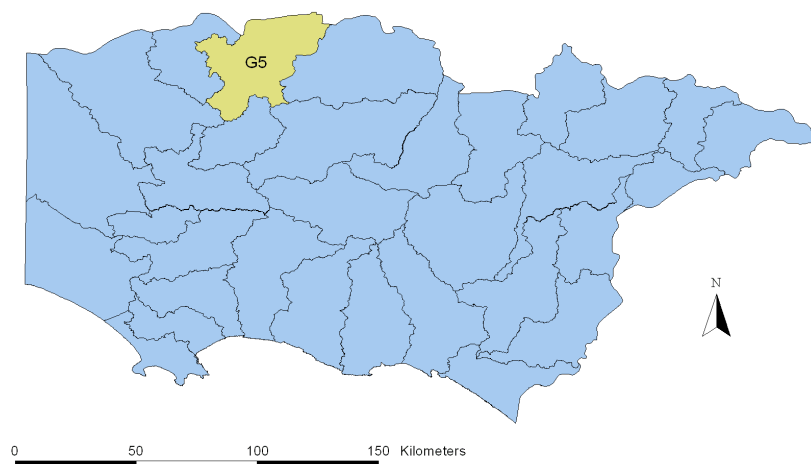
### Top 3 factors when considering changing land management practices:

Suitability of soils-92%

Cash flow-88%

Cost of machinery/equipment-80%

# Glenelg River & Mathers Creek (G5)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 463 ha

### 3 most common land uses or enterprises:

- Sheep for wool-77%
- Dryland pasture-65%
- Remnant vegetation-55%

**Proportion of respondents who reported areas showing signs of salinity:** 76%

**Proportion likely to sell property:** 23%

**Proportion likely to pass property on to a family member:** 65%

### Most commonly adopted CRP:

- Work to control non-crop weeds and pests-100%
- Only watered stock from trough/tank/dam-89%
- Planted trees and shrubs-76%

**On-property profit (2002/2003):** 82%

**Average on-property income (2002/2003):**  
\$34,000

**Off-property profit (2002/2003):** 81%

**Average off-property income (2002/2003):**  
\$23,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 49 years

**Farmer by occupation:** 80%

**Landcare membership:** 57%

**Commodity group membership:** 33%

**Proportion with government funded work on their property in the past 5 years:** 45%

### Top 3 issues:

- Movement of young people out of district-93%
- Availability of services-87%
- Decline of small towns-77%

### Top 3 values attached to property:

- Providing a sound economic investment-93%
- Building/maintaining a viable business-90%
- Being an attractive place to live-90%

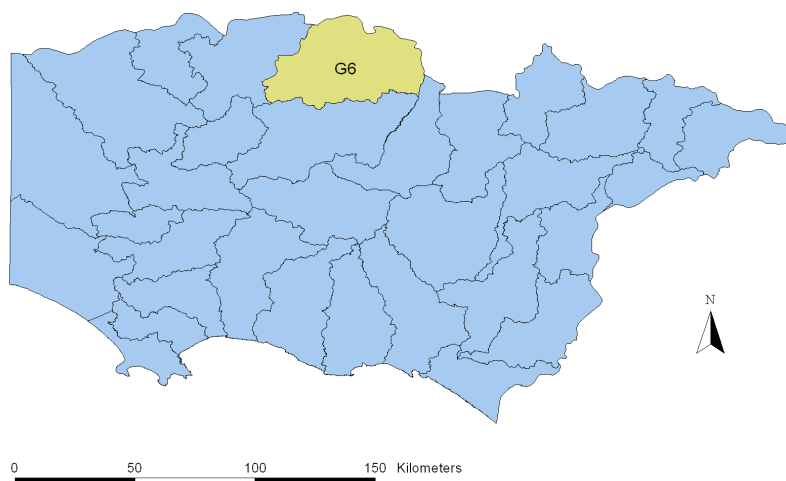
### NRM topics where respondents reported the highest knowledge (% with sound knowledge):

- How to recognise signs of salinity-63%
- Legislation about chemical storage/handling-60%
- Benefits of ground cover on soil health-60%

### Top 3 factors when considering changing land management practices:

- Suitability of soils-93%
- Existence of long-term markets-89%
- Cash flow-86%

# Glenelg River-Grampians Headwaters (G6)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 197 ha

### 3 most common land uses or enterprises:

- Dryland pasture-57%
- Sheep for wool-55%
- Remnant vegetation-52%

**Proportion of respondents who reported areas showing signs of salinity:** 36%

**Proportion likely to sell property:** 24%

**Proportion likely to pass property on to a family member:** 67%

### Most commonly adopted CRP:

- Work to control non-crop weeds and pests-100%
- Only watered stock from trough/tank/dam-92%
- Fenced waterways to manage stock access-67%

**On-property profit (2002/2003):** 37%

**Average on-property income (2002/2003):**  
\$29,000

**Off-property profit (2002/2003):** 76%

**Average off-property income (2002/2003):**  
\$24,500

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 52 years

**Farmer by occupation:** 38%

**Landcare membership:** 19%

**Commodity group membership:** 6%

**Proportion with government funded work on their property in the past 5 years:** 19%

### Top 3 issues:

- Movement of young people out of district-70%
- Decline of small towns-70%
- Cost of managing weeds and pest animals-58%

### Top 3 values attached to property:

- Able to pass property on in better condition-81%
- Providing a sound economic investment-78%
- Being an attractive place to live-77%

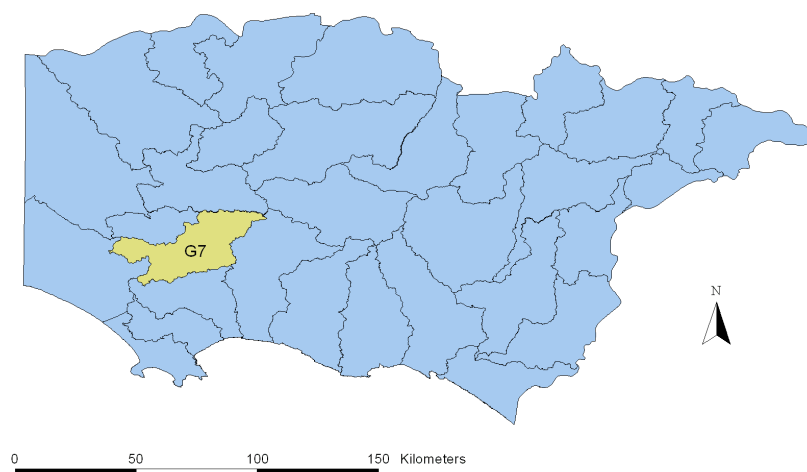
### NRM topics where respondents reported the highest knowledge (% with sound knowledge):

- Benefits of retaining native vegetation-63%
- Benefits of establishing local native plants-60%
- Effects of unrestricted stock access-41%

### Top 3 factors when considering changing land management practices:

- Cash flow-76%
- Suitability of soils-70%
- Availability of water-69%

# Crawford River (G7)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 292 ha

### 3 most common land uses or enterprises:

- Dryland pasture-81 %
- Other tree plantings-59%
- Remnant vegetation-59%

**Proportion of respondents who reported areas showing signs of salinity:** 32%

**Proportion likely to sell property:** 27%

**Proportion likely to pass property on to a family member:** 42%

### Most commonly adopted CRP:

- Only watered stock from trough/tank/dam-100%
- Work to control non-crop weeds and pests-87%
- Record of soil tests results for paddocks-79%

**On-property profit (2002/2003):** 84%

**Average on-property income (2002/2003):**  
\$36,000

**Off-property profit (2002/2003):** 76%

**Average off-property income (2002/2003):**  
\$29,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 49 years

**Farmer by occupation:** 68%

**Landcare membership:** 44%

**Commodity group membership:** 21%

**Proportion with government funded work on their property in the past 5 years:** 27%

### Top 3 issues:

- Cost of managing weeds and pest animals-81%
- Movement of young people out of district-78%
- Availability of important services-74%

### Top 3 values attached to property:

- The freedom of working for themselves-90%
- Being a great place to raise a family-89%
- Being an attractive place to live-77%

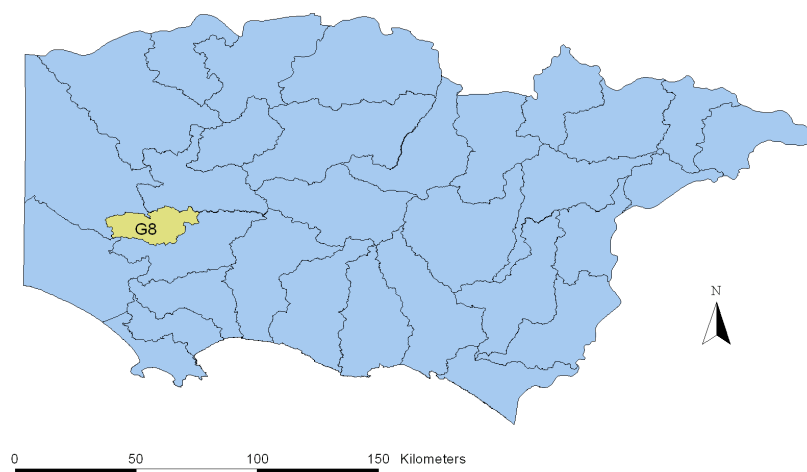
### NRM topics where respondents reported the highest knowledge (% with sound knowledge):

- How to interpret soil test results-53%
- Legislation about chemical storage/handling-53%
- Effects of unrestricted stock access-41%

### Top 3 factors when considering changing land management practices:

- Cash flow-88%
- Cost of machinery/equipment-81%
- Suitability of soils-75%

## Stokes River (G8)



### CHARACTERISTICS OF PROPERTIES

**Median property size:** 125 ha

**3 most common land uses or enterprises:**

- Remnant vegetation-61%
- Dryland pasture-50%
- Other tree plantings-44%

**Proportion of respondents who reported areas showing signs of salinity:** 44%

**Proportion likely to sell property:** 22%

**Proportion likely to pass property on to a family member:** 56%

**Most commonly adopted CRP:**

- Only watered stock from trough/tank/dam-100%
- Work to control non-crop weeds and pests-100%
- Fenced waterways to manage stock access-75%

**On-property profit (2002/2003):** 65%

**Average on-property income (2002/2003):**  
\$14,000

**Off-property profit (2002/2003):** 87%

**Average off-property income (2002/2003):**  
\$31,000

### CHARACTERISTICS OF RESPONDENTS

**Median age:** 50 years

**Farmer by occupation:** 31%

**Landcare membership:** 18%

**Commodity group membership:** 12%

**Proportion with government funded work on their property in the past 5 years:** 22%

**Top 3 issues:**

- Decline of small towns-75%
- Reduced employment opportunities-65%
- Availability of important services-65%

**Top 3 values attached to property:**

- The freedom of working for themselves-82%
- Building/maintaining a viable business-75%
- Providing a sound economic investment-75%

**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

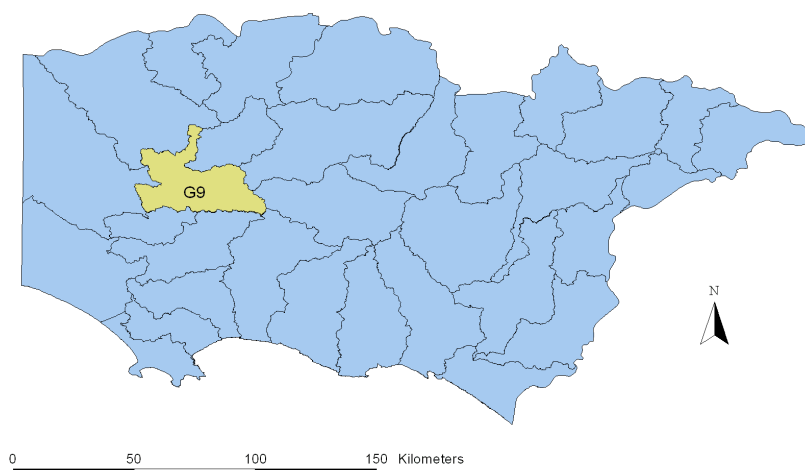
- Benefits of establishing local native plants-53%
- Riparian vegetation improving water quality-47%
- Legislation about chemical storage/handling-44%

**Top 3 factors when considering changing land management practices:**

- Suitability of soils-94%
- Existence of long-term markets-81%
- Cash flow-80%



## Lower Wannon River (G9)



### CHARACTERISTICS OF PROPERTIES

**Median property size:** 209 ha

**3 most common land uses or enterprises:**

- Beef cattle-83%
- Remnant vegetation-58%
- Dryland pasture-63%

**Proportion of respondents who reported areas showing signs of salinity:** 27%

**Proportion likely to sell property:** 37%

**Proportion likely to pass property on to a family member:** 49%

**Most commonly adopted CRP:**

- Only watered stock from trough/tank/dam-98%
- Work to control non-crop weeds and pests-70%
- Planted trees and shrubs-68%

**On-property profit (2002/2003):** 76%

**Average on-property income (2002/2003):**  
\$24,000

**Off-property profit (2002/2003):** 72%

**Average off-property income (2002/2003):**  
\$22,000

### CHARACTERISTICS OF RESPONDENTS

**Median age:** 54 years

**Farmer by occupation:** 58%

**Landcare membership:** 46%

**Commodity group membership:** 10%

**Proportion with government funded work on their property in the past 5 years:** 35%

**Top 3 issues:**

- Decline of small towns-83%
- Reduced employment opportunities-83%
- Availability of important services-75%

**Top 3 values attached to property:**

- Building/maintaining a viable business-89%
- The freedom of working for themselves-86%
- Able to pass property on in better condition-82%

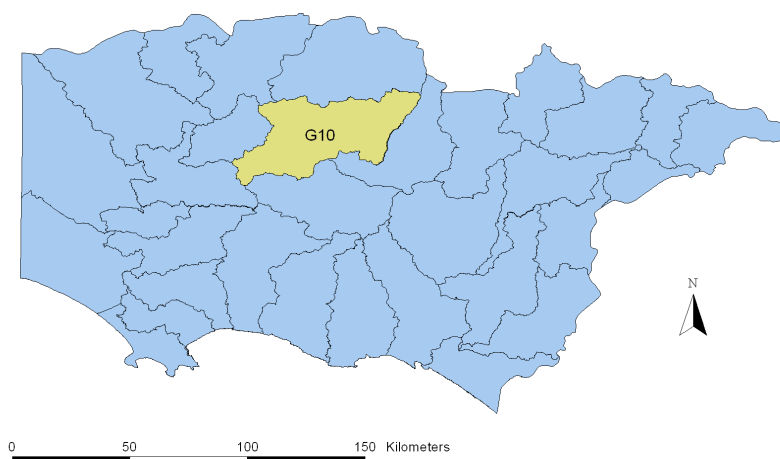
**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

- Effects of unrestricted stock access-55%
- Benefits of ground cover on soil health-50%
- Benefits of establishing local native plants-45%

**Top 3 factors when considering changing land management practices:**

- Cost of machinery/equipment-71%
- Cash flow-69%
- Stage of life-68%

## Wannon River-Dwyers Creek to Falls (G10)



### CHARACTERISTICS OF PROPERTIES

**Median property size:** 200 ha

**3 most common land uses or enterprises:**

- Sheep for wool-66%
- Dryland pasture-62%
- Remnant vegetation-59%

**Proportion of respondents who reported areas showing signs of salinity:** 50%

**Proportion likely to sell property:** 31%

**Proportion likely to pass property on to a family member:** 65%

**Most commonly adopted CRP:**

- Only watered stock from trough/tank/dam-93%
- Work to control non-crop weeds and pests-87%
- Record of soil test results for paddocks-62%

**On-property profit (2002/2003):** 65%

**Average on-property income (2002/2003):**  
\$21,000

**Off-property profit (2002/2003):** 92%

**Average off-property income (2002/2003):**  
\$33,000

### CHARACTERISTICS OF RESPONDENTS

**Median age:** 48 years

**Farmer by occupation:** 56%

**Landcare membership:** 44%

**Commodity group membership:** 31%

**Proportion with government funded work on their property in the past 5 years:** 35%

**Top 3 issues:**

- Movement of young people-86%
- Availability of important services-85%
- Reduced employment opportunities-74%

**Top 3 values attached to property:**

- Able to pass property on in better condition-96%
- Being a great place to raise a family-86%
- Being an attractive place to live-86%

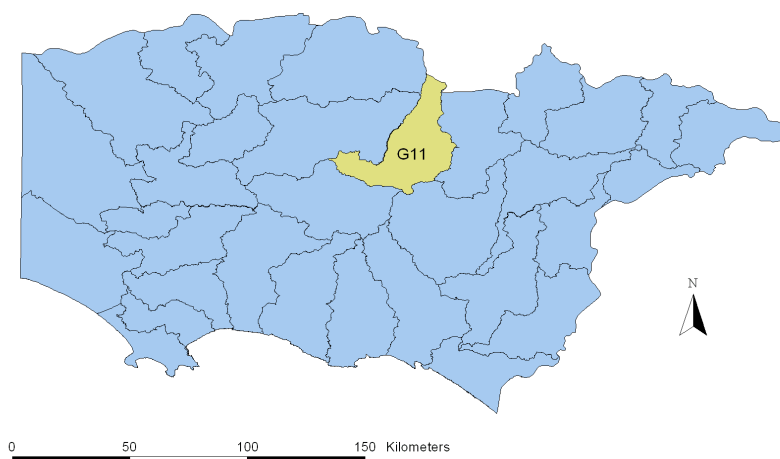
**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

- Benefits of establishing local native plants-56%
- How to identify signs of salinity-45%
- Benefits of ground cover on soil health-50%

**Top 3 factors when considering changing land management practices:**

- Cost of machinery/equipment-93%
- Needs a large investment of funds-89%
- Suitability of soils-89%

# Wannon River-Grampians Headwater (G11)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 386 ha

### 3 most common land uses or enterprises:

- Sheep for wool-79%
- Dryland pasture-75%
- Other tree plantings-61%

**Proportion of respondents who reported areas showing signs of salinity:** 57%

**Proportion likely to sell property:** 10%

**Proportion likely to pass property on to a family member:** 74%

### Most commonly adopted CRP:

- Only watered stock from trough/tank/dam-93%
- Work to control non-crop weeds and pests-87%
- Record of soil test results for paddocks-62%

**On-property profit (2002/2003):** 73%

**Average on-property income (2002/2003):**  
\$34,000

**Off-property profit (2002/2003):** 65%

**Average off-property income (2002/2003):**  
\$29,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 50 years

**Farmer by occupation:** 70%

**Landcare membership:** 64%

**Commodity group membership:** 36%

**Proportion with government funded work on their property in the past 5 years:** 42%

### Top 3 issues:

- Movement of young people-83%
- Availability of important services-72%
- Dryland salinity undermining production-71%

### Top 3 values attached to property:

- Able to pass property on in better condition-83%
- Building/maintaining a viable business-83%
- Freedom of working for themselves-83%

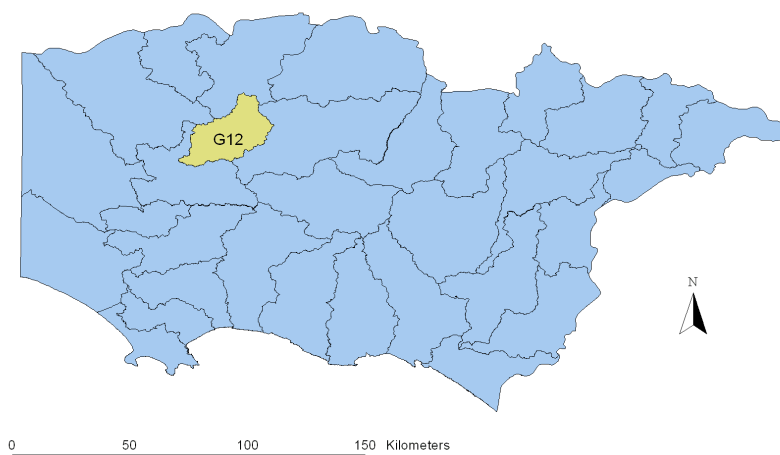
### NRM topics where respondents reported the highest knowledge (% with sound knowledge):

- Effects of unrestricted stock access-57%
- Benefits of pasture in crop rotation-54%
- Legislation about chemical storage/handling-50%

### Top 3 factors when considering changing land management practices:

- Cash flow-93%
- Extent practice will address environment-85%
- Existence of long-term markets-82%

## Bryans Creek (G12)



### CHARACTERISTICS OF PROPERTIES

**Median property size:** 203 ha

**3 most common land uses or enterprises:**

- Dryland pasture-74%
- Sheep for wool-71%
- Sheep for meat-52%

**Proportion of respondents who reported areas showing signs of salinity:** 45%

**Proportion likely to sell property:** 17%

**Proportion likely to pass property on to a family member:** 74%

**Most commonly adopted CRP:**

- Only watered stock from trough/tank/dam-87%
- Work to control non-crop weeds and pests-83%
- Tested quality of major water sources-70%

**On-property profit (2002/2003):** 83%

**Average on-property income (2002/2003):**  
\$21,000

**Off-property profit (2002/2003):** 79%

**Average off-property income (2002/2003):**  
\$26,000

### CHARACTERISTICS OF RESPONDENTS

**Median age:** 53 years

**Farmer by occupation:** 63%

**Landcare membership:** 70%

**Commodity group membership:** 17%

**Proportion with government funded work on their property in the past 5 years:** 47%

**Top 3 issues:**

- Movement of young people-90%
- Availability of important services-93%
- Decline of small towns-89%

**Top 3 values attached to property:**

- Able to pass property on in better condition-90%
- Being a great place to raise a family-90%
- Being an attractive place to live-87%

**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

- Effects of unrestricted stock access-76%
- Benefits of establishing local native plants-57%
- Riparian vegetation improving water quality-55%

**Top 3 factors when considering changing land management practices:**

- Existence of long-term markets-85%
- Cash flow-81%
- Availability of surface or groundwater-81%

# Grange Burn (G13)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 95 ha

### 3 most common land uses or enterprises:

- Dryland pasture-66%
- Sheep for meat-49%
- Sheep for wool-45%

**Proportion of respondents who reported areas showing signs of salinity:** 27%

**Proportion likely to sell property:** 26%

**Proportion likely to pass property on to a family member:** 48%

### Most commonly adopted CRP:

- Only watered stock from trough/tank/dam-100%
- Work to control non-crop weeds and pests-88%
- Cropped using a rotation based on soil test-77%

**On-property profit (2002/2003):** 68%

**Average on-property income (2002/2003):**  
\$19,000

**Off-property profit (2002/2003):** 82%

**Average off-property income (2002/2003):**  
\$33,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 56 years

**Farmer by occupation:** 48%

**Landcare membership:** 15%

**Commodity group membership:** 19%

**Proportion with government funded work on their property in the past 5 years:** 17%

### Top 3 issues:

- Movement of young people-82%
- Availability of important services-71%
- Decline of small towns-72%

### Top 3 values attached to property:

- Being an attractive place to live-88%
- Able to pass property on in better condition-84%
- Providing the desired lifestyle-84%

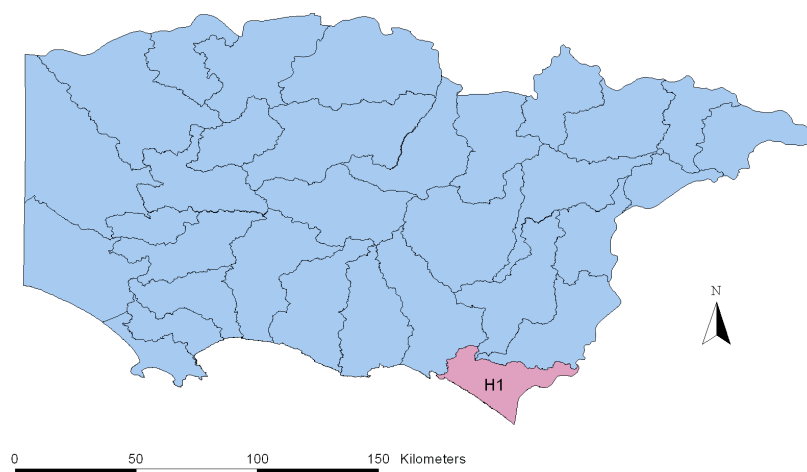
### NRM topics where respondents reported the highest knowledge (% with sound knowledge):

- Legislation about chemical storage/handling-49%
- Benefits of pasture in crop rotation-39%
- Effects of unrestricted stock access-35%

### Top 3 factors when considering changing land management practices:

- Suitability of soils-74%
- Existence of long-term markets-72%
- Cost of machinery/equipment-72%

# Hopkins River/Brucknell (H1)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 160 ha

**3 most common land uses or enterprises:**

- Dryland pasture-76%
- Dairying-66%
- Other tree plantings-50%

**Proportion of respondents who reported areas showing signs of salinity:** 4%

**Proportion likely to sell property:** 39%

**Proportion likely to pass property on to a family member:** 61%

**Most commonly adopted CRP:**

- Cropped using minimum tillage-100%
- Cropped using a rotation based on soil test-100%
- Only watered stock from trough/tank/dam-91%

**On-property profit (2002/2003):** 76%

**Average on-property income (2002/2003):**  
\$22,000

**Off-property profit (2002/2003):** 53%

**Average off-property income (2002/2003):**  
\$21,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 56 years

**Farmer by occupation:** 73%

**Landcare membership:** 25%

**Commodity group membership:** 23%

**Proportion with government funded work on their property in the past 5 years:** 15%

**Top 3 issues:**

- Availability of water-83%
- Availability of important services-74%
- Movement of young people-69%

**Top 3 values attached to property:**

- Being a great place to raise a family-91%
- Being an attractive place to live-90%
- Building/maintaining a viable business-88%

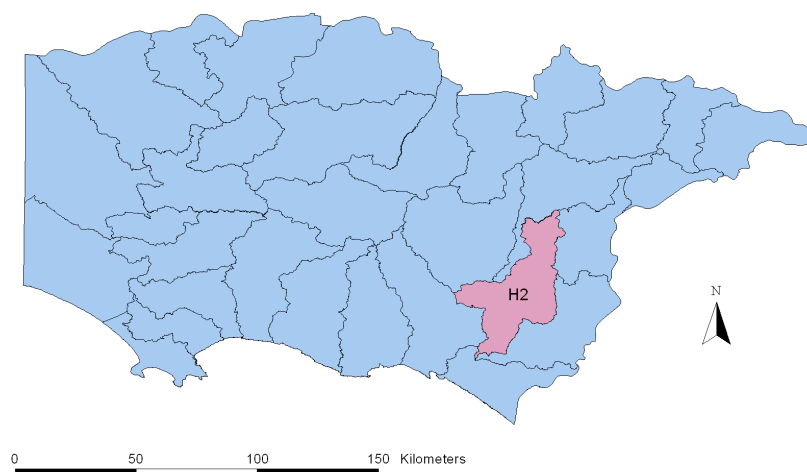
**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

- Benefits of ground cover on soil health-50%
- Legislation about chemical storage/handling-47%
- Benefits of retaining native vegetation-44%

**Top 3 factors when considering changing land management practices:**

- Suitability of soils-86%
- Support from family-86%
- Cost of machinery/equipment-88%

# Hopkins River/Blind Creek (H2)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 222 ha

### 3 most common land uses or enterprises:

- Dryland pasture-83%
- Dairying-41%
- Other tree plantings-45%

**Proportion of respondents who reported areas showing signs of salinity:** 28%

**Proportion likely to sell property:** 39%

**Proportion likely to pass property on to a family member:** 46%

### Most commonly adopted CRP:

- Only watered stock from trough/tank/dam-100%
- Work to control non-crop weeds and pests-87%
- Planted trees and shrubs-88%

**On-property profit (2002/2003):** 82%

**Average on-property income (2002/2003):**  
\$32,000

**Off-property profit (2002/2003):** 71%

**Average off-property income (2002/2003):**  
\$30,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 51 years

**Farmer by occupation:** 81%

**Landcare membership:** 50%

**Commodity group membership:** 24%

**Proportion with government funded work on their property in the past 5 years:** 27%

### Top 3 issues:

- Movement of young people-91%
- Decline of small towns-91%
- Availability of important services-90%

### Top 3 values attached to property:

- Being a great place to raise a family-92%
- Freedom of working for themselves-90%
- Building/maintaining a viable business-88%

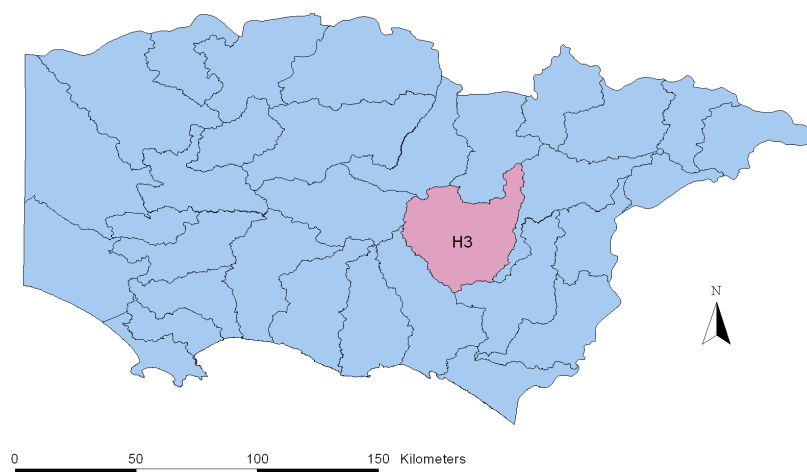
### NRM topics where respondents reported the highest knowledge (% with sound knowledge):

- Legislation about chemical storage/handling-53%
- Benefits of ground cover on soil health-46%
- Effects of unrestricted stock access-43%

### Top 3 factors when considering changing land management practices:

- Cash flow-90%
- Cost of machinery/equipment-90%
- Support from family-88%

# Hopkins River/Muston Creek (H3)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 380 ha

### 3 most common land uses or enterprises:

- Other tree plantings-92%
- Dryland pasture-89%
- Sheep for meat-81%

**Proportion of respondents who reported areas showing signs of salinity:** 50%

**Proportion likely to sell property:** 48%

**Proportion likely to pass property on to a family member:** 44%

### Most commonly adopted CRP:

- Only watered stock from trough/tank/dam-100%
- Work to control non-crop weeds and pests-100%
- Planted trees and shrubs-93%

**On-property profit (2002/2003):** 92%

**Average on-property income (2002/2003):**  
\$27,000

**Off-property profit (2002/2003):** 72%

**Average off-property income (2002/2003):**  
\$33,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 49 years

**Farmer by occupation:** 76%

**Landcare membership:** 72%

**Commodity group membership:** 28%

**Proportion with government funded work on their property in the past 5 years:** 64%

### Top 3 issues:

- Movement of young people-78%
- Availability of important services-74%
- Decline of small towns-67%

### Top 3 values attached to property:

- Being an attractive place to live-89%
- Building/maintaining a viable business-89%
- Being a great place to raise a family-85%

### NRM topics where respondents reported the highest knowledge (% with sound knowledge):

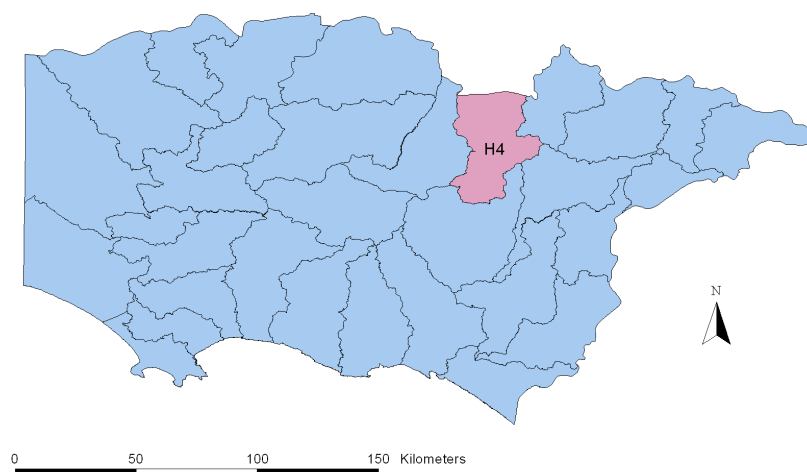
- Effects of unrestricted stock access-59%
- Legislation about chemical storage/handling-59%
- Benefits of establishing local native plants-56%

### Top 3 factors when considering changing land management practices:

- Suitability of soils-92%
- Existence of long-term markets-89%
- Availability of surface or groundwater-85%



# Mid Hopkins River (H4)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 464 ha

**3 most common land uses or enterprises:**

- Dryland pasture-80%
- Sheep for wool-70%
- Broadacre cropping-67%

**Proportion of respondents who reported areas showing signs of salinity:** 55%

**Proportion likely to sell property:** 17%

**Proportion likely to pass property on to a family member:** 50%

**Most commonly adopted CRP:**

- Only watered stock from trough/tank/dam-100%
- Work to control non-crop weeds and pests-100%
- Cropped using minimum tillage-90%

**On-property profit (2002/2003):** 84%

**Average on-property income (2002/2003):**  
\$32,000

**Off-property profit (2002/2003):** 80%

**Average off-property income (2002/2003):**  
\$26,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 54 years

**Farmer by occupation:** 77%

**Landcare membership:** 67%

**Commodity group membership:** 35%

**Proportion with government funded work on their property in the past 5 years:** 41%

**Top 3 issues:**

- Movement of young people-83%
- Availability of important services-83%
- Decline of small towns-79%

**Top 3 values attached to property:**

- Building/maintaining a viable business-93%
- Able to pass property on in better condition-90%
- Being a great place to raise a family-89%

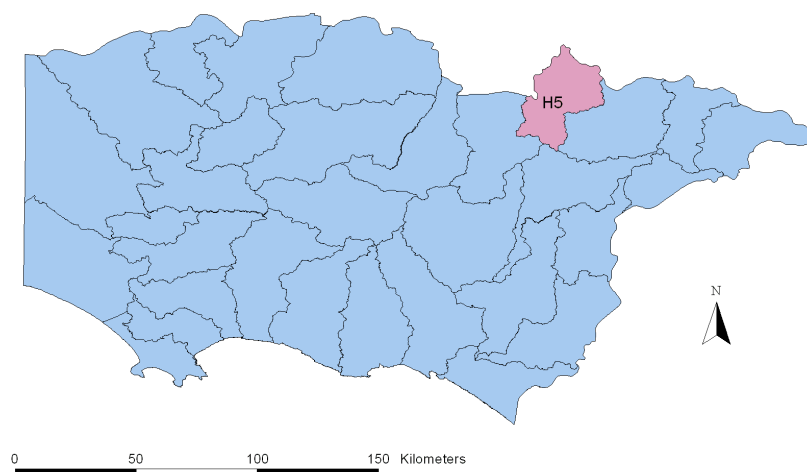
**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

- How to recognise signs of salinity-57%
- Benefits of ground cover on soil health-59%
- Benefits of pasture in crop rotation-61%

**Top 3 factors when considering changing land management practices:**

- Suitability of soils-86%
- Cash flow-82%
- Stage of life-82%

# Upper Hopkins River (H5)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 430 ha

### 3 most common land uses or enterprises:

- Sheep for wool-89%
- Dryland pasture-75%
- Other tree plantings-68%

**Proportion of respondents who reported areas showing signs of salinity:** 44%

**Proportion likely to sell property:** 22%

**Proportion likely to pass property on to a family member:** 59%

### Most commonly adopted CRP:

- Only watered stock from trough/tank/dam-100%
- Work to control non-crop weeds and pests-100%
- Planted trees and shrubs-82%

**On-property profit (2002/2003):** 62%

**Average on-property income (2002/2003):**  
\$34,000

**Off-property profit (2002/2003):** 96%

**Average off-property income (2002/2003):**  
\$29,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 54 years

**Farmer by occupation:** 65%

**Landcare membership:** 62%

**Commodity group membership:** 27%

**Proportion with government funded work on their property in the past 5 years:** 69%

### Top 3 issues:

- Movement of young people-79%
- Cost of managing weeds and pest animals-75%
- Decline of small towns-65%

### Top 3 values attached to property:

- Able to pass property on in better condition-92%
- Building/maintaining a viable business-84%
- Freedom of working for themselves-84%

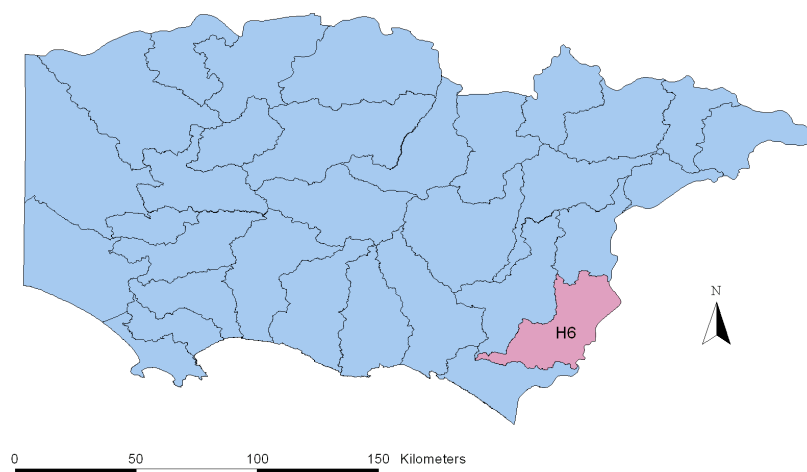
### NRM topics where respondents reported the highest knowledge (% with sound knowledge):

- Legislation about chemical storage/handling-52%
- Benefits of pasture in crop rotation-44%
- Benefits of ground cover on soil health-41%

### Top 3 factors when considering changing land management practices:

- Suitability of soils-82%
- Cash flow-75%
- Existence of long-term markets-89%

## Lower Mt Emu Creek (H6)



### CHARACTERISTICS OF PROPERTIES

**Median property size:** 160 ha

**3 most common land uses or enterprises:**

- Dryland pasture-80%
- Other tree plantings-59%
- Dairying-54%

**Proportion of respondents who reported areas showing signs of salinity:** 7%

**Proportion likely to sell property:** 36%

**Proportion likely to pass property on to a family member:** 52%

**Most commonly adopted CRP:**

- Only watered stock from trough/tank/dam-92%
- Work to control non-crop weeds and pests-79%
- Planted trees and shrubs-73%

**On-property profit (2002/2003):** 68%

**Average on-property income (2002/2003):**  
\$32,000

**Off-property profit (2002/2003):** 61%

**Average off-property income (2002/2003):**  
\$16,000

### CHARACTERISTICS OF RESPONDENTS

**Median age:** 55 years

**Farmer by occupation:** 74%

**Landcare membership:** 30%

**Commodity group membership:** 16%

**Proportion with government funded work on their property in the past 5 years:** 19%

**Top 3 issues:**

- Movement of young people-87%
- Decline of small towns-84%
- Availability of surface and ground water-80%

**Top 3 values attached to property:**

- Being a great place to raise a family-91%
- Providing the desired lifestyle-89%
- Building/maintaining a viable business-88%

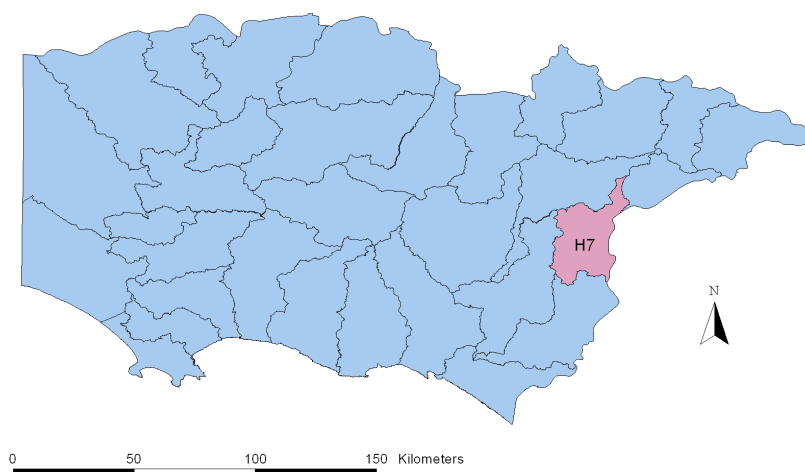
**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

- Legislation about chemical storage/handling-59%
- Benefits of pasture in crop rotation-52%
- Benefits of ground cover on soil health-47%

**Top 3 factors when considering changing land management practices:**

- Cash flow-92%
- Cost of machinery/equipment-89%
- Stage of life-83%

## Mid Mt Emu Creek (H7)



### CHARACTERISTICS OF PROPERTIES

**Median property size:** 403 ha

**3 most common land uses or enterprises:**

- Dryland pasture-75%
- Other tree plantings-64%
- Broadacre cropping-57%

**Proportion of respondents who reported areas showing signs of salinity:** 21%

**Proportion likely to sell property:** 32%

**Proportion likely to pass property on to a family member:** 50%

**Most commonly adopted CRP:**

- Work to control non-crop weeds and pests-100%
- Only watered stock from trough/tank/dam-91%
- Record of soil test results for paddock-89%

**On-property profit (2002/2003):** 88%

**Average on-property income (2002/2003):**  
\$33,000

**Off-property profit (2002/2003):** 62%

**Average off-property income (2002/2003):**  
\$22,000

### CHARACTERISTICS OF RESPONDENTS

**Median age:** 50 years

**Farmer by occupation:** 88%

**Landcare membership:** 42%

**Commodity group membership:** 27%

**Proportion with government funded work on their property in the past 5 years:** 31%

**Top 3 issues:**

- Availability of important services-89%
- Decline of small towns-86%
- Movement of young people-85%

**Top 3 values attached to property:**

- Building/maintaining a viable business-96%
- Being part of a rural community-89%
- Providing the desired lifestyle-89%

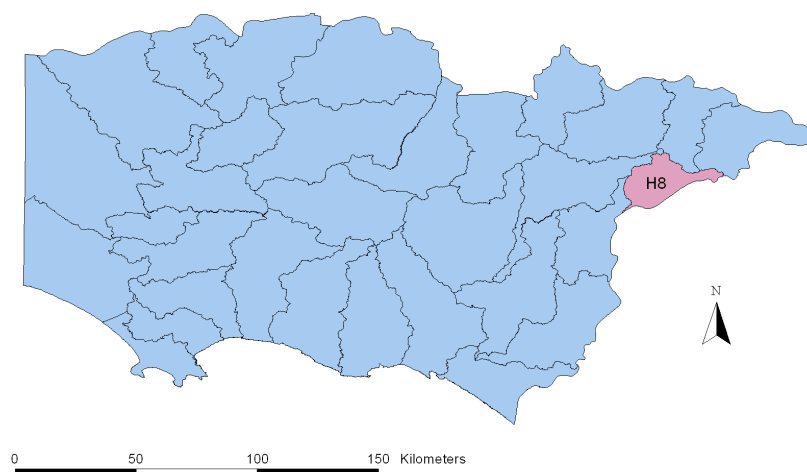
**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

- Legislation about chemical storage/handling-63%
- Benefits of pasture in crop rotation-52%
- How to recognise signs of salinity-44%

**Top 3 factors when considering changing land management practices:**

- Cash flow-86%
- Cost of machinery/equipment-79%
- Suitability of soils-79%

## Upper Mt Emu Creek (H8)



### CHARACTERISTICS OF PROPERTIES

**Median property size:** 390 ha

**3 most common land uses or enterprises:**

- Dryland pasture-61 %
- Other tree plantings-57%
- Broadacre cropping-57%

**Proportion of respondents who reported areas showing signs of salinity:** 8%

**Proportion likely to sell property:** 19%

**Proportion likely to pass property on to a family member:** 68%

**Most commonly adopted CRP:**

- Only watered stock from trough/tank/dam-90%
- Work to control non-crop weeds and pests-89%
- Planted trees and shrubs-67%

**On-property profit (2002/2003):** 64%

**Average on-property income (2002/2003):**  
\$23,000

**Off-property profit (2002/2003):** 62%

**Average off-property income (2002/2003):**  
\$27,000

### CHARACTERISTICS OF RESPONDENTS

**Median age:** 54 years

**Farmer by occupation:** 69%

**Landcare membership:** 32%

**Commodity group membership:** 25%

**Proportion with government funded work on their property in the past 5 years:** 26%

**Top 3 issues:**

- Movement of young people-89%
- Availability of important services-85%
- Reduced employment opportunities-82%

**Top 3 values attached to property:**

- Freedom of working for themselves-96%
- Building/maintaining a viable business-92%
- Being a great place to raise a family-92%

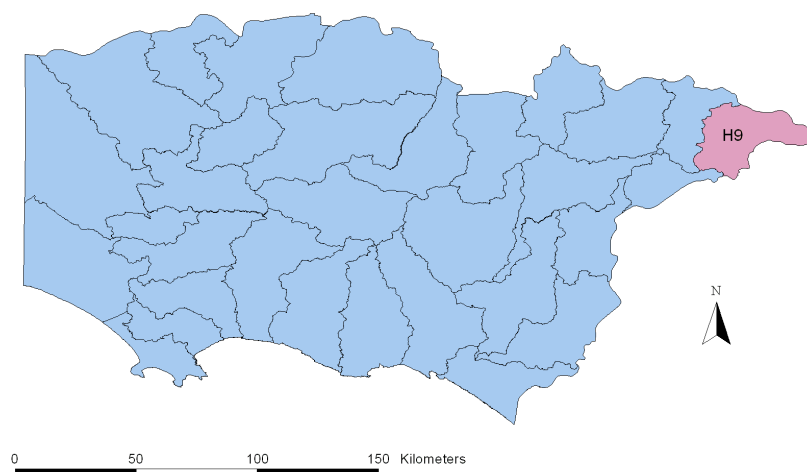
**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

- Benefits of pasture in crop rotation-52%
- How to recognise signs of salinity-52%
- Legislation about chemical storage/handling-48%

**Top 3 factors when considering changing land management practices:**

- Cash flow-96%
- Cost of machinery/equipment-92%
- Suitability of soils-92%

## Burrumbeet Creek (H9)



### CHARACTERISTICS OF PROPERTIES

**Median property size:** 100 ha

**3 most common land uses or enterprises:**

- Dryland pasture-55%
- Sheep for wool-50%
- Native remnant vegetation-46%

**Proportion of respondents who reported areas showing signs of salinity:** 43%

**Proportion likely to sell property:** 30%

**Proportion likely to pass property on to a family member:** 48%

**Most commonly adopted CRP:**

- Only watered stock from trough/tank/dam-100%
- Work to control non-crop weeds and pests-100%
- Cropped using minimum tillage-89%

**On-property profit (2002/2003):** 43%

**Average on-property income (2002/2003):**  
\$29,000

**Off-property profit (2002/2003):** 82%

**Average off-property income (2002/2003):**  
\$24,000

### CHARACTERISTICS OF RESPONDENTS

**Median age:** 52 years

**Farmer by occupation:** 41%

**Landcare membership:** 36%

**Commodity group membership:** 9%

**Proportion with government funded work on their property in the past 5 years:** 14%

**Top 3 issues:**

- Cost of managing weeds and pest animals-78%
- Movement of young people-75%
- Availability of important services-68%

**Top 3 values attached to property:**

- Freedom of working for themselves-86%
- Being an attractive place to live-86%
- Being a great place to raise a family-86%

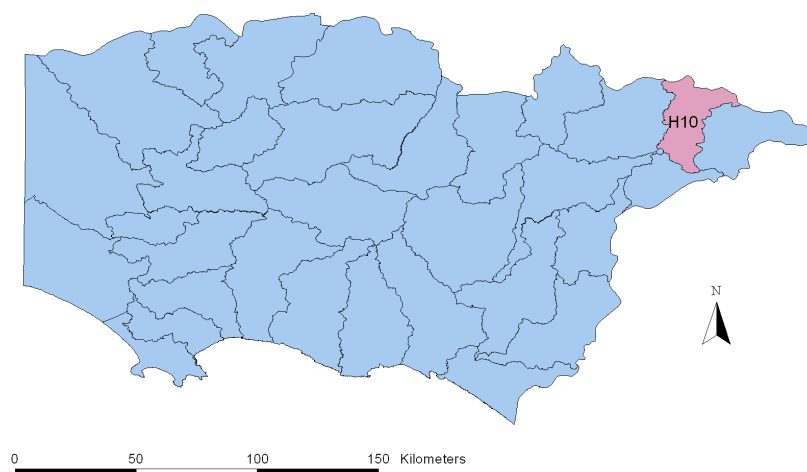
**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

- Legislation about chemical storage/handling-65%
- Benefits of pasture in crop rotation-35%
- Benefits of ground cover on soil health -29%

**Top 3 factors when considering changing land management practices:**

- Cash flow-100%
- Cost of machinery/equipment-100%
- Availability of surface and groundwater-90%

# Trewalla Creek (H10)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 75 ha

### 3 most common land uses or enterprises:

- Dryland pasture-57%
- Sheep for wool-52%
- Native remnant vegetation-39%

**Proportion of respondents who reported areas showing signs of salinity:** 32%

**Proportion likely to sell property:** 31%

**Proportion likely to pass property on to a family member:** 56%

### Most commonly adopted CRP:

- Only watered stock from trough/tank/dam-100%
- Work to control non-crop weeds and pests-88%
- Cropped using rotation with pasture-75%

**On-property profit (2002/2003):** 46%

**Average on-property income (2002/2003):**  
\$17,000

**Off-property profit (2002/2003):** 96%

**Average off-property income (2002/2003):**  
\$25,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 53 years

**Farmer by occupation:** 46%

**Landcare membership:** 38%

**Commodity group membership:** 4%

**Proportion with government funded work on their property in the past 5 years:** 4%

### Top 3 issues:

- Reduced employment opportunities-77%
- Movement of young people-89%
- Availability of important services-85%

### Top 3 values attached to property:

- Being a great place to raise a family-81%
- Being an attractive place to live-80%
- Providing the desired lifestyle-75%

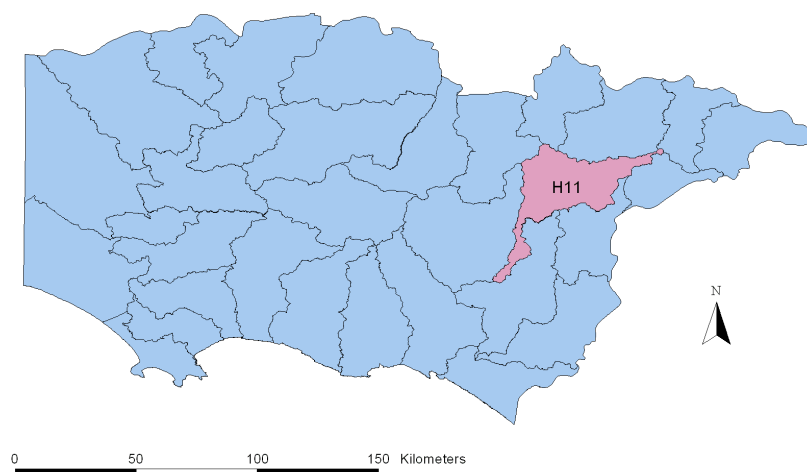
### NRM topics where respondents reported the highest knowledge (% with sound knowledge):

- Effects of unrestricted stock access -42%
- Legislation about chemical storage/handling-39%
- Riparian vegetation improving water quality-39%

### Top 3 factors when considering changing land management practices:

- Cash flow-100%
- Cost of machinery/equipment-100%
- Suitability of soils -100%

## Lower Fiery & Salt Creek (H11)



### CHARACTERISTICS OF PROPERTIES

**Median property size:** 600 ha

**3 most common land uses or enterprises:**

- Sheep for wool-93%
- Dryland pasture-86%
- Broadacre cropping-79%

**Proportion of respondents who reported areas showing signs of salinity:** 32%

**Proportion likely to sell property:** 19%

**Proportion likely to pass property on to a family member:** 68%

**Most commonly adopted CRP:**

- Cropped using minimum tillage-91%
- Only watered stock from trough/tank/dam-90%
- Record of soil test results for paddocks-87%

**On-property profit (2002/2003):** 90%

**Average on-property income (2002/2003):**  
\$27,000

**Off-property profit (2002/2003):** 61%

**Average off-property income (2002/2003):**  
\$16,000

### CHARACTERISTICS OF RESPONDENTS

**Median age:** 53 years

**Farmer by occupation:** 90%

**Landcare membership:** 59%

**Commodity group membership:** 53%

**Proportion with government funded work on their property in the past 5 years:** 33%

**Top 3 issues:**

- Movement of young people-93%
- Availability of important services-87%
- Cost of managing weeds and pest animals-77%

**Top 3 values attached to property:**

- Providing most of the household income-94%
- Freedom of working for themselves-93%
- Building/maintaining a viable business-90%

**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

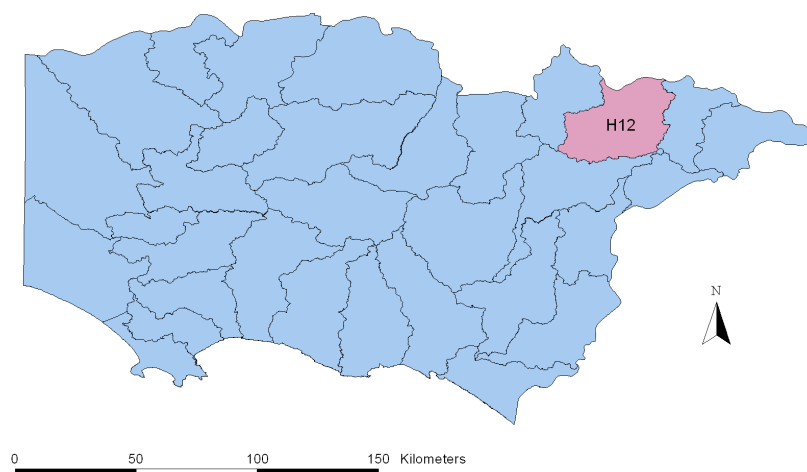
- Benefits of pasture in crop rotation-61%
- Benefits of ground cover on soil health -55%
- Riparian vegetation improving water quality-39%

**Top 3 factors when considering changing land management practices:**

- Cash flow-83%
- Extent change fits with existing enterprises-79%
- Existence of long-term markets -79%



# Upper Fiery Creek (H12)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 269 ha

**3 most common land uses or enterprises:**

- Dryland pasture-68%
- Sheep for wool-62%
- Broadacre cropping-43%

**Proportion of respondents who reported areas showing signs of salinity:** 20%

**Proportion likely to sell property:** 35%

**Proportion likely to pass property on to a family member:** 57%

**Most commonly adopted CRP:**

- Only watered stock from trough/tank/dam-86%
- Cropped using minimum tillage-78%
- Work to control non-crop weeds and pests-71%

**On-property profit (2002/2003):** 46%

**Average on-property income (2002/2003):**  
\$30,000

**Off-property profit (2002/2003):** 71%

**Average off-property income (2002/2003):**  
\$18,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 56 years

**Farmer by occupation:** 57%

**Landcare membership:** 48%

**Commodity group membership:** 17%

**Proportion with government funded work on their property in the past 5 years:** 18%

**Top 3 issues:**

- Availability of important services-70%
- Reduced employment opportunities-65%
- Movement of young people-64%

**Top 3 values attached to property:**

- Freedom of working for themselves-83%
- Being an attractive place to live-81%
- Providing the desired lifestyle-77%

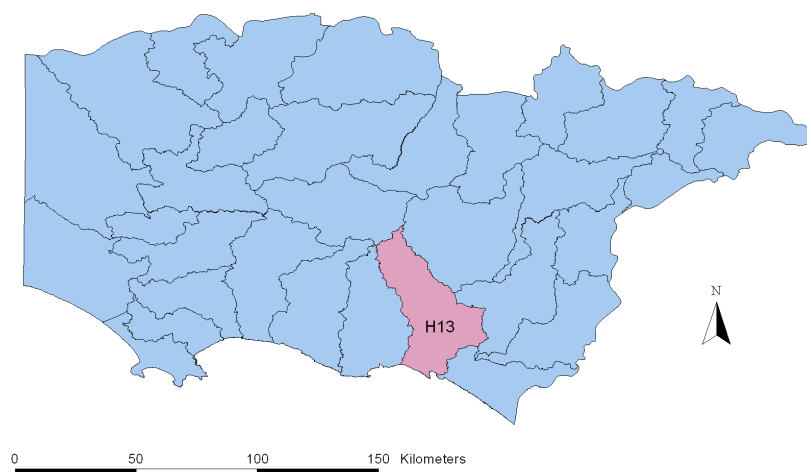
**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

- Benefits of pasture in crop rotation-33%
- Legislation about chemical storage/handling -52%
- How to recognise signs of salinity-48%

**Top 3 factors when considering changing land management practices:**

- Cash flow-77%
- Cost of machinery/equipment-73%
- Stage of life-70%

# Merri River (H13)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 145 ha

**3 most common land uses or enterprises:**

- Dryland pasture-76%
- Other tree plantings-54%
- Beef cattle-46%

**Proportion of respondents who reported areas showing signs of salinity:** 17%

**Proportion likely to sell property:** 40%

**Proportion likely to pass property on to a family member:** 45%

**Most commonly adopted CRP:**

- Only watered stock from trough/tank/dam-90%
- Work to control non-crop weeds and pests-84%
- Planted trees and shrubs-71%

**On-property profit (2002/2003):** 65%

**Average on-property income (2002/2003):**  
\$30,000

**Off-property profit (2002/2003):** 64%

**Average off-property income (2002/2003):**  
\$22,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 53 years

**Farmer by occupation:** 63%

**Landcare membership:** 24%

**Commodity group membership:** 14%

**Proportion with government funded work on their property in the past 5 years:** 24%

**Top 3 issues:**

- Availability of surface and groundwater-67%
- Cost of managing weeds and pest animals-65%
- Movement of young people-64%

**Top 3 values attached to property:**

- Building/maintaining a viable business-94%
- Freedom of working for themselves-89%
- Being an attractive place to live-89%

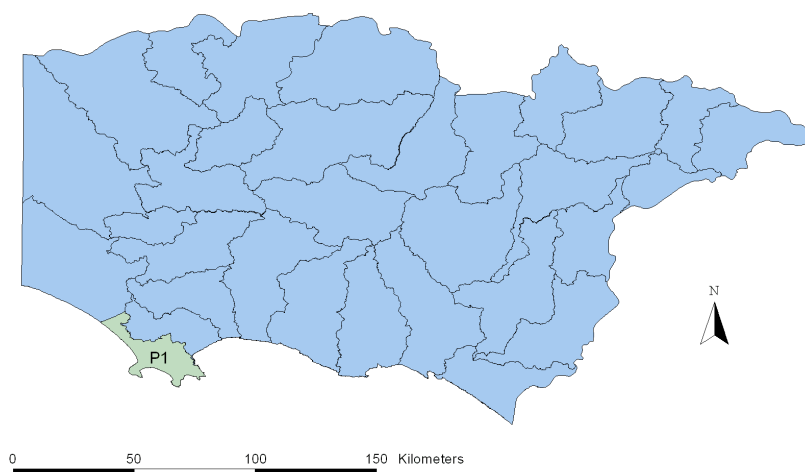
**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

- Benefits of ground cover on soil health-47%
- Legislation about chemical storage/handling -41%
- Benefits of pasture in crop rotation-40%

**Top 3 factors when considering changing land management practices:**

- Cash flow-91%
- Suitability of soils-81%
- Extent change will increase land value-81%

# Portland and Wattle Creek (P1)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 80 ha

### **3 most common land uses or enterprises:**

- Dryland pasture-76%
- Native remnant vegetation-56%
- Beef cattle-56%

**Proportion of respondents who reported areas showing signs of salinity:** 4%

**Proportion likely to sell property:** 42%

**Proportion likely to pass property on to a family member:** 39%

### **Most commonly adopted CRP:**

- Only watered stock from trough/tank/dam-100%
- Cropped using a rotation based on soil test-100%
- Cropped using a rotation with pasture-100%

**On-property profit (2002/2003):** 75%

**Average on-property income (2002/2003):**  
\$21,000

**Off-property profit (2002/2003):** 83%

**Average off-property income (2002/2003):**  
\$36,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 52 years

**Farmer by occupation:** 39%

**Landcare membership:** 17%

**Commodity group membership:** 17%

**Proportion with government funded work on their property in the past 5 years:** 22%

### **Top 3 issues:**

- Movement of young people-84%
- Reduced employment opportunities-79%
- Cost of managing weeds and pest animals-76%

### **Top 3 values attached to property:**

- Being an attractive place to live-96%
- Providing the desired lifestyle-92%
- Building/maintaining a viable business-91%

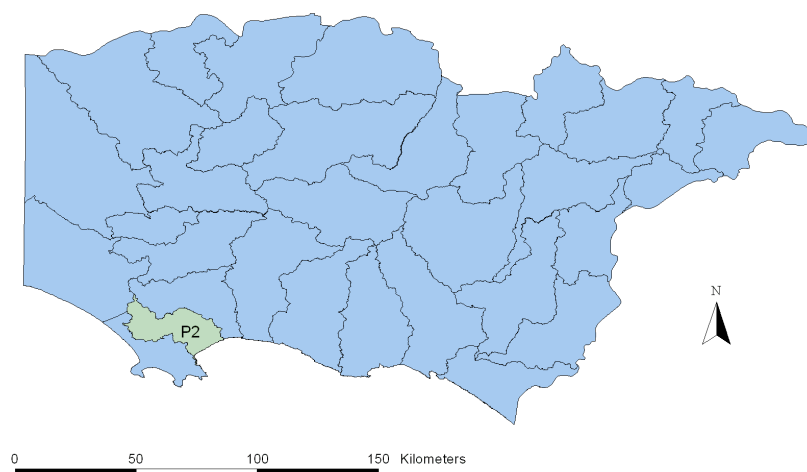
### **NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

- Legislation about chemical storage/handling -48%
- Benefits of ground cover on soil health-36%
- Benefits of retaining native vegetation-36%

### **Top 3 factors when considering changing land management practices:**

- Cash flow-91%
- Cost of machinery/equipment-87%
- Suitability of soils-83%

## Surry River (P2)



### CHARACTERISTICS OF PROPERTIES

**Median property size:** 72 ha

**3 most common land uses or enterprises:**

- Dryland pasture-73%
- Beef cattle-62%
- Other tree plantings-58%

**Proportion of respondents who reported areas showing signs of salinity:** 15%

**Proportion likely to sell property:** 25%

**Proportion likely to pass property on to a family member:** 57%

**Most commonly adopted CRP:**

- Only watered stock from trough/tank/dam-100%
- Cropped using a rotation based on soil test-100%
- Cropped using minimum tillage-100%

**On-property profit (2002/2003):** 64%

**Average on-property income (2002/2003):**  
\$23,000

**Off-property profit (2002/2003):** 80%

**Average off-property income (2002/2003):**  
\$29,000

### CHARACTERISTICS OF RESPONDENTS

**Median age:** 51 years

**Farmer by occupation:** 39%

**Landcare membership:** 16%

**Commodity group membership:** 17%

**Proportion with government funded work on their property in the past 5 years:** 21%

**Top 3 issues:**

- Movement of young people-77%
- Availability of important services-77%
- Cost of managing weeds and pest animals-73%

**Top 3 values attached to property:**

- Being a great place to raise a family-96%
- Being an attractive place to live-89%
- Building/maintaining a viable business-87%

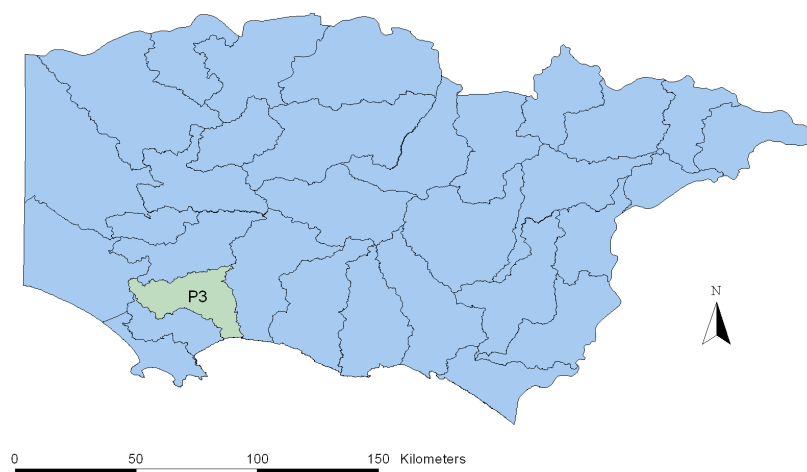
**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

- How to interpret soil test results-52%
- Benefits of ground cover on soil health-48%
- Benefits of retaining native vegetation-46%

**Top 3 factors when considering changing land management practices:**

- Stage of life-80%
- Existence of long-term markets-79%
- Cash flow-75%

# Fitzroy River (P3)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 205 ha

### 3 most common land uses or enterprises:

- Dryland pasture-80%
- Beef cattle-70%
- Native remnant vegetation-67%

**Proportion of respondents who reported areas showing signs of salinity:** 17%

**Proportion likely to sell property:** 21%

**Proportion likely to pass property on to a family member:** 62%

### Most commonly adopted CRP:

- Only watered stock from trough/tank/dam-100%
- Cropped using a rotation based on soil test-100%
- Work to control non-crop weeds and pests-100%

**On-property profit (2002/2003):** 69%

**Average on-property income (2002/2003):**  
\$19,000

**Off-property profit (2002/2003):** 76%

**Average off-property income (2002/2003):**  
\$30,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 53 years

**Farmer by occupation:** 70%

**Landcare membership:** 23%

**Commodity group membership:** 17%

**Proportion with government funded work on their property in the past 5 years:** 30%

### Top 3 issues:

- Reduced employment opportunities-75%
- Decline of small towns-73%
- Availability of important services-72%

### Top 3 values attached to property:

- Able to pass property on in better condition-90%
- Being an attractive place to live-90%
- Building/maintaining a viable business-90%

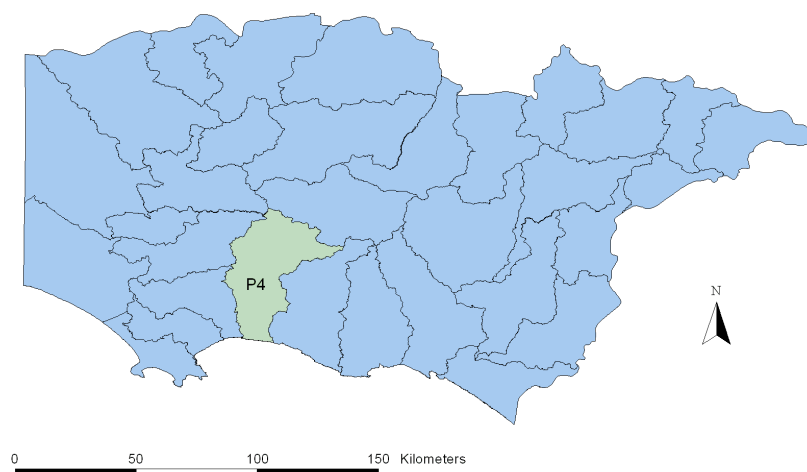
### NRM topics where respondents reported the highest knowledge (% with sound knowledge):

- Benefits of ground cover on soil health-53%
- Benefits of pasture in crop rotation-50%
- Riparian vegetation improving water quality-43%

### Top 3 factors when considering changing land management practices:

- Cost of machinery/equipment-90%
- Cash flow-90%
- Suitability of soils-87%

## Darlots Creek (P4)



### CHARACTERISTICS OF PROPERTIES

**Median property size:** 240 ha

**3 most common land uses or enterprises:**

- Dryland pasture-72%
- Beef cattle-69%
- Other tree plantings-59%

**Proportion of respondents who reported areas showing signs of salinity:** 27%

**Proportion likely to sell property:** 32%

**Proportion likely to pass property on to a family member:** 59%

**Most commonly adopted CRP:**

- Only watered stock from trough/tank/dam-82%
- Cropped using minimum tillage-80%
- Work to control non-crop weeds and pests-65%

**On-property profit (2002/2003):** 70%

**Average on-property income (2002/2003):**  
\$43,000

**Off-property profit (2002/2003):** 52%

**Average off-property income (2002/2003):**  
\$22,000

### CHARACTERISTICS OF RESPONDENTS

**Median age:** 54 years

**Farmer by occupation:** 71%

**Landcare membership:** 40%

**Commodity group membership:** 10%

**Proportion with government funded work on their property in the past 5 years:** 39%

**Top 3 issues:**

- Movement of young people-81%
- Decline of small towns-66%
- Availability of surface and ground water-66%

**Top 3 values attached to property:**

- Provides a sound economic investment-87%
- Being a great place to raise a family-85%
- Provides most of the household income-82%

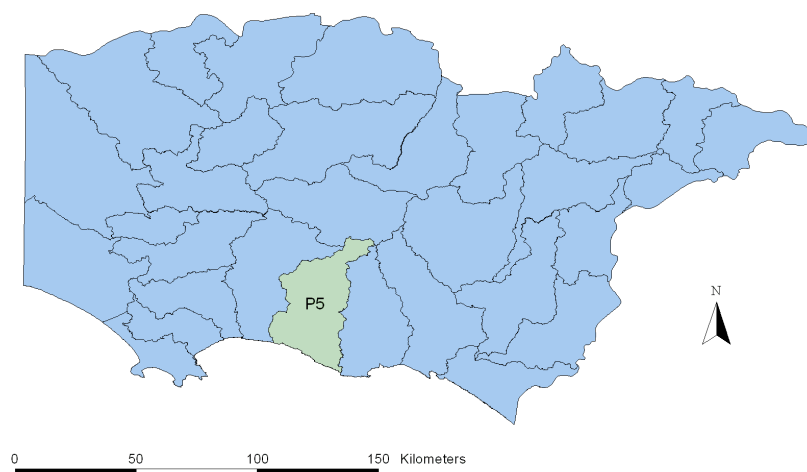
**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

- Legislation about chemical storage/handling-47%
- Benefits of retaining native vegetation-45%
- How to access property management courses-45%

**Top 3 factors when considering changing land management practices:**

- Cash flow-85%
- Suitability of soils-81%
- Cost of machinery/equipment-78%

## Eumeralla Creek (P5)



### CHARACTERISTICS OF PROPERTIES

**Median property size:** 225 ha

**3 most common land uses or enterprises:**

Dryland pasture-77%  
Beef cattle-71%  
Sheep for meat-53%

**Proportion of respondents who reported areas showing signs of salinity:** 27%

**Proportion likely to sell property:** 24%

**Proportion likely to pass property on to a family member:** 62%

**Most commonly adopted CRP:**

Only watered stock from trough/tank/dam-100%  
Record of soil test results for paddocks-71%  
Work to control non-crop weeds and pests-67%

**On-property profit (2002/2003):** 81%

**Average on-property income (2002/2003):**  
\$23,000

**Off-property profit (2002/2003):** 83%

**Average off-property income (2002/2003):**  
\$23,000

### CHARACTERISTICS OF RESPONDENTS

**Median age:** 49 years

**Farmer by occupation:** 59%

**Landcare membership:** 30%

**Commodity group membership:** 19%

**Proportion with government funded work on their property in the past 5 years:** 21%

**Top 3 issues:**

Movement of young people-88%  
Availability of important services-82%  
Availability of surface and ground water-77%

**Top 3 values attached to property:**

Able to pass property on in better condition-88%  
Building/maintaining a viable business-88%  
Provides the desired lifestyle-83%

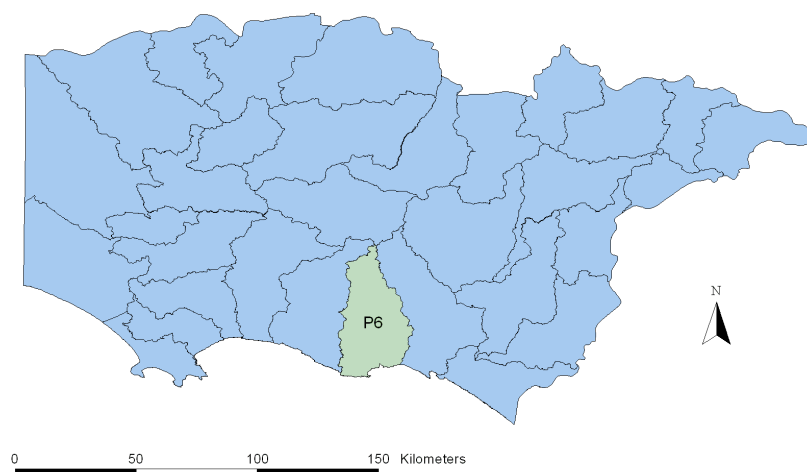
**NRM topics where respondents reported the highest knowledge (% with sound knowledge):**

Legislation about chemical storage/handling-52%  
Benefits of establishing local native plants-61%  
Effects of unrestricted stock access-55%

**Top 3 factors when considering changing land management practices:**

Cash flow-88%  
Suitability of soils-88%  
Existence of long-term markets-84%

# Moyne River (P6)



## CHARACTERISTICS OF PROPERTIES

**Median property size:** 195 ha

### 3 most common land uses or enterprises:

- Dryland pasture-75%
- Beef cattle-69%
- Other tree plantings-50%

**Proportion of respondents who reported areas showing signs of salinity:** 14%

**Proportion likely to sell property:** 36%

**Proportion likely to pass property on to a family member:** 49%

### Most commonly adopted CRP:

- Only watered stock from trough/tank/dam-100%
- Record of soil test results for paddocks-71%
- Work to control non-crop weeds and pests-67%

**On-property profit (2002/2003):** 77%

**Average on-property income (2002/2003):**  
\$41,000

**Off-property profit (2002/2003):** 56%

**Average off-property income (2002/2003):**  
\$32,000

## CHARACTERISTICS OF RESPONDENTS

**Median age:** 54 years

**Farmer by occupation:** 78%

**Landcare membership:** 41%

**Commodity group membership:** 9%

**Proportion with government funded work on their property in the past 5 years:** 27%

### Top 3 issues:

- Movement of young people-78%
- Availability of important services-76%
- Availability of surface and ground water-76%

### Top 3 values attached to property:

- Freedom of working for themselves-94%
- Being a great place to raise a family-91%
- Providing a sound economic investment-89%

### NRM topics where respondents reported the highest knowledge (% with sound knowledge):

- Legislation about chemical storage/handling-49%
- Benefits of pasture in crop rotation-33%
- Effects of unrestricted stock access-32%

### Top 3 factors when considering changing land management practices:

- Cash flow-88%
- Suitability of soils-85%
- Existence of long-term markets-78%



## **Appendix 2 – Significant differences across sub-catchments**

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**Table A1**  
**Perception of issues affecting property across sub-catchments**

Sub-Catchment	% of respondents who reported these as important issues on their property			
	Dryland salinity undermining productive capacity (F=2.049, p=0.001)	Uncertain/low returns limiting investment in long-term health (F=1.891, p=0.002)	Management of pest plants and animals on Crown Land (F=2.220, p<0.001)	Regulations affecting the employment of labour (F=1.987, p=0.001)
G1	16%	44%	76%	32%
G2	17%	50%	77% (highest)	37%
G3	19%	48%	35%	44%
G4	33%	59%	37%	46%
G5	53% (highest)	70%	58%	58%
G6	42%	58%	62%	41%
G7	21%	53%	72%	71% (highest)
G8	17%	29% (lowest)	50%	39%
G9	33%	51%	51%	37%
G10	43%	62%	64%	57%
G11	53% (highest)	74% (highest)	61%	55%
G12	20%	41%	50%	46%
G13	31%	40%	46%	47%
H1	15%	73%	48%	45%
H2	30%	63%	45%	59%
H3	22%	59%	44%	63%
H4	30%	50%	57%	60%
H5	43%	71%	57%	44%
H6	16%	63%	27%	38%
H7	29%	63%	29%	57%
H8	26%	37%	22% (lowest)	31%
H9	29%	48%	46%	27%
H10	40%	44%	52%	24%
H11	16%	48%	39%	61%
H12	27%	70%	30%	57%
H13	18%	71%	39%	43%
P1	20%	46%	75%	17% (lowest)
P2	11%	44%	77% (highest)	41%
P3	17%	61%	62%	35%
P4	9% (lowest)	39%	41%	48%
P5	24%	68%	53%	56%
P6	30%	49%	35%	51%

**Table A2**  
**Perception of issues affecting the district across sub-catchments**

Sub-Catchment	% of respondents who reported these as important issues in their district							
	Reduced employment opportunities (F=1.747, p=0.007)	Property sub-division undermining agriculture (F=2.125, p<0.001)	Decline of small towns (F=1.897, p=0.002)	Property amalgamation causing less viable communities (F=2.736, p<0.001)	Availability of important services (F=2.154, p<0.001)	Movement of young people out of the district (F=2.054, p<0.001)	Dryland salinity undermining productive capacity (F=2.272, p<0.001)	Dryland salinity reducing water quality (F=2.072, p=0.001)
G1	40% (lowest)	8%	60%	60%	64%	72%	12% (lowest)	12% (lowest)
G2	47%	10%	70%	38%	76%	80%	21%	35%
G3	61%	12%	72%	51%	79%	79%	23%	26%
G4	63%	4%	70%	82% (highest)	65%	93% (highest)	37%	48%
G5	67%	27%	77%	57%	87%	93% (highest)	50%	58%
G6	56%	27%	68%	32%	58%	67%	49%	52%
G7	58%	27%	73%	52%	70%	76%	30%	39%
G8	61%	6%	67%	44%	61%	56% (lowest)	28%	33%
G9	81%	7%	83%	54%	73%	63%	34%	48%
G10	74%	19%	74%	61%	85%	86%	48%	44%
G11	59%	35%	66%	59%	72%	83%	69% (highest)	66%
G12	67%	14%	86%	69%	93% (highest)	90%	41%	69% (highest)
G13	56%	21%	71%	37%	71%	82%	37%	43%
H1	57%	23%	59%	39%	72%	68%	21%	28%
H2	77%	24%	88% (highest)	60%	86%	88%	41%	45%
H3	52%	4%	67%	52%	74%	78%	37%	59%
H4	59%	3% (lowest)	77%	67%	83%	83%	47%	33%
H5	44%	21%	61%	46%	57%	79%	39%	36%
H6	73%	20%	82%	57%	80%	87%	27%	38%
H7	68%	14%	86%	57%	89%	82%	22%	37%
H8	82% (highest)	15%	74%	54%	85%	89%	22%	31%
H9	61%	35%	57%	50%	68%	75%	27%	46%
H10	77%	31%	69%	42%	84%	89%	44%	35%
H11	65%	3% (lowest)	73%	47%	84%	93% (highest)	13%	32%
H12	65%	23%	52%	55%	70%	64%	36%	23%
H13	50%	21%	49% (lowest)	40%	54% (lowest)	60%	21%	33%
P1	76%	36% (highest)	56%	16% (lowest)	60%	84%	24%	24%
P2	69%	30%	56%	42%	74%	77%	26%	19%
P3	72%	30%	73%	45%	70%	63%	20%	20%
P4	58%	25%	66%	41%	56%	81%	19%	28%
P5	59%	24%	71%	49%	79%	88%	30%	36%
P6	60%	25%	67%	41%	76%	78%	28%	33%

**Table A2 cont.**  
**Perception of issues affecting the district across sub-catchments**

Sub-Catchment	% of respondents who reported these as important issues in their district			
	Plantations reducing ground water recharge (F=2.771, p<0.001)	Soil acidity undermining productive capacity of the district (F=1.468, p=0.049)	Urban development in coastal areas (F=3.436, p<0.001)	Availability of surface and groundwater for agriculture (F=1.585, p=0.023)
G1	60%	24%	16%	64%
G2	66%	55%	14%	68%
G3	55%	44%	7%	58%
G4	30%	41%	4%	48%
G5	38%	70% (highest)	10%	58%
G6	36%	50%	15%	52%
G7	66%	39%	18%	76%
G8	33%	33%	6%	39%
G9	61%	48%	3%	56%
G10	46%	57%	22%	64%
G11	25%	48%	14%	59%
G12	41%	32%	11%	48%
G13	55%	43%	18%	67%
H1	31%	38%	28%	80% (highest)
H2	23%	57%	17%	57%
H3	30%	37%	15%	48%
H4	23%	47%	3%	60%
H5	18% (lowest)	46%	0% (lowest)	50%
H6	30%	49%	23%	78%
H7	18% (lowest)	36%	0% (lowest)	54%
H8	52%	54%	7%	67%
H9	50%	41%	14%	38% (lowest)
H10	46%	36%	4%	56%
H11	23%	42%	10%	55%
H12	48%	27%	0% (lowest)	57%
H13	29%	38%	28%	66%
P1	56%	40%	44% (highest)	72%
P2	54%	39%	19%	56%
P3	67% (highest)	23% (lowest)	43%	57%
P4	50%	31%	6%	59%
P5	65%	39%	21%	73%
P6	36%	33%	32%	76%

**Table A3**  
**Values attached to property across sub-catchments**

Sub-Catchment	% of respondents who reported these were important values of their property						
	Providing most of the household income (F=2.849, p<0.001)	Building/ maintaining a viable business (F=1.719, p=0.009)	Work on the property the only job ever done (F=1.668, p=0.014)	Contributing to the local economy (F=2.593, p<0.001)	An asset to fund retirement (F=1.706, p=0.010)	A great place to raise a family (F=1.490, p=0.043)	Freedom of working for myself (F=1.620, p=0.018)
G1	56%	68%	36%	56%	60%	72%	76%
G2	67%	73%	14%	66%	63%	55%	73%
G3	56%	85%	18%	56%	59%	67%	69%
G4	89%	85%	36%	69%	65%	84%	80%
G5	77%	90%	23%	60%	57%	83%	90%
G6	50%	66%	16%	59%	41% (lowest)	63%	53%
G7	76%	85%	27%	76%	67%	76%	82%
G8	53%	67%	6%	44%	50%	39% (lowest)	53%
G9	66%	83%	33%	55%	53%	69%	77%
G10	52%	69%	12%	46%	65%	73%	58%
G11	63%	78%	19%	47%	47%	75%	78%
G12	74%	86%	29%	62%	48%	87% (highest)	76%
G13	48%	74%	23%	51%	49%	76%	62%
H1	79%	85%	42%	77% (highest)	75%	80%	84%
H2	81%	85%	37%	77% (highest)	74%	86%	83%
H3	74%	89%	22%	63%	70%	85%	100% (highest)
H4	83%	93%	50%	72%	53%	83%	73%
H5	63%	78%	15%	48%	48%	67%	82%
H6	80%	82%	51% (highest)	69%	69%	87% (highest)	80%
H7	82%	96% (highest)	43%	64%	82% (highest)	68%	86%
H8	61%	86%	41%	67%	46%	85%	79%
H9	50%	61%	27%	35%	57%	78%	79%
H10	39% (lowest)	54% (lowest)	4% (lowest)	23% (lowest)	42%	65%	42% (lowest)
H11	94% (highest)	90%	39%	68%	61%	77%	93%
H12	52%	65%	26%	32%	48%	64%	68%
H13	71%	92%	31%	67%	68%	74%	84%
P1	54%	88%	17%	63%	67%	71%	83%
P2	44%	77%	12%	59%	70%	78%	74%
P3	76%	90%	7%	76%	59%	79%	86%
P4	69%	75%	29%	53%	50%	72%	72%
P5	64%	82%	24%	59%	68%	64%	76%
P6	83%	86%	41%	70%	75%	83%	89%

**Table A4**  
**Respondents long-term plans for their property across sub-catchments**

Sub-Catchment	% of respondents who said their long-term plans were likely to involve these options		
	Sub-divide and sell a small part of the property (F=1.913, p=0.002)	Someone else in the family will make management decisions (F=1.646, p=0.015)	Continue to live on the property (F=1.691, p=0.011)
G1	0% (lowest)	20%	48%
G2	7%	19%	39%
G3	0% (lowest)	36%	56%
G4	0% (lowest)	28%	52%
G5	7%	23%	70%
G6	3%	22%	49%
G7	0% (lowest)	12% (lowest)	52%
G8	0% (lowest)	28%	28% (lowest)
G9	0% (lowest)	26%	64%
G10	8%	19%	62%
G11	3%	42%	68%
G12	3%	32%	69%
G13	4%	15%	71%
H1	4%	37%	63%
H2	3%	38%	43%
H3	4%	22%	52%
H4	3%	37%	57%
H5	0% (lowest)	37%	67%
H6	5%	38%	46%
H7	4%	29%	64%
H8	4%	42%	63%
H9	9%	30%	35%
H10	4%	24%	56%
H11	3%	36%	65%
H12	0% (lowest)	32%	74% (highest)
H13	8%	22%	59%
P1	13%	13%	65%
P2	25% (highest)	26%	68%
P3	0% (lowest)	24%	72%
P4	9%	44% (highest)	52%
P5	0% (lowest)	24%	55%
P6	0% (lowest)	33%	67%

**Table A5**  
**Attitudes towards NRM across sub-catchments**

Sub-Catchment	% of respondents who agreed with these statements	
	Landholders should <i>not</i> be expected to manage in expectation of drought conditions (F=1.585, p=0.023)	The difficulties and costs of stubble retention outweigh the benefits of this practice (F=1.717, p=0.009)
G1	0% (lowest)	20%
G2	21%	7%
G3	13%	14%
G4	8%	21%
G5	31%	11%
G6	15%	17%
G7	22%	19%
G8	6%	0% (lowest)
G9	26%	8%
G10	11%	14%
G11	7%	17%
G12	28%	24%
G13	13%	20%
H1	27%	20%
H2	20%	17%
H3	4%	22%
H4	14%	45% (highest)
H5	11%	8%
H6	19%	20%
H7	14%	21%
H8	26%	23%
H9	32%	9%
H10	15%	20%
H11	10%	43%
H12	24%	25%
H13	25%	28%
P1	17%	26%
P2	23%	17%
P3	7%	14%
P4	34% (highest)	7%
P5	18%	3%
P6	24%	9%

**Table A6**  
**Knowledge of NRM across sub-catchments**

Sub-Catchment	% of respondents who said they had sound knowledge							
	How to interpret soil test results (F=1.546, p=0.029)	Aboriginal land management activities (F=1.885, p=0.003)	How to recognise signs of salinity (F=2.004, p=0.001)	How to interpret water quality tests (F=1.961, p=0.001)	How to access property management courses (F=1.493, p=0.042)	Benefits of minimising water entering groundwater (F=1.604, p=0.020)	The benefits of integrating farm forestry (F=1.846, p=0.003)	The effects of draining wetlands (F=1.927, p=0.002)
G1	28%	4%	20%	16%	36%	4%	32%	20%
G2	38%	0% (lowest)	40%	31%	24%	41% (highest)	28%	43% (highest)
G3	24%	7%	41%	27%	42%	15%	24%	24%
G4	8% (lowest)	4%	54%	23%	32%	15%	32%	27%
G5	27%	0% (lowest)	63% (highest)	30%	40%	23%	23%	17%
G6	25%	3%	38%	13%	28%	6%	25%	28%
G7	52% (highest)	6%	36%	21%	42%	18%	42% (highest)	30%
G8	24%	0% (lowest)	41%	12%	19%	12%	35%	41%
G9	22%	0% (lowest)	44%	24%	24%	17%	24%	23%
G10	21%	0% (lowest)	45%	7%	35%	25%	24%	29%
G11	23%	0% (lowest)	37%	13%	47% (highest)	20%	27%	37%
G12	20%	7%	45%	35%	31%	24%	31%	24%
G13	19%	4%	29%	14%	31%	10%	19%	19%
H1	43%	4%	21%	26%	30%	26%	11%	13%
H2	27%	3%	37%	17%	35%	18%	17%	24%
H3	48%	4%	52%	52% (highest)	39%	22%	15%	33%
H4	47%	3%	57%	27%	30%	28%	10%	20%
H5	19%	4%	30%	11%	30%	11%	15%	22%
H6	25%	0% (lowest)	27%	11%	34%	21%	18%	25%
H7	39%	0% (lowest)	43%	18%	30%	11%	7%	18%
H8	26%	0% (lowest)	33%	26%	37%	11%	26%	30%
H9	14%	9%	26%	17%	9% (lowest)	0% (lowest)	17%	9%
H10	15%	0% (lowest)	31%	8%	12%	15%	12%	12%
H11	39%	0% (lowest)	45%	39%	42%	23%	13%	32%
H12	19%	5%	48%	14%	24%	5%	5%	0% (lowest)
H13	28%	6%	24%	18%	20%	19%	14%	14%
P1	33%	4%	16% (lowest)	12%	24%	8%	12%	16%
P2	52% (highest)	8%	20%	4% (lowest)	16%	8%	8%	32%
P3	37%	13%	33%	27%	33%	23%	13%	30%
P4	25%	19% (highest)	38%	25%	44%	9%	25%	22%
P5	31%	3%	39%	18%	24%	24%	15%	36%
P6	25%	5%	29%	8%	24%	11%	3% (lowest)	18%



**Table A6 cont.**  
**Knowledge of NRM across sub-catchments**

Sub-Catchment	% of respondents who said they had sound knowledge			
	Major NRM strategies of the GHCMA (F=1.914, p=0.002)	Processes leading to soil acidification (F=1.703, p=0.010)	Ability of vegetation in waterways and gullies to improve water quality (F=1.913, p=0.002)	Ability of perennial vegetation and standing stubble to improve water quality (F=2.173, p<0.001)
G1	8%	16%	28%	25%
G2	10%	21%	48%	36%
G3	15%	13%	51%	41%
G4	15%	8%	54%	28%
G5	13%	20%	63% (highest)	40%
G6	6%	13%	38%	16%
G7	3%	21%	46%	36%
G8	0% (lowest)	24%	41%	24%
G9	23% (highest)	20%	36%	31%
G10	7%	30%	32%	32%
G11	10%	10%	37%	33%
G12	10%	21%	55%	55% (highest)
G13	10%	14%	14%	21%
H1	6%	4%	31%	15%
H2	10%	15%	33%	27%
H3	15%	27%	44%	33%
H4	10%	31%	55%	35%
H5	15%	15%	41%	30%
H6	2%	7%	23%	14%
H7	0% (lowest)	7%	43%	18%
H8	4%	12%	30%	19%
H9	0% (lowest)	0% (lowest)	13% (lowest)	4% (lowest)
H10	4%	15%	39%	27%
H11	7%	36% (highest)	48%	32%
H12	10%	5%	19%	10%
H13	6%	8%	37%	21%
P1	4%	12%	20%	12%
P2	4%	4%	44%	16%
P3	10%	23%	43%	27%
P4	13%	16%	28%	19%
P5	12%	16%	30%	30%
P6	5%	3%	27%	14%

**Table A7**  
**Constraints to implementing changed management practices across sub-catchments**

Sub-Catchment	% of respondents who said these were an important factors when considering change to management practices							
	Fits with existing enterprises (F=1.475, p=0.047)	Time before seeing returns (F=1.512, p=0.037)	Need acquire new knowledge or skills (F=1.471, p=0.048)	Commitment and support from family (F=1.635, p=0.016)	Will address environmental issues (F=1.527, p=0.034)	Availability of labour (F=1.926, p=0.002)	Stage of life (F=1.568, p=0.026)	Extent change will increase land value (F=1.576, p=0.024)
<b>G1</b>	71%	74%	75% (highest)	70%	63%	48%	54%	58%
<b>G2</b>	56%	64%	54%	59%	57%	44%	59%	64%
<b>G3</b>	60%	66%	46%	80%	67%	67%	62%	74%
<b>G4</b>	52%	64%	56%	72%	68%	48%	72%	76%
<b>G5</b>	68%	75%	43%	78%	68%	75%	79%	71%
<b>G6</b>	42%	39%	48%	61%	64%	70%	58%	72%
<b>G7</b>	66%	69%	50%	69%	63%	68%	58%	72%
<b>G8</b>	63%	53%	56%	56%	75%	69%	60%	50%
<b>G9</b>	51%	55%	42%	51%	51%	54%	68%	47%
<b>G10</b>	62%	56%	54%	60%	78%	85% (highest)	73%	65%
<b>G11</b>	63%	67%	56%	67%	85% (highest)	75%	63%	52%
<b>G12</b>	52%	48%	56%	69%	77%	65%	81%	77%
<b>G13</b>	50%	54%	48%	62%	68%	44%	64%	66%
<b>H1</b>	61%	48%	51%	84%	55%	64%	79%	77%
<b>H2</b>	80%	60%	63%	88% (highest)	63%	65%	69%	74%
<b>H3</b>	69%	77% (highest)	73%	62%	77%	65%	73%	73%
<b>H4</b>	59%	71%	57%	75%	71%	54%	82%	64%
<b>H5</b>	62%	15% (lowest)	59%	59%	67%	61%	74%	63%
<b>H6</b>	64%	64%	74%	72%	63%	67%	83%	81% (highest)
<b>H7</b>	68%	68%	68%	63%	61%	71%	75%	79%
<b>H8</b>	83% (highest)	61%	63%	58%	67%	76%	58%	75%
<b>H9</b>	32% (lowest)	39%	67%	67%	78%	67%	89% (highest)	78%
<b>H10</b>	41%	39%	44%	48% (lowest)	50%	39% (lowest)	57%	44% (lowest)
<b>H11</b>	79%	72%	48%	69%	62%	59%	48% (lowest)	59%
<b>H12</b>	50%	59%	50%	50%	55%	41%	70%	57%
<b>H13</b>	51%	63%	56%	56%	54%	67%	79%	81% (highest)
<b>P1</b>	67%	52%	39% (lowest)	65%	59%	39% (lowest)	68%	78%
<b>P2</b>	50%	54%	42%	50%	42% (lowest)	46%	80%	71%
<b>P3</b>	67%	67%	70%	70%	57%	47%	80%	70%
<b>P4</b>	56%	59%	42%	67%	59%	48%	62%	52%
<b>P5</b>	61%	73%	52%	74%	58%	76%	72%	77%
<b>P6</b>	65%	69%	41%	75%	64%	59%	73%	78%

**Table A8**  
**Other characteristics**

Variable	Sub-catchments in the Glenelg Basin												
	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13
Reside on the property	70%	40%	76%	79%	80%	50%	64%	38%	81%	72%	90%	85%	74%
Course on property management	63%	42%	43%	67%	67%	38%	50%	53%	40%	62%	49%	37%	38%
Median time live in the area	39 yrs	40 yrs	40 yrs	42 yrs	33 yrs	25 yrs	31 yrs	18 yrs	43 yrs	30 yrs	37 yrs	40 yrs	39 yrs
Median time lived on the property	22 yrs	9 yrs	28 yrs	32 yrs	20 yrs	8 yrs	19 yrs	18 yrs	29 yrs	20 yrs	21 yrs	26 yrs	16 yrs
Member of a Landcare group	4%	17%	56%	71%	57%	19%	44%	18%	46%	44%	64%	70%	15%
Preparing a whole farm plan	77%	43%	57%	56%	61%	58%	58%	47%	41%	56%	55%	57%	30%
Involved in succession planning	42%	38%	38%	52%	58%	55%	34%	54%	35%	48%	55%	45%	40%
Involved in local action planning	28%	40%	56%	64%	57%	22%	56%	27%	49%	59%	58%	73%	27%

Lowest

Highest

**Table A8 cont.**  
**Other characteristics**

Variable	Sub-catchments in the Hopkins Basin												
	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13
Reside on the property	81%	83%	85%	77%	82%	86%	85%	71%	74%	72%	86%	71%	84%
Course on property management	44%	50%	56%	52%	54%	50%	54%	41%	27%	17%	80%	32%	42%
Median time live in area	43 yrs	44 yrs	34 yrs	43 yrs	46 yrs	48 yrs	40 yrs	20 yrs	35 yrs	25 yrs	51 yrs	36 yrs	40 yrs
Median time lived in property	28 yrs	29 yrs	23 yrs	28 yrs	33 yrs	23 yrs	26 yrs	14 yrs	19 yrs	17 yrs	28 yrs	27 yrs	24 yrs
Member of a Landcare group	25%	50%	72%	67%	62%	30%	42%	32%	36%	38%	59%	48%	24%
Preparing a whole farm plan	50%	52%	54%	46%	41%	43%	36%	27%	25%	29%	45%	37%	46%
Involved in succession planning	52%	54%	52%	54%	46%	49%	40%	61%	45%	33%	64%	45%	41%
Involved in local action planning	47%	50%	64%	52%	59%	34%	43%	50%	62%	35%	52%	43%	26%

Lowest

Highest

**Table A8 cont.**  
**Other characteristics**

Variable	Sub-catchments in the Portland Coast Basin					
	P1	P2	P3	P4	P5	P6
Reside on the property	68%	69%	79%	80%	81%	87%
Course on property management	52%	36%	40%	48%	50%	42%
Median time live in area	31 yrs	34 yrs	40 yrs	30 yrs	29 yrs	45 yrs
Median time lived in property	20 yrs	24 yrs	23 yrs	25 yrs	18 yrs	26 yrs
Member of a Landcare group	17%	16%	23%	40%	30%	41%
Preparing a whole farm plan	28%	32%	41%	52%	39%	45%
Involved in succession planning	25%	39%	46%	46%	30%	48%
Involved in local action planning	52%	46%	43%	55%	31%	38%

Lowest

Highest