Australian Government
Bureau of Rural Sciences

Biosecurity awareness and peri-urban landholders: a case study approach

Heather J. Aslin & Nicole A. Mazur
Social Sciences Programme

December 2005

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

Copies available from:
BRS Publication Sales
GPO Box 858
Canberra ACT 2601
Ph: 1800 020 157
Fax: 02 6272 2330

Email: salesbrs@brs.gov.au

Internet: http://www.affa.gov.au/brs

Executive summary

This study focuses on peri-urban and rural lifestyle landowners as a possible biosecurity risk group, and reports on literature findings and case studies conducted in Western Australia, Victoria and Queensland

Peri-urban and rural lifestyle landowners have been identified as a potential biosecurity risk group, and concerns have been expressed about whether existing biosecurity information and awareness campaigns are reaching this segment of the rural population. These concerns arise partly from perceptions that this segment, because it covers people who have variable and often minor involvement in primary production, are often not linked into industry networks and may have little knowledge of rural land management or primary production issues. This study, building on an earlier Bureau of Rural Sciences' investigation, reports on current literature findings and outcomes of three case studies conducted in areas where there are large numbers of these kinds of landowners. Case study areas were the City of Swan, Western Australia (where extension services specifically designed for these kinds of landholders were examined); the City of Greater Bendigo, Victoria; and the Brisbane and Sunshine Coast Hinterland region, Queensland.

This landholder category appears to diverse, mobile and increasing in numbers. It includes segments that may be difficult to contact like absentee landowners, second and holiday home owners, and people who actively avoid involvement with government

Findings support the view that the peri-urban and lifestyle landholder category as a whole is diverse, highly mobile and increasing in numbers. It includes absentee landowners, second and holiday home owners, and some groups of people from both English speaking and non-English speaking backgrounds who are suspicious of government and avoid contact with government agencies. These characteristics mean that communicators need to set priorities and work strategically to contact and maintain links with the different segments within this broad landholder category, and to see that the different segments receive basic information to raise their awareness of biosecurity risks.

Case study interviewees indicated that these kinds of landholders contributed to biosecurity risks associated with spread of existing pests and weeds, and poor pasture, land management or animal husbandry practices

Biosecurity risks that case study interviewees most commonly associated with these kinds of landholders were the risks of spreading existing pests and weeds, and risks associated with poor pasture, land management or animal husbandry. There was widespread agreement that many peri-urban landholders lack experience in these areas and may be unaware of biosecurity risks related to their practices.

To go beyond broad awareness raising approaches using the mass media or general ratepayer mail-outs, local knowledge needs be applied to identify targeted ways to reach different sub-groups

There is no simple way of communicating with all these landholders, other than by very broad-brush approaches using the mass media, particularly television, or through general mail outs using Local Government ratepayer lists. They have many different interests and many special interest groups exist related to different land uses, hobbies and other activities. Relevant interest groups, networks and

service providers need to be identified on a case-by-case basis by tapping into local knowledge, and using local, regional and State-based experts as appropriate to issues and locations of concern. In terms of providing ongoing advisory and information services to these kinds of landholders, the models provided by the Western Australian Small Landholder Information Service and the Swan Canning Property Planning Project should be considered for possible application in other locations where there are many similar landholders.

Appropriate ways of contacting these landholders involve using informal networks and communication channels supporting their current values and interests — often related to community, family, lifestyle, environment and sustainability

Appropriate ways of communicating with members of this audience include using the often relatively informal networks and communication channels that support their current values and interests, and tap into their sense of community, either place-based or interest-based. Communication and extension activities for them need to apply adult learning principles, group-based approaches, tap into non-utilitarian value sets, and offer activities outside normal working hours. Mobilising these landholders' existing value sets and relating biosecurity activities to these values is the best way of motivating them to take action. Existing values of many in this landholder segment relate to matters like community, family, lifestyle, environment, sustainability and intergenerational concerns.

The report concludes by identifying the need to develop research and communication strategies specifically for these landholders, and to clarify government roles in ongoing biosecurity communication and extension activities for them

In concluding, the report discusses differing interpretations of biosecurity and their relationship to current jurisdictional arrangements; the significance of the peri-urban landholder category; the role of fresh produce markets and direct selling techniques for these landholders; and makes suggestions about future research and communication strategies for them. In particular, the report identifies the need to adopt a layered communications approach with a direct focus on these kinds of landholders, and the need to clarify the responsibilities of the different levels of government in biosecurity communication and extension activities for them.

Contents

Acknowledgments

We would like to thank the following people for their expert advice and assistance:

Western Australia — Tim Batt, Marie Bracks-Burns, Nancye Gannaway, Neil Guise, Garry Hogden, Ian Kinnimoth, Corinna Lange, Sandy Lloyd, Marion White, Linda Taman, Chris Mayberry, Neil Guise, Ray Kerslake, Mark Jones, Simon Merriweather, Megan Narducci, Stephen Prowse, Avril Russell-Brown, Greg Ryan, Greg Sawyer, Lesley Thomas, Adrian Tomlinson; *Victoria* — Margaret Allan, Jeff Bothe, Greg Hughes, Susannah Milne, Sandra Volk, Rod Badman, George Downing, Tom Glynn, Max Coster, Neil Barr, Peter Howden, Greg Cahill, Dean Bridgfoot, Chris Pollock, Anthony Sheehan, Rod Bowles, Carole Hollier, Jim Crosthwaite, Rachel Spokes, Paul Flint, Roy Lovel, Michael Boyd; *Queensland* — Simon Bewg, Roly Nepier, Rod Thompson, Pip Hanrick, Sandy Mackenzie, Robert Morton, Kevin Cook, Paul McCarthy, Karen Skelton, Lyn Aitken, Peter Mann, Rick Whittle; *South Australia* — Peter Houston, David Creeper; *New South Wales* — Trish Holyoake, Kevin Cooper; *Northern Territory* — Andrew de Witte; *Australian Capital Territory* — Marilyn Chalkley, Helen Bailey, Robert Murphy, Tony Brennan, Alison Roach, Greg Fulham, Jamie Penrose, Garth Donovan; *Tasmania* — Andrew Cooney.

BRS colleagues who helped with the project were: Alice Woodhead, who undertook preliminary work investigating AQIS procedures, databases and communication strategies; Shannon Kelson who prepared the case study maps; Rob Lesslie and Jodie Smith who provided advice about land use maps, and Bob Munro, who advised on animal health issues. Our thanks to Catherine Mobbs for comments on the draft report.

Our particular thanks to Howard Conkey and Greg Flaherty of the DAFF Product Integrity, Animal and Plant Health Division for advice and support throughout the project.

1 Introduction and background

This report responds to a request from the Product Integrity, Animal and Plant Health Division (PIAPH) of the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) to conduct an investigation with the aim of developing a better understanding of peri-urban and non-farmer landholders living in rural areas, who may need to be contacted in biosecurity awareness campaigns and may be called upon to take action if particular biosecurity issues arise. The report uses the term 'peri-urban' to describe these landholders, but the term is intended to refer to small, hobby and lifestyle landowners who purchase rural properties principally for non-farming purposes, and who may or may not be engaged in primary production activities on their land.

The investigation focuses on:

- identifying who may be being missed in existing biosecurity awareness campaigns and may therefore pose particular risks e.g. people of non-English speaking backgrounds (NESB), hobby and lifestyle farmers, people raising plants or animals for subsistence use, and people involved in selling, bartering or trading plant and animal products through informal means e.g. growers' markets, as opposed to formal sales in the wholesale and retail sectors
- identifying their practices that may be of concern from a biosecurity viewpoint
- identifying how these people can be contacted, incorporated into biosecurity communication networks, and targeted in education and awareness campaigns
- how to motivate this audience to ensure that they reduce or eliminate any biosecurity risks their practices pose.

This project is follow-up research to an earlier project completed for PIAPH, *Peri-urban landholders and bio-security issues — a scoping study* (Aslin, Kelson, Smith & Lesslie, 2004).

An associated project has been conducted concurrently with this one — an audit of existing education and awareness material available to landholders. The audit is identifying what material is available, in what form, what media are being used, who is providing the material, who is accessing it, and what measures of success in education and awareness raising can be identified.

This project and its findings are relevant to the National Biosecurity Strategy currently being developed. It is also in line with a resolution of the Primary Industries Ministerial Council relating to national communication arrangements for pest and disease emergencies (Primary Industries Ministerial Council, 2004).

Interest in peri-urban farmers and their significance for national rural and regional policy was heightened by the Review of the National Landcare Program, which identified this group as one which is rapidly growing and which may not be sufficiently engaged by Landcare (DAFF, 2003).

Project outcomes

Intended primary outcomes of the project are:

- an enhanced understanding of high-risk peri-urban target groups — who these target groups are, what they do, what motivates them, and how to reach them

- a more cohesive approach to national biosecurity awareness (in line with the proposed National Biosecurity Strategy) — the outcomes of this research are intended to help coordinate communication and awareness campaigns by helping to pull together existing awareness activities undertaken by numerous State/Territory and Australian Government agencies, working to close any gaps, and building on the strengths of those initiatives in addressing the high-risk activities of these growing target groups not reached by existing projects.

Intended secondary outcomes include:

- improved relationships and open communication channels between Australian Government and State/Territory agricultural agencies and stakeholders
- a mutually beneficial, cohesive approach to identifying and mitigating high-risk activities of target community groups
- increased public awareness about biosecurity practices, PIAPH and DAFF activities, and education materials available.

The project was guided by an advisory committee, which included representatives of Commonwealth agencies with biosecurity-related responsibilities, and also by advice from State and Territory stakeholders. Project work was undertaken between September 2004 and August 2005.

Scope and definitions

Biosecurity

There are many definitions of biosecurity, each with slightly different scope and emphasis. Some examples are shown in Box 1. The definition provided by the Food and Agriculture Organisation is the most comprehensive, and is the only one that specifically mentions genetically modified organisations (GMOs) and the introduction of new genotypes as well as whole organisms. All the definitions include pests and diseases, both plant and animal.

This project focuses on terrestrial biosecurity issues in Australia, and does not specifically consider freshwater or marine aspects. It concentrates mainly on risks to primary industries, agricultural production and agricultural trade, and only secondarily on risks to human health, biodiversity and environment. However, many of these risks are intimately linked — for example, environmental pollution can lead to agricultural produce being contaminated, with potential consequences for human health.

Box 1: Alternative definitions of biosecurity

Food and Agriculture Organisation (United Nations)
Biosecurity is a strategic and integrated approach that encompasses the policy and regulatory frameworks (including instruments and activities) that analyse and manage risks in the sectors of food safety, animal life and health, and plant life and health, including associated environmental risk. Biosecurity covers the introduction of plant pests, animal pests and diseases, and zoonoses, the introduction and release of genetically modified organisms (GMOs) and their products, and the introduction and management of invasive alien species and genotypes. *Biosecurity* is a holistic concept of direct relevance to the sustainability of agriculture, food safety, and the protection of the environment, including biodiversity (see http://www.fao.org.biosecurity)

New Zealand Ministry of Agriculture and Forestry
Biosecurity can be described as:

- the protection of the economy, environment, and people's health from the risks posed by unwanted exotic pests and diseases entering the country; and
- the control of endemic pests and diseases within the country (New Zealand Controller and Auditor-General, 2002)

Box 1 (cont.)

Australian Biosecurity Cooperative Research Centre
'Biosecurity' is the protection of people, animals and ecological systems against disease and other biological threats. Biosecurity is achieved through systems that aim to protect public health, animal and plant industries, and the environment, for the entry, establishment and spread of unwanted pests and diseases (see http://www1.abcrc.org.au/pages/About.aspx?MenuID=3)

WA Department of Agriculture
Biosecurity is a general description for a set of measures designed to protect a country, state, or individual farming properties from the entry and spread of unwanted animals, pests, diseases and weeds (WA Department of Agriculture Farmnote no. 71/2002)

Peri-urban

The term 'peri-urban' was discussed in the previous report (Aslin et al., 2004). It is a geographical or planning term meaning 'around the urban', does not have a precise definition, and may need to be operationalised in different ways in different situations. For example, in a recent quantitative audit of peri-urban agriculture, Houston (2005a) develops a multi-criterion definition to identify Australian Local Government Areas (LGAs) 'subject to peri-urban influence'. His definition is based on considering population density, proportion of employment in non-rural industries, and proportion of new residents. Using these criteria assumes that peri-urban areas generally have lower population densities than metropolitan areas, substantial proportions of people employed in occupations not related to agriculture, and substantial and continuing influxes of new residents.

In this study, 'peri-urban' has been used in a common language sense. It has been left it to the various experts consulted to interpret the term in a way that is meaningful to them, and no definition has been pre-imposed. In this sense, 'peri-urban' as applied to landholders tends to be used interchangeably to mean small farmers, small landholders, hobby and lifestyle farmers living on or near the rural-urban fringe. However, the audit of peri-urban agriculture mentioned above focused on mainstream primary producers farming in areas subject to peri-urban influence, and the fact that a landholder lives in a peri-urban area does not necessarily mean that they are not a commercial farmer. The qualitative methods used in this study enabled us to clarify directly with interviewees that the focus of our interest was people living on rural smallholdings in peri-urban areas, but who were not there primarily to farm. The choice of case studies in this project also indicates that these kinds of landholders are very widely distributed, and are not restricted to areas immediately surrounding larger population centres. Even for those small landholders who commute to city workplaces, a 1996 study using ABS journey to work data concluded that the peri-urban fringe probably extends up to 100 km from the Central Business District (CBD) of each of the five mainland capital cities (McKenzie, 1996). It is likely that the fringe's extent for commuters is now even greater as a result of suburban expansion and improved transport links. However, being within reasonable commuting distance of large population centres may be a major consideration for some peri-urban landholders, but not all.

Stakeholders

Corresponding to the report's focus, relevant stakeholder groups and potential sources of expertise have been identified as:

National agencies — Australian Government

- Animal Health Australia (AHA)

- Plant Health Australia (PHA)
- DAFF
- Department of Environment and Heritage (DEH)

State agencies
- primary industry and agriculture departments
- biosecurity-specific agencies/divisions e.g. Biosecurity Victoria
- natural resource management and environmental agencies
- advisory boards/committees set up by these agencies

Local government
- environment and environmental health officers
- planners (including social planners)

Researchers
- BRS
- CSIRO
- Cooperative Research Centres for Biosecurity, Weeds and Invasive Species
- university researchers
- Research and Development Corporations

Regional organisations
- Catchment and natural resource management groups/authorities (CMAs and NRM groups)

Industry Associations
- Rural Lands/Agricultural Protection Boards
- primary industry associations — livestock, plants, forestry, horticulture and other crops
- National Farmers' Federation

Private sector
- real estate agents
- agricultural services (e.g. stock and station agents)
- gardening professionals/centres
- market organisers
- veterinarians

Community groups
- environmental and conservation organisations
- Landcare groups
- special interest/hobbyist groups e.g. avicultural and plant societies
- ethnic and religious associations — particularly for landholders of Non-English Speaking Backgrounds (NESB)
- service clubs and other community organisations.

Specific organisations in some of these categories were identified in each case study area, and representatives from some organisations were interviewed. National organisations have also been represented on the project's advisory committee.

2 Review of previous work on peri-urban landholders and biosecurity issues

Overseas studies

The changing nature of the countryside and the characteristics of rural landowners is an expanding field of interest in many western nations that are experiencing similar trends to those occurring in Australia. Studies come mainly from the sociological, planning and geographical literature. The changes being seen in rural land use and rural land ownership are linked to corresponding shifts in the world agricultural and food system in which agricultural production is becoming more industrialised and knowledge-intensive, and is moving to an agribusiness and supply chain mentality (Martin, 2001). Conversely, more urban-based westerners with non-agricultural income sources are focusing on lifestyle factors and are seeking rural properties offering an attractive setting and the possibility of becoming part of a small rural community while still being within reach of city amenities (Johnson, 2001). The outcome of these changes has been described as the emergence of a 'multi-functional' or 'post-productivist' countryside (Smailes, 2002). These terms highlight the fact that much of the countryside, particularly in scenically attractive peri-urban and near-urban areas, is no longer valued most highly for its commodity production potential but for its amenity and lifestyle potential, and for development opportunities associated with this potential.

The implications of land use changes for the availability of agricultural land have been the focus of work in the United States and Europe. For example, the book *Holding our ground* (Daniels & Bowers, 1997), highlights the increasing pressures on agricultural land coming from expanding populations and suburban development, and makes a case for special measures to protect farmland. It discusses land protection options available in the United States.

The changing nature of rural landowners and land use has implications for a wide range of government services and responsibilities. In terms of biosecurity, there has been relatively little focus on the significance of increasing number of rural landowners who do not rely on agricultural production for an income. Most biosecurity research focuses on particular animal or plant pests or diseases (biological characteristics, risk assessment, control methods), or in some cases, on issues for particular industry sectors or ecosystems, and does not take a primarily social perspective. A recent review of biosecurity research in New Zealand analyses research activities and identifies 406 relevant research projects (Green, 2001). In assessing gaps in this biosecurity research, the author comments:

> This review indicates that $57 million [NZ] of post-border biosecurity research is being spent with limited reference to the social context of biosecurity management. There are only three projects that touch on public attitudes, and another on rehabilitating freshwater ecosystems that has a clear component of public involvement. Yet, a 1998 MRST [NZ Ministry of Research, Science and Technology] report called for multidisciplinary research (in biosecurity) that involved "significant components of social and economic research to ensure that cost effective solutions are developed that meet economic and social expectations." (Green, 2001, p.25).

The MRST report referred to in this quotation re-states the question 'What are institutional and societal boundaries [and barriers] to cross-sectoral responses?' (originally posed by Penman, 1998). In relation to this study, these boundaries particularly include the institutional and societal and boundaries that may separate farmer and non-farmer landholders.

Australian studies with national scope

Studies considering the topic of socio-demographic change in rural and regional Australia provide useful background to this work. Among these is a paper by Hugo (2002), which paints a broad picture of the major demographic processes and trends. Hugo highlights the blurring of the characteristics of metropolitan and non-metropolitan populations taking place as a result of increased personal mobility that allows people to move from large cities and live in rural fringe areas while still engaging in activities in major urban areas. This blurring is shown by a convergence in the employment structures of metropolitan and non-metropolitan areas, with a decline over the period 1986 to 1996 in the significance of employment in the agricultural sector in rural areas, accompanied by marked increases in the mining and manufacturing sector, the construction sector, and the trade, finance, property and business services, public administration, defence, community service and recreation sector.

Stimson (2001) suggests that Australian society is dividing on multiple dimensions, including shifts in occupational structure, income distribution and the incidence of poverty. He characterises one of the major drivers of these changes as being a transition from technology-sensitive goods producing industries to person-based and knowledge-based industries. These changes have contributed to regional 'hot spots' of employment growth, which include the Brisbane — South East Queensland area, metropolitan Perth, and a range of locations along Australia's eastern coast. Stimson comments that the Statistical Divisions surrounding the capital cities tend to be areas with significant gains in national share of employment in ABS industry categories, as these peri-urban areas have experienced rapid population growth. Partly as a result, there can be widely contrasting housing and labour markets between peri-urban and other rural areas.

Salt (2005) has examined data from the 2001 Census on people who work from home. In this Census, 5.3% of the Australian workforce indicated that they worked from home on Census day. Of the ten areas with the highest percentages of people working from home, five appear to be non-metropolitan. They are (with their corresponding percentages): Mount Tambourine, Gold Coast Hinterland, Qld (11.7%); Maleny, Sunshine Coast Hinterland, Qld (11.3%); Cundinup, Augusta, WA (10.9%); Daylesford, Vic. (10.6%); and Noosaville, Sunshine Coast, Qld (10.2%). Salt interprets these figures as evidence of a continuing structural shift towards 'white collar' jobs in fields like management, accounting, marketing and administration, in which workers can use laptop computers, dial up technology and telecommute.

The socio-demographic significance of the 'Baby Boomer' generation and its movement into the retirement age bracket has been noted in a number of studies (Burnley & Murphy, 2004; Salt, 2001; Mackay, 1998). These age group considerations apply to many current farm families as well as to the general population, leading these families to focus on retirement assets and providing motivation for them to consider sub-dividing or selling farm properties, including possibly selling to people seeking rural lifestyles rather than farming ones.

In a research review paper, Black, Duff, Saggers & Baines (2000) identify peri-urban issues as among the priority areas for rural communities and rural social research. They suggest that:

> There has been a shift in perspective from seeing the rural-urban fringe as simply land in the process of being taken into urban development, to recognising that peri-urban areas may in fact have a dynamic of their own in which rural businesses co-exist with hobby farms and other kinds of small holdings (Black et al., 2000, p.29).

Black and his co-authors conclude that qualitative research in peri-urban areas where agriculture coexists with other land uses could complement existing quantitative studies and shed light on issues associated with competing land uses. Biosecurity issues are among these.

The BRS 2004 scoping study reviewed previous published work, examined the relevance of ongoing BRS land use mapping, and investigated how existing secondary data (mainly from the Census of Population and Housing) could be applied to describe landowners in particular geographical areas (Aslin et al., 2004). The scoping study highlighted the relevance of previous work, including Burnley & Murphy's (2004) book which is focused on identifying and describing 'population turnaround' or 'sea change' regions where Australians are moving from larger cities to smaller towns and rural areas in the capital city hinterlands. Burnley & Murphy characterise the major groups of 'sea changers' as follows:

- 'free agents' (retirees and people with independent incomes, alternative lifestylers, people with mobile occupations or able to work from home)
- 'forced relocators' (people effectively forced to move from cities because they cannot afford city house prices or living costs)
- 'periodic populations'(tourists, weekend and holiday visitors, some of whom may own holiday homes, and some of whom effectively live in two places)
- smaller categories of 'gentrifiers' (people who renovate old houses), and inter-state migrants (who may also fit into the other categories).

While 'sea changers' are not the same as the landholder group of interest here and include people moving into smaller towns and cities as well as to rural situations, these broad categories are likely to apply to both groups. Authors like Hamilton & Mail (2003) have characterised similar groups as being involved not just in 'sea-changing', but in 'downshifting'.

The BRS study reviewed data from one catchment-based survey (the Goulburn Broken Catchment of Victoria — Curtis, MacKay, Van Nouhuys, Lockwood, Byron & Graham, 2000), to see what light this shed on the differences between the characteristics and behaviour of farmer and non-farmer landholders. These catchment-based surveys are some of the few sources of information for landholders in particular areas that allow farmers and non-farmers to be distinguished. Many other rural landholder surveys have an industry focus and only sample properties with agricultural production above a prescribed dollar value, or use other sampling frames based on farm business listings (for example ABN numbers), thus excluding many or all non-farmer landholders from consideration. The information from the Goulburn Broken survey suggested that the non-farmer landholders:

- tend to own smaller properties than farmers
- tend to be better educated than farmers
- are likely to be engaged in low capital agricultural occupations (if any)
- may not spend much time working on property and may be absentee landowners
- are likely to be mature age and older, including many people of retirement age.

The BRS scoping study also examined the potential applicability of land use mapping (see Lesslie, Barson, Bordas, Randall & Ritman, 2003) to identify areas where peri-urban landholders are concentrated. The land use category that appeared most relevant was the 'rural residential' category. Land use maps were generated for two of this project's case study areas (up-to-date data were not available for the third case study area in Western Australia), and provided some guidance as to where people of interest might be concentrated, but it is clearly very difficult to distinguish lifestyle properties from commercial farms without directly surveying landholders. Many lifestyle properties may be former commercial farms and no land use changes may have occurred that could be detected from visual inspections, aerial photography or satellite imagery, information sources commonly used in land use mapping.

Currently a wide range of socio-economic studies are underway or have been completed with funding from the National Action Plan for Salinity and Water Quality (NAP) and the second

tranche of the Natural Heritage Trust (NHT). These studies focus on NAP priority regions and catchment management-related issues. BRS is conducting or has completed catchment-based landholder surveys in the Glenelg–Hopkins, Victoria; Lachlan, New South Wales; Queensland Murray–Darling and Burnett–Mary, Queensland; and is extending these surveys to catchments in South Australia, Tasmania and Western Australia. As described for the similar survey done in Goulburn Broken (Curtis et al., 2000), these surveys potentially allow some further analysis of the characteristics of non-farmer rural landholders in the respective catchments, their land use practices, and their future intentions for their properties, but ask few questions directly relevant to biosecurity issues.

Risk assessment and risk perception is a related research field that is expanding rapidly and cannot be dealt with in any detail here. As an example of this kind of research, Barnes (2002) has considered risk perception and social meaning, and their relevance to community safety issues. He highlights the increasing divergence between the cultures and perceptions of a 'professionalised bureaucracy' and scientists who are given formal regulatory responsibility for dealing with hazards, and those of the general public. This can lead to major gaps in trust and credibility which can only be bridged by regulators developing a better understanding of how the public makes sense of and copes with risk and uncertainty.

Further work examines national crisis communication methods and initiatives. For example, Conkey (2004) describes existing arrangements for coordinating communication before, during and after emergencies. These arrangements include the establishment of a national communication network, production of pre-approved advertising material, national telephone arrangements, creation of a national agricultural emergency website, ongoing NESB biosecurity education and awareness campaigns, and a crisis communication course to train public relations professionals for a role in responding to emergencies.

New South Wales studies

A number of previous studies focus on Sydney's rapidly changing western fringe (Kelleher, Chant & Johnson, 1998; Johnson, Kelleher & Chant, 1998; Bunker, 2003). These studies were briefly reviewed in the previous scoping study. They highlight the significance of western Sydney for agricultural production, increasing pressures for land to be taken out of production, community support for local agriculture, and the challenges for government in managing the complex interface between farm and suburb. Research by the NSW Department of Agriculture on the value of agricultural production in the Sydney Basin suggests that returns could be as much as $10,000 per hectare, considerably higher than estimates from ABS farm surveys, which are around $5,500 per hectare (Mason, reported in Murphy, 2003). These estimates compare with the overall average return for NSW agricultural land of around $136 per hectare.

In terms of specific biosecurity issues in the Sydney area, Walsh (unpublished) undertook a study of trading patterns and disease risks associated with pig farming in the Sydney Basin. This is being followed up with several studies focusing specifically on the risks associated with swill feeding of pigs (swill feeding is the practice of illegally feeding livestock on household wastes containing animal matter, which caused the recent outbreak of foot and mouth disease in the United Kingdom). The original Sydney Basin study found that 57% of pig production in the area was 'non-commercial' or 'hobby-based', and that awareness of the disease risks associated with swill feeding was low.

A 2003 media report describes a collaborative project between Planning NSW, NSW Agriculture, and the NSW Department of Sustainable Resources, focused on mapping and

protecting land used for primary production in coastal northern New South Wales (see http://www.abc.net.au/northcoast/stories/s860988.htm).

South Australian studies

Two studies have been completed examining the issues of managing 'derelict' apple and pear orchards in South Australia (Creeper & Nicholson, n.d.; Creeper, Nicholson & Willing, n.d.). These derelict orchards and associated feral trees, often along roadsides, are a problem in the Adelaide Hills where South Australian apple and pear production is concentrated, and where there are many lifestyle and hobby farms, small non-commercial growers and absentee landholders. Unmanaged orchards are considered a significant biosecurity threat to the apple and pear industry because they may harbour infestations of pests and diseases, particularly codling moth. The study used a combination of social surveys, remote sensing, field mapping and GIS techniques to develop an approach to managing this threat. It found that most of the respondents in the areas surveyed wished to help in addressing the problem, but were hampered by lack of time, money and resources (knowledge and infrastructure). The actions recommended as a result of the study were to conduct an effective extension program, provide ongoing mediation assistance to some growers to help them negotiate with their neighbours, and to consider long term legislative mechanisms to help achieve the desired on-ground outcomes.

Victorian studies

A substantial amount of work on small farms and smallholders has been undertaken in Victoria, where these kinds of properties are widespread in many rural areas. Much of the recent work has been undertaken as part of the 'Drivers of land use change project', which is a collaborative exercise between the Victorian Departments of Primary industries (DPI) and Sustainability and Environment (DSE). Some of this work has been published in the proceedings of the Conference on Rural Land Use Change (see Hollier, Reid & Francis, 2003; Farmar-Bowers, 2003; and Crosthwaite, 2003), and also on the website of the National Extension Policy Forum (Hollier, Francis & Reid, 2004). If these kinds of properties are defined as those less than 100 ha in size and with an estimated value of agricultural production of less than $75,000, they make up approximately 37% of rural holdings in Victoria and dominate some parts (Barr & Karunaratne, 2001). They dominate on the slopes of the Great Dividing Range and around Melbourne and the major regional centres.

Hollier at al. (2004) point out that these kinds of landowners may be viewed as potential allies or threats to natural resource management, industry and biosecurity. Interviews and group discussions with smallholders in Victoria indicated that they tend to have the characteristics and preferences shown in Box 2.

Hollier and her colleagues stress that these landholders are a diverse group, and extension practice needs to be flexible to accommodate their differences.

Box 2: Characteristics and preferences of small lifestyle farmers in Victoria (from Hollier et al., 2004)

Characteristics:

- Land size – small
- Connection to major centres – moderate/high
- Disposable income – high
- Outside labour – moderate
- Off-farm income – very high
- Distance from regional centre – low
- Technical agricultural and land management expertise – low
- Business expertise – moderate/high
- Farming history – low
- Connection to industry bodies – low

Values:

- Value rural lifestyle
- Strong land stewardship ethic
- Place low value on production and economics

Social networks:

- Favour horizontal networks (focus on implementing practice change that adds value to social and/or environmental factors and are concentrated in place) – not vertical networks (focus on industry and economic development and relate to industry location)

Information and learning preferences:

- Major information sources – newsletters, neighbours and newspapers
- Favour group-based learning and use of adult learning principles

Tasmanian studies

Gorrie (2004) carried out a review of quarantine systems and biosecurity in Tasmania. While the review does not make any specific mention of social research to underpin biosecurity measures, among its recommendations are that the responsible Department (the Tasmanian Department of Primary Industries, Water and Environment, DPIWE) should enhance and supplement its current level of specific awareness and public education campaigns on quarantine and biosecurity issues.

Sectoral and industry-based studies

Houston (2005a, see http://www.rirdc.gov.au/comp04/ras2.html) has conducted a national audit of peri-urban agriculture using his definition of peri-urban as discussed in Chapter 1 of this report. He applies his definition to ABS Census of Population and Housing data to identify Statistical Local Areas (SLAs) outside metropolitan areas that are subject to 'significant peri-urban influence'. He then examines agricultural production in these SLAs using ABS Agricultural Census data. The results are depicted in map form for the main agricultural commodities included in the Agricultural Census. From these maps, the most important peri-urban production areas for each of these commodities can be readily identified.

On the basis of this and other work, Houston (2005b) has presented summary findings on the value of agricultural production in peri-urban areas around Australia. He concludes that on the basis of existing evidence, peri-urban areas in the five mainland states produce around 25% of Australia's total gross value of production, and that this may be an underestimate. He believes that peri-urban agriculture is not well accounted for in the current ABS Agricultural Census, and there is a need for a re-think both about better data collection for peri-urban areas, and also the public policy implications of the improved understanding of the agricultural significance of these areas.

The Australian Bureau of Agricultural and Resource Economics (ABARE) conducts a range of surveys focused on farming or on particular agricultural sectors. Because of their sampling frames and industry focus, these surveys tend to exclude most of the non-commercial rural landholders of interest in this study. However, ABARE's small farm surveys highlight the declines in Australian farm numbers and the trend towards increasing farm sizes (ABARE, 1997). A high proportion of the decline in farm numbers is due to loss of small farms. These are the farms that, in favoured areas, are likely to be acquired by rural lifestylers, who may be purchasing entire properties or the smaller rural allotments created by farm subdivision. The first issue of the *Farm Policy Journal*, produced by the Australian Farm Institute, carries a number of papers that highlight declines in numbers of full-time farmers in most developed countries, and corresponding increases in numbers of part-timers.

Hodges (2005) reviews the literature on 'peri-urban farm' activities as part of the National Landcare Program monitoring and evaluation project 2003–06. Hodges includes analysis of data from a recent ABARE small farm and other industry survey which sampled 1,703 farmers Australia-wide. The sample included only properties that were registered farm businesses with an ABN number. Farms in peri-urban areas were included incidentally to the main purpose of the survey, and they were distinguished as farms falling within SLAs that lie within 100 km of a capital city. This ABARE survey suggested that peri-urban farmers operate smaller holdings, tend to have a lower proportion of their land covered by native woodlands, and have marginally lower membership of Landcare groups than non-peri-urban farmers. They tend to produce more high value agricultural products like fruit, vegetables, flowers and eggs than non-peri-urban farmers. Hodges concludes from the survey results that peri-urban farmers are more responsive to land degradation issues like salinity, soil acidity and weed infestations than are non-peri-urban farmers. By further examining data obtained from Houston (2005b), derived from ABS surveys, Hodges suggests that numbers of peri-urban farms are *decreasing*, but less rapidly than those in the broader farm sector. He points out the need for care with these interpretations in view of data limitations and the nature of the sampling frame used, which excludes rural properties that are not registered farm businesses.

Barclay (2005) surveyed approximately 3,000 livestock producers in Queensland, New South Wales and Victoria with the aim of investigating their biosecurity precautions, knowledge and understanding, and perceptions of risk associated with emergency animal diseases. She found that newspapers were their most commonly-cited source of knowledge; 58% had implemented some kind of biosecurity strategy on their property (the most common being isolating new stock to check for diseases); lack of money, time, information and the drought were the main things preventing them putting biosecurity strategies into place; the greatest perceived risks for an emergency disease outbreak were associated with neighbours not reporting illness or death among their stock, the presence of feral pigs or goats, neighbours importing animals or semen or having a high turnover of stock; and they thought that responsibility for emergency animal disease prevention lay primarily with Federal and State Governments.

In relation to the NESB landholder sector, research was undertaken on NESB primary producers as part of the Agriculture Advancing Australia communication campaign (EMD Multicultural Marketing and Management, 2001, 2004). While this work focuses on primary producers only, not rural landholders as a whole, there are some general messages about communicating with NESB landholders that are relevant to this study. They include the identification of barriers to communication, which were:

- Lack of language skills
- Lack of information from mainstream sources
- Operating in poorly organised and structured sectors
- Information being too complex
- Government's myths and stereotypes
- Lack of time to attend forums and meetings or being intimidated by these forums
- Not being members of associations or formal groups
- Lack of literacy both in first language and English
- Cultural differences in how information is disseminated.

The Australian Quarantine Inspection Service (AQIS) has commissioned research to support its quarantine campaigns, particularly the current *Quarantine Matters* campaign. AQIS has also focused on issues associated with communicating with people from NESB backgrounds who are involved in primary industries, as a particular risk group for importing illegal biological material. It has developed detailed strategies to reach particular ethnic groups, using direct interaction with NESB farmer forums, placing material in a range of ethnic media, producing information material in a number of languages, and providing a multi-lingual information line.

More specific sectoral research of this kind has concentrated on Asian and NESB vegetable growers and market gardeners, either focusing on how to encourage adoption of best practices (Morgan, 2003), or safe use of farm chemicals (Parker, 2000).

Local Government's role

A paper by Eggleston & Koob (2004) considers Local Government's role in agricultural emergencies, and concludes that this sector of government has a key role in community-based emergency management and as part of whole-of-government arrangements to deal with emergencies. The paper points out that Local Government is the closest level of government to communities, and possesses a detailed and intimate knowledge of the community it serves on a day-to-day basis. In particular, Local Government's health, welfare and infrastructure functions are seen as an integral part of delivering services, including responding to emergencies.

A recent survey investigated the NRM roles of coastal councils around Australia, and in particular, looked at their involvement with regionally-based NRM groups (Australian Local Government Association, 2005). Among other things, the survey found that these councils were facing significant pressures on their natural resources as a result of population increases and increased tourism; that they required more funding to maintain their current programs; and that they were in urgent need of training for staff working in planning and environmental management areas. Survey respondents believed that these issues needed to be given higher priority and to be better funded.

Studies on farmers' markets and mixed markets selling fresh produce

An interest area identified early in the study was how small landholders who are engaged in at least some primary production sell their produce, if they sell it at all. This raises supply chain issues and particularly issues associated with simplified supply chains in which producers sell directly to consumers without intermediaries being involved (processors, marketers, wholesalers, retailers — see Figure 1). This interest area arises from an observed increase in fresh produce markets, roadside stalls and 'farm gate' sales in parts of rural Australia, and the possibility that these direct selling methods are used by peri-urban producers who are outside mainstream industry networks and may not be aware of biosecurity issues.

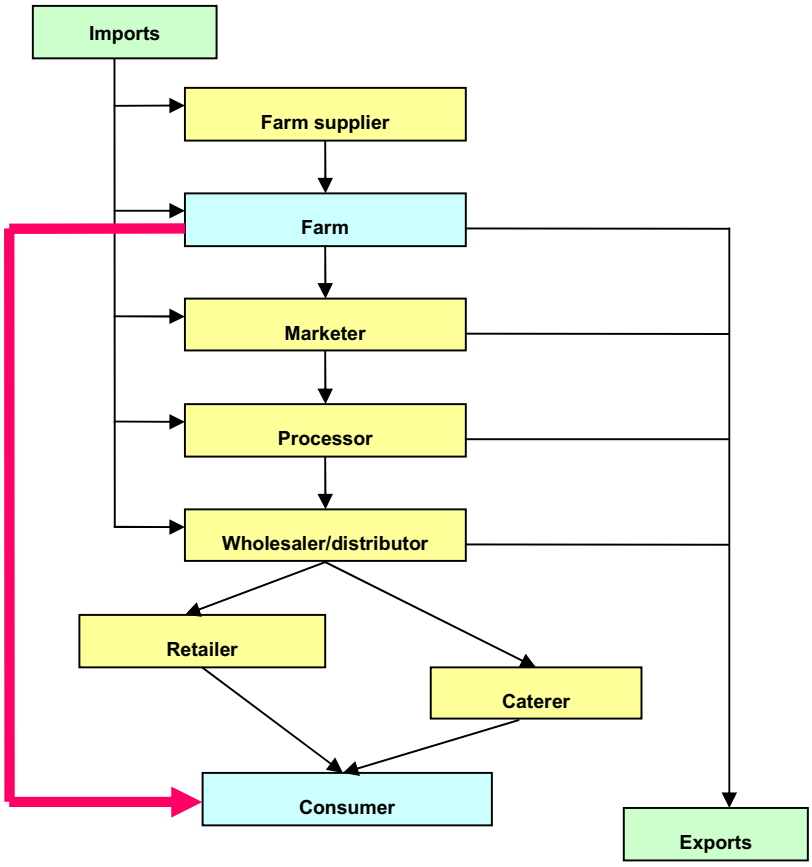


Figure 1: A simplified version of the food supply chain showing the direct-selling route highlighted in red (modified from http://www.eafl.org.uk/downloads/LocalLinksAppendix4.pdf)

The Victorian DPI has conducted research on farmers' markets and reports are available on its website. The research undertaken includes customer surveys done at the Hume Murray, Collingwood and Hastings Farmers' Markets. The customer reports may be of interest because they provide a profile of customers that could be used if a biosecurity emergency arose and purchasers of particular products needed to be traced. A further study is reported in *The value of 'new generation' farmers' markets to the community: perspectives of market managers* (Coster, 2004). This report describes findings from a survey completed by 51 managers of these kinds of markets around Australia, and provides some comparative information from markets elsewhere in the world, principally the United States, Canada and

the United Kingdom. Contact details for the markets surveyed were obtained from the Australian Farmers' Markets Association website (see http://www.farmersmarkets.org.au).

A second phase of the study, providing the details of five or six markets, has also been done. However, the findings of these studies may not be particularly relevant to this report because by their very nature, farmers' and producers' markets are likely to be dominated by mainstream commercial producers who are seeking alternative retail outlets. Few small or hobby farmers are likely to have the volume or reliability of production to be able to sell at larger farmers' markets. Smallholders are more likely to sell at the small-scale, informal, community-based markets that are now widespread around Australia. A bimonthly magazine entitled *Australian markets and fairs* is readily available from newsagents, and provides a very extensive listing of these kinds of events throughout Australia and New Zealand. They appear to be numerous and growing in numbers and popularity. Many of these markets would be referred to as 'mixed' markets not 'farmers' markets', because farm produce tends to be only one of many commodities traded, and stallholders include agents and retailers as well as producers. The 'farmers' market' definition cited in Coster's report is that of the Australian Farmers' Markets Association, which is that it is 'a predominantly fresh food market that operates regularly within a community at a focal public location that provides a suitable environment for farmers and food producers to sell farm origin and associated value-added processed food products directly to customers' (see http://www.farmersmarkets.org.au/about.jsp).

In his market study, Coster found that virtually all the markets sold fresh produce, value-added fruit and jam, baked goods, poultry and eggs. The majority of the markets were held in local showgrounds, parks or town squares. At the time of the study, Coster estimated that there were 80 farmers' markets in Australia, and their possible annual sales value could be around $40 million. Ninety-six percent of the markets surveyed reported having a 'food safety plan' in place. Sixty-five percent had a 'producer only' policy and 35% reported that they enforced this policy.

3 Approach and methods

The project had these main stages:

- Agreeing on a project plan
- Conducting a literature review and preliminary investigations — this involved examining existing literature and DAFF information sources, particularly AQIS databases; seeking advice from State and Territory agencies; and conducting an initial exploratory field trip to the Shepparton area, Victoria
- Selecting three case study locations
- Conducting case study research in the locations identified
- Analysing case study data and preparing case study reports
- Preparing a final report.

Methodological perspectives

Yin (1989, 1993) has written extensively about case studies as a research method. They are widely used when the topic of interest cannot be readily separated from its context — the context itself is a vital part of the study and a key aspect of the research. The issue that then arises is that the complexity of the context, and variation between different contexts, is likely to mean that many different variables are introduced, and multiple data sources and methods are needed to examine them. These considerations applied in this study as land use practices, landholder characteristics, biosecurity risks in different locations, and biophysical factors influencing practices and risks, vary greatly around Australia.

This study used a multiple case study approach (three case studies), and the case studies were primarily exemplary in nature — that is they were designed to provide examples of situations where there were substantial numbers of peri-urban landholders, describe these situations, and gather information about landholders in these situations. The basic research design approximated a multiple-case replication design.

Figure 2 shows the methods and research stages in diagrammatic form.

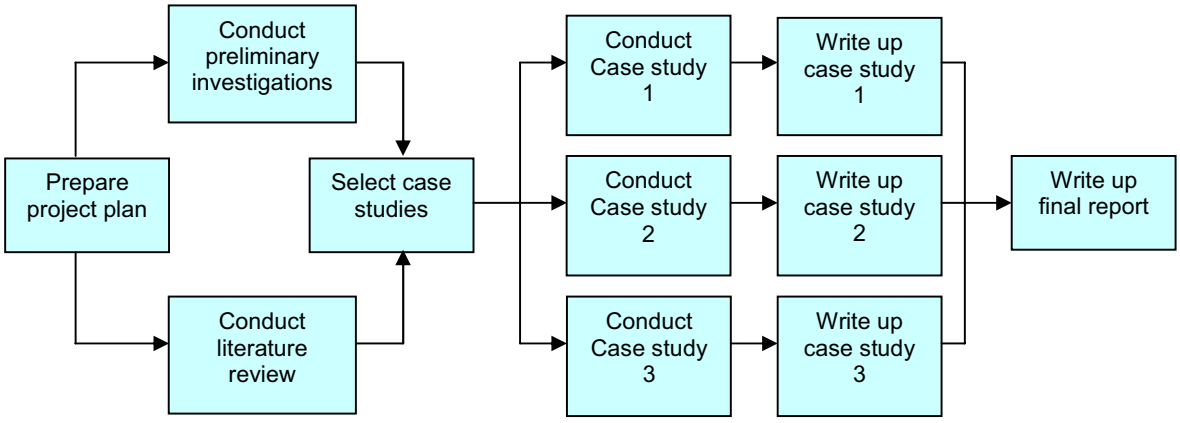


Figure 2: Diagrammatic version of project methods and research stages (after Yin, 1989)

Selecting case study areas

Given the project's Australia-wide scope, possible dimensions relevant to selecting case study locations were identified as:

- Climatic/latitudinal — tropical versus temperate locations
- Location and size of nearest population centre — regional/rural/urban, metropolitan fringe/regional city fringe
- Land use considerations — land use mapping/concentrations of rural residential/hobby farming
- Nature of practices and nature of biological material involved — plant/animal/microbial etc.; domesticated versus wild species; newly introduced versus established species; commercial/non-commercial production practices; suspected risk practices; materials known to be frequently illegally imported or not declared (AQIS or Customs information)
- Social dimensions or social groupings of interest — locations with concentrations of particular ethnic groups of concern; industry verus non-industry members; interest groups or hobbyist groups; commercial producers versus non-commercial producers; produce agents/stock and station agents
- Existence of events at which produce/animals/plants are sold, traded or displayed — wet markets; producers' markets; agricultural shows; produce and special interest shows (orchids, birds etc.); roadside sales
- Relative risk ratings or magnitude of likely costs of biosecurity emergencies — risks to industry and size of industry involved; extent of human, animal and plant health risks
- Mobility of biological materials represented — extent to which material is moved around the country e.g. for show or display purposes or to points of sale; livestock movements or tracking
- Life cycle/food chain considerations — ability to trace whole of life cycle of product.

Advice was sought from the advisory committee and State and Territory representatives about possible case studies within their jurisdictions and the extent of support that might be available to conduct these case studies. The case studies they suggested and some of the considerations mentioned above were incorporated into a matrix to help select case studies (Table 1).

Table 1: Case study selection matrix

Possible case study	Climatic region	Nature of threat/disease	Risk to industry	Risk to humans	Risk to animals	Presence of ethnic groups	Well-defined region	Readily identifiable groups
NSW – pig swill feeding (Sydney area)	temperate	Foot and mouth disease BSE	Yes	Yes	Yes	Yes (European origin)	Yes	Yes?
NSW – tracking livestock	temperate sub-tropical	Foot and mouth disease BSE OJD Other livestock diseases	Yes	Yes	Yes	Yes (European origin)	?	? (RLPB, LGAs)
Tas. – unlicensed egg producers	temperate	Avian influenza Newcastle disease Salmonella	Yes	Yes	Yes	?	? (Launceston, Hobart)	?
Qld – citrus canker	sub-tropical	Citrus canker	Yes	No	No	?	? (Brisbane fringe)	?
Qld – Maleny producer markets	sub-tropical	?	Yes	?	?	Yes (Asian origin)	Yes	Yes (market contacts?)
Qld – Northern region producer markets	tropical	?	Yes	?	?	Yes (Asian origin)	?	?
WA – small producers in Swan Canning area	temperate	?	Yes	?	?	No	Yes	Yes
Vic. – pig swill feeding	temperate	Swine fever Foot and mouth disease BSE	Yes	Yes	Yes	Yes (European origin)	Yes?	Yes?
Vic. – small farmers	temperate	?	Yes	?	?	Yes (European origin)	?	?
SA – apple and pear orchards	temperate	Codling moth? Other pests and diseases	Yes	No	No	Yes (European origin)	Yes	? (PIRSA, LGAs)
NT – grape vine leaf rust	tropical	Grape vine leaf rust	Yes	No	No	Yes (Asian origin)	Yes/?	Yes (Darwin, Palmerston)
AQIS –focused case on illegal imports	To be discussed	To be discussed	Yes	To be discussed	To be discussed	To be discussed	To be discussed	To be discussed

Based on these considerations and examining existing information about possible areas, including BRS land use maps, in consultation with PIAPH the researchers selected the following locations for case studies (the order shown is the one in which the case studies were conducted):

- Case Study 1: City of Swan, WA
- Case Study 2: City of Greater Bendigo, Vic.
- Case Study 3: Brisbane and Sunshine Coast Hinterland, Qld.

Delineation of case study areas to correspond with Local Government Areas (LGAs) was made necessary by the geographical basis of much of the existing data and information available about these areas.

Case study methods

Within each case study a number of different methods of collecting data were used: literature and web-based research, document collection, observational techniques, and semi-structured interviews. Using multiple methods is designed to provide opportunities to cross check information from different sources and improve the validity of the research. While the same general methods were used in each case study, the differing nature of each case and varied availability of information for each, meant that differences in how case studies were conducted were inevitable. To help make the case studies more comparable, several checklists and templates were developed to guide field work, and an interview guide with a set of questions and prompts was prepared.

Interviewees and interview questions

The interviewees in the study were purposively chosen as people who had specific roles and knowledge relevant to the study, and who could be considered to be 'case experts'. The stakeholder analysis shown in Chapter 1 of this report helped as guide to selecting interviewees. Interviewees were assured that opinions expressed would not be associated with particular individuals, but also asked if they could be acknowledged by having their names listed in the final report. All agreed to this.

Interview data were analysed using standard content analysis methods, in which responses to each of the questions asked were summarised, responses across all interviewees examined and the range of responses to each question characterised, and question responses reported in a way that reflected the range of views but without attempting to quantify them. Time and resource limitations influenced the selection of interviewees and the number of interviews that could be completed.

The questions asked covered the topics shown in Box 3.

Box 3: Topics covered by interview questions

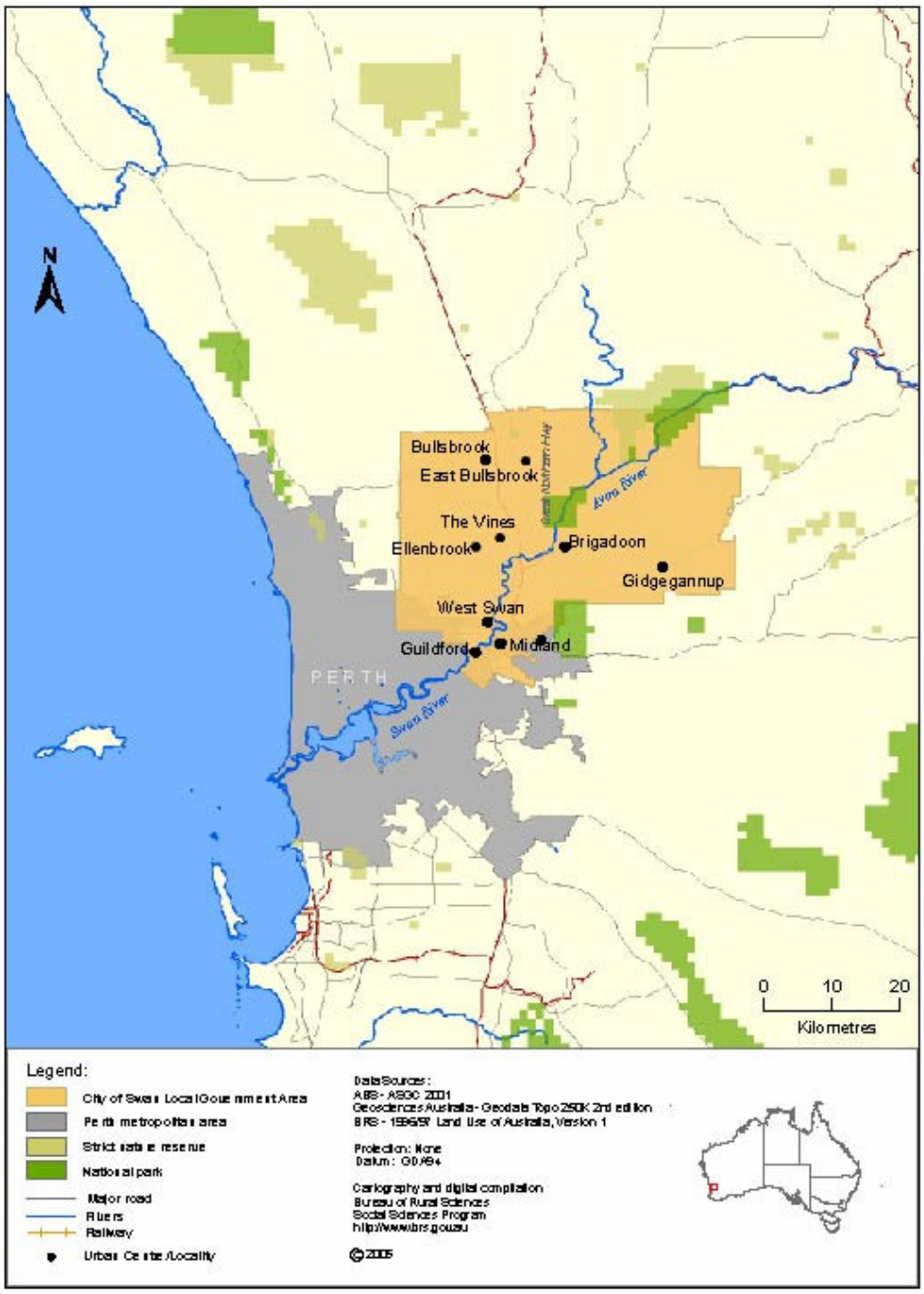
1. Interviewees' particular role and interests in this topic
2. Biosecurity issues operating in this State/region/LGA
3. Available knowledge/information about landholders and land use practices in area (with a particular focus on hobby/lifestyle farmers)
4. Existence of any specific programs/projects for small landholders
5. Sources of information/databases/lists of these landholders or relevant interest groups
6. Any special conditions associated with this information
7. Suggestions about who else to speak to with knowledge of/responsibility for this type of information
8. Communication channels/media/networks etc. relevant to these landholders
9. Communication channels/media/networks used in interviewees' job
10. Awareness of other people working in this area
11. Other relevant reports, references etc. that could be useful
12. Other people with an interest in this topic
13. Other comments or questions, or information the researchers could provide.

Market observations

There were opportunities to visit and make observations at a number of markets being held during case study visits, and in some cases to speak with the market manager and stallholders. This was the general approach used:

- Obtain details of markets in proposed case study areas from websites and other sources
- If possible identify market manager and ask them beforehand about their informal knowledge of stallholders and their information records (if any) on stallholders
- Visit market(s) being held in the area during the case study, identify stalls selling fresh produce and/or live animals — note kinds of items for sale, and any identifying information or certifications displayed on the produce or stall
- Conduct informal conversations with stallholders where possible, with a focus on determining if they are the producer, and if so, whether they consider themselves a commercial producer, where produce is grown and on what kind of property, and whether they sell at other markets.

4 Case study 1: City of Swan and surrounds, Western Australia



Location and background

The City of Swan is located east of Perth, between 15 and 50 km from the centre of Perth. It is one of the most diverse, fastest growing and largest LGAs in Perth and the eastern metropolitan region, covering an area of 1,042 sq km (City of Swan, 2004a). The City of Swan includes 35 localities and encompasses a range of residential settings including new and older residential suburbs, rural-residential properties and rural towns, and commercial/industrial precincts. Midlands is the commercial and administrative centre of Swan and is located approximately 17 km from the Perth CBD.

The City also sits within the boundaries of the larger Swan Region, designated as one of six areas in WA where community regional groups oversee and facilitate the development and implementation of regional natural resource management (NRM) strategies. The Swan Region has four sub-regions, three of which fall within the City of Swan's boundaries. The WA Department of Agriculture also uses regional boundaries to assist its planning and management activities. The City of Swan is part of the South West Agricultural Region, and the Midland subregion.

The City was originally established in 1829 as Guildford, and was the first port and trade centre for the Swan River Colony. By 1970 the Shire of Swan-Guildford was amalgamated with the Town of Midland and by 2000, it became the City of Swan. The City of Swan now comprises the area known as the Swan Valley with its associated coastal plains to the west, the Ellen's Brook and Lower Chittering Districts to the north, and the Hills District to the east. The historic towns of Guildford and Midland are in the southern part of the City.

Jurisdictional arrangements and biosecurity issues in Western Australia

A suite of programs in WA's Department of Agriculture seek to improve public awareness and understanding of a range of biosecurity matters, including a Biosecurity Communications project. Some programs and activities have been designed specifically to target small landholders and seek to build their capacity to undertake sound biosecurity and sustainable land management practices. They are discussed in more detail below. The major program of this kind is the Small Landholder Information Service.

The Small Landholder Information Service

The Small Landholder Information Service (SLIS) was created in late 2003 when staff in Western Australia's Department of Agriculture recognised that the growing number of small or hobby farms posed particular challenges for ensuring the protection of biodiversity and regional agricultural industries. There have been concerns about whether 'hobby farmers' have sufficient knowledge and skills to manage what has becoming an increasing proportion of the landscape: 'peri-urban' areas that border agricultural land and/or subdivisions on agricultural land. In WA, managing weeds, plant and animal disease and pests as well as minimising the risks of land degradation have been identified as particular challenges. Moreover, the Department of Agriculture recognised that its field officers, including Biosecurity Officers, would have a limited capacity to reach this growing audience.

There was now a need for innovative communication and extension tools. While the SLIS was established primarily because of the perceived need for increased Biosecurity

awareness and adoption by small landholders, it was recognised that land management, enterprise and property planning, and general lifestyle issues were higher on the typical small landholder 'radar'. The SLIS is currently focused on the south-west region of WA, where the numbers and expansion of small landholdings is greatest. However, the Department of Agriculture intends the Service to operate across all areas of the State where there are concentrations of small landholders. The Department has received an increasing number of small landholder queries from outside the South West region, and some learning events have been delivered according to this demand.

The SLIS model relies on some core funding to leverage external (government, private and community sectors) support for delivering 'extension' type services. A small group of Department staff oversee, coordinate and support the development of learning events, promotional materials, and local and regional networks for SLIS delivery. Two Department staff (based in the South West) seek to build links between the SLIS and existing NRM and Landcare networks, referred to as an 'advocate system'. Many seminars and workshops are delivered by the private sector, and in some cases the community sector, whilst SLIS also calls on some specialist delivery from staff within the Department. These events are modelled on events developed in the Swan Canning sister project (described below). SLIS partners a range of NRM groups in accessing funding to deliver events.

The SLIS uses a range of mechanisms to deliver information and training to owners of small rural properties across the State. Apart from the learning events, SLIS also provides a focal contact point for small landholder queries (phone, fax, personal, email and internet). The Service defines 'small properties' as those between one and a hundred hectares, which are owned by people who are *not* undertaking commercial-scale agricultural activities. The focus of SLIS activities is primarily on property planning, farm management, stock care, rural responsibilities, and weed and pest control.

The Swan Canning Property Planning Project

The Swan Canning Property Planning Project (SCPPP) is a sister project to the SLIS. The SCPPP, which began in 1999, is run by the Department of Agriculture and funded by the Swan River Trust's (SRT) Swan Canning Cleanup Program. The SRT was established in 1989 to coordinate improved management and restoration of the Swan and Canning Rivers. The SCPPP is funded on five-year contract cycles and delivers at least 50 events per year.

The SCPPP seeks to encourage better land management in the Catchment to reduce eutrophication and therefore algal blooms in the Swan and Canning Rivers. It aims to do so by delivering public seminars and workshops for interested small landholders in the Swan Canning Catchment area. Collectively, the separate SCPPP events seek to build small landholders' capacity for land management by encouraging them to develop holistic property plans (see Table 2). The SCPPP design is predicated on the value of demonstrations and facilitated workshops to stimulate learning, as well as providing incentives to encourage participation. The free 'Heavenly Hectares' seminars were designed to be the 'hook', which attracts and interests small landholders in good land management practices and then introduces them to how property planning can help them build sustainable farms. These seminars are free and participants are introduced to sustainable land management principles, encouraged to participate in the other SCPPP events, and can collect a range of information products. At the Property Planning Workshops, small landholders — with the help of the workshop facilitators — use aerial photographs to create detailed land management plans for their properties. The Field Days give small landholders the opportunity to explore a range of farm management topics in greater depth.

Similarly to the SLIS, while the SCPPP primarily has a broad focus on building small landholders' capacity for land management, it does introduce landholders to a selection of biosecurity issues, such as weed control, dieback management, livestock and horticulture management (see Appendix 1). This emphasis reflects the interests of the Program's sponsor (the SRT's brief is to reduce nutrients in the Swan River through improved land management practices), as well as landholders' interests in managing their properties in general and their low awareness of biosecurity issues in particular. Currently, the SCPPP does not have a particular focus on NESB small landholders.

Table 2: Swan Canning Property Planning Project (SCPPP) components

SCPPP Component	Characteristics	Topics covered	Process
Heavenly Hectares Seminars	No. of events: 20 events annually Group size: 30-90 individuals Duration: 3 hours Cost: Free	Introduction to general environmental sustainable land management principles and practices Introduction to the Property Planning Workshops and Skill Development Field Days	Powerpoint presentations, discussions, provision of wide range of information products (brochures, books) and sponsors' samples, notification of other SCPPP components
Property Planning Workshops	No. of events: 20 events annually Group size: 16 families Duration: 7 hours Cost: $33	Further details regarding sustainable land management practices and in context of specific participants' small farms	Group and individual work on development of specific property management plans for each participant
Skill Development Field Days	No. of events: 10 events annually Group size: 20-70 families Duration: varies Cost: Free	Generally focus on topics covered briefly in Heavenly Hectares seminars (e.g. pasture management, weed control, tree planting, fencing, bush management)	In-depth coverage of topics combined with demonstrations on farm sites

The Pest and Disease Information Service

The Pest and Disease Information Service (PaDIS) is another Department of Agriculture information service that addresses biosecurity matters, and which may include small landholders in its target audience. The PaDIS seeks to build the capacity of urban and rural residents to recognise biosecurity risks and services their inquiries. The Service provides free advice and specimen identification on animal and plant pests, diseases and weeds. When established, the Service was originally known as the Garden Advice Centre (GAC). The Department of Agriculture identified the need for providing a stronger biosecurity focus to this service, particularly given an increase in the number of pests in Western Australia, so a complete revamp of GAC was conducted and PaDIS was developed, and funded through the Plant Health Program.

PaDIS includes a website and call-in number that enables members of the public to obtain assistance with identifying common pests and diseases that affect gardens and households in Western Australia. The national 1 800 Plant Health Hotline is also serviced by PaDIS for Western Australia. The PaDIS staff handle a wide range of gardening and non-commercial agricultural queries (sometimes over 1,000 per month), and will forward printed information to callers and inquiries about hard to identify pests on to registered experts. The PaDIS website contains photographic and textual information, as well as links to related sites, including those for small landholders. The PaDIS also produces a range of printed information, including 32 different garden notes and a booklet on identifying common seasonal, quarantine and common household pests.

PaDIS staff also attend high profile urban events, such as Garden Week and the Great Gardens workshops, to provide advice.

Biosecurity issues

A common biosecurity risk for landholdings of all sizes in WA is weeds (WA Department of Agriculture, 2003: 4). Weeds have been identified as having a major impact on native vegetation throughout WA and urban and peri-urban areas around Perth. There are 79 species of plants that have been declared as a serious threat or as a potentially serious threat. Some of the most common weeds are listed in Table 3.

The City of Swan has identified that the management of several of the more common weeds is a major challenge (see also Table 3). The City set aside approximately half a million dollars in 2002/03 to control weeds and formulate a management strategy.

Dieback (Phytophthora) is a major disease affecting native plants in south-west Western Australia and the City of Swan. Many bushland areas located in the City of Swan contain dieback and the City is continuing to investigate appropriate management regimes to control the problem, including mapping affected areas and working with WA's Dieback Work Group to identify management guidelines for Councils.

The Agriculture Department has identified and declared numerous insect and vertebrate pests in WA. Some of the more common insect pests in the rural and semi-rural areas of WA are shown in Table 3. Two of the most serious introduced predators in the Swan Region are foxes and cats, which prey on threatened native fauna like the bandicoot, numbat and chuditch as well as ground-nesting birds and some reptiles (City of Swan, 2004a).

Table 3: Common weed species in the Swan region (City of Swan, 2004a; WA Dept of Agriculture, 2003)

Type and scale of weed problem	Weed species	
Common weeds in WA	Paterson's curse*	Parkinsonia*
	Cape tulip*	Grewia asiatica*
	Doublegee*	Noogoora burr*
	Guildford grass	Mesquite*
	Capeweed	Salvinia*
	Bridal creeper	Water hyacinth*
	Castor oil plant	
	Caltrop	
Common weeds in the Swan Region	Arum lily*	Morning glory vine
	Caltrop	Narrow leaf cotton bush
	Cape tulip*	Onehunga (jojo)
	Dock	Paterson's curse*
	Doublegee*	South African love grass
	Bamboo	Sour sob
	Blackberry*	Veldt grass
	Cotton bush*	Watsonia
	Kikuyu grass	Wild oats
Common insect pests in WA	Locusts*	Stable flies
	Wingless grasshoppers*	Aphids
	Fruit fly*	Cutworm
	Grain beetles*	Budworm
Vertebrate pests in WA	Foxes*	Rodents
	Rabbits*	Deer*

* *Declared weed or pest under the* Agriculture and Related Resources Protection Act 1976

Geography, natural resources and land uses in the City of Swan

The City of Swan has a broad range of land uses, including national parks, major commercial and industrial areas, traditional and hobby farming areas, and older established and new residential areas. The City's rural areas include the Swan Hills (Gidgegannup, Brigadoon), Bullsbrook–Gnangara and the Swan Valley. These areas have been attracting mature families seeking to upgrade to their second home and/or seeking a rural environment/lifestyle.

Approximately 20% of the different land uses in the Swan Region include extensive and intensive agriculture, whose value has been estimated at $277 million (Swan Catchment Council, 2004). The region's agricultural production is primarily characterised by small, diversified rural properties. Cropping, grazing and pasture comprise the Region's extensive agriculture (170,650 ha) and horticulture, irrigated pastures and cropping, and animal production constitute the intensive agriculture (Swan Catchment Council, 2004). The Region's major agricultural product is poultry and egg production. Other activities include nurseries, vegetable production, fruit growing, and beef cattle and grape production (Swan Catchment Council, 2004).

The Swan Region generally has a Mediterranean climate with warm dry summers and mild wet winters. Mean temperatures vary from 24°C in summer to 13°C in winter. The Region has been affected by long-term climate variability, which has seen declines in average winter rainfall over the last 30 years.

There are three main landform types in the City of Swan: the Swan Coastal Plain, the Darling Plateau and the Dandaragan Plateau. The Swan Coastal Plan covers the western portion of the City of Swan and encompasses two distinct soil belts. The Darling Plateau covers the eastern portion of the City and is comprised of hilly landscapes and major valleys along the scarp.

The City of Swan contains many water features and resources. The City lies within the Swan catchment area with water draining into the Swan and Avon River systems. A major portion of Perth's water supply comes from sources within the City of Swan's boundaries. There are also four major wetland systems and some 450 wetlands have been mapped, identified and evaluated. Thirty-seven wetlands are protected under the State's policy and legislation (City of Swan, 2004a).

There are 23 different vegetation complexes with the City of Swan. Approximately 60% of the area's native vegetation has been cleared to accommodate various land uses, including agriculture, residential development and viticulture. There are numerous sites in the City's boundaries that have been identified as having important conservation values. There are approximately 40 flora species declared as 'rare' and given conservation priority listings (City of Swan, 2004a). The region has a wide variety of native plant and animal species. Twenty-five species in the City are considered threatened or priority for conservation efforts (City of Swan, 2004a). There are limited site specific surveys of fauna in the City of Swan, but some of the more notable native fauna under threat include bandicoots, the numbat and chuditch.

Socio-economic profile

Population and age structure

Swan's total population was estimated to be 85,094 in 2004, and is expected to increase by 43,000 (to 127,922) by 2016, with an average annual growth rate of 2.76% (City of

Swan, 2004). The City is estimated to be the fourth fastest growing LGA in the Perth region after the Cities of Wanneroo, Rockingham and Perth. Some of the largest population gains are expected to occur in the localities of Ellenbrook, West Swan, Altona and Swan View (City of Swan, 2004b).

The City is attracting people from the northern and eastern suburbs of Perth looking for affordable homes. Part of the demand is also due to declining amounts of available land in neighbouring municipalities and new housing developments in West Swan, Caversham, Henley Brook and Whiteman Park and the Ellenbrook area (City of Swan, 2004b). Substantial sub-division of bushland areas is taking place in some parts of the city fringe (Figure 3).

Figure 3: Land subdivision and bush blocks for sale, northern Swan region

Compared to metropolitan Perth, Swan has a higher proportion of children and young people aged between 0-14 years and adults aged 30-39 years. Swan also has a lower proportion than Perth of people aged 45 years and over. The median age in Swan is 31 years (City of Swan, 2004b).

Ethnic diversity

In 2001, 2.7% of Swan residents (2,365) identified themselves as Indigenous. This percentage accounts for 12% of Indigenous population of metropolitan Perth and is estimated to be growing at twice the rate of the non-Indigenous population (City of Swan, 2004b).

In 2001, 64% (54,654) of the population of Swan were born in Australia and 28% (23,451) were born overseas. The largest proportion of these people was from the UK (10.2%), New Zealand (2.8%), Vietnam (1.6%), Italy (1.4%) and India (1.4%). In 2001, 14.3% of residents (11,770) indicated they spoke a language other than English at home, slightly higher than the Perth average (13.5%) (State of Swan Report, 2004: 55). Of that percentage, Italian is the most common foreign language spoken at home (15.3%), followed by Vietnamese (14.3%), Cantonese (7%) and Croatian (5.5%) (City of Swan, 2004b).

Income and employment

The City's economic base includes commerce, retail, tourism, residential development, industry, manufacturing and agriculture. The Swan Valley has a growing reputation as a quality viticulture area with table grape cultivation and wine production.

The median average weekly household income in Swan was $812, which was slightly higher than Perth ($805) and for WA as a whole ($779). A majority of the employed resident population of Swan work outside the City's boundaries. Twenty-eight percent of residents both live and work in the City. There has been a downward trend in Swan's unemployment rate: from 9.8% in March 2001 to 5.9% in December 2003 (City of Swan, 2004b).

In 2004, the largest proportion of the City's residents worked in the following areas: Intermediate Clerical (19%); Tradespersons and Related Workers (15%); and Associate Professionals (12%). The largest percentage of Swan residents worked in the retail trade, manufacturing, property and business services industries, and health and community services. Employment in the Agriculture, Forestry and Fisheries sector was low in comparison (e.g. less than 1,000 people). Some 64.5% of Swan's labour force travelled to work by car (City of Swan, 2004b).

Transport and services

The City of Swan is dissected by several national transport routes and substantial infrastructure. Within the City's boundaries are part of Perth's domestic airport, an RAAF airbase, gas pipelines and Perth's major water mound. The City is serviced by a major train service (to Midland — the City's major administrative centre), and Perth's CBD is approximately a 15 minute trip by car.

Community groups

There are many community groups in the City of Swan which have interests in the areas of health, welfare, senior citizens, community and economic development (e.g. Progress Associations), education (e.g. school groups), and cultural activities (e.g. ethnic groups). There are also many groups with interests in environmental conservation in the City of Swan and the surrounding region, and who participate in on-ground activities (tree planting, rubbish collection, weed control), research (flora and fauna surveys), educational programs and strategic natural resource planning. These groups are discussed in more detail in the next section and some are listed in Appendix 1.

Communication channels and media

There are three local community newspapers in the Swan region. They are *The Midland Reporter*, *The Hills Gazette*, and *The Echo*. The City is also covered by Perth's metropolitan stations, which include Channels 7, 9, 10, SBS, ABC and Access 31. Radio coverage is by metropolitan stations, both AM and FM. The City's more popular stations are 92.9FM, 93.7FM, 94.5FM, 96.1FM, 1080AM, and 1206AM.

Television coverage is also via the major metropolitan television networks: ABC, Prime, Seven, WIN, and SBS.

Sites and events visited

Four markets in the City of Swan and the South-west region of WA were visited. Details of these markets are given in Appendix 2. While these markets cannot be considered to be a representative sample of all farmers' markets in WA, some common patterns were detected during field observations (e.g. size, type of goods sold, interests and situations of the stallholders). Many of the stallholders attending these markets were commercial-scale producers of agricultural products (e.g. farmers selling their 'overflow' crops, typically fruit and vegetables). It was also commonplace for stallholders to be retailers

of agricultural products they had purchased directly from farmers or wholesalers. There were some stallholders who were selling their goods – ranging from antiques, used and/or clothing, books, home-grown plants, baked goods – for some additional income, as opposed to earning a living by attending the market. There were two cases where stallholders were selling animals that they had raised on their small landholdings.

Three of the market managers had to obtain licenses and lease sites from Local Government to run the markets. The fourth manager conducted a produce market from a building he owned. The comprehensiveness and consistency with which managers kept records of their stallholders (or suppliers) varied considerably. Typically, the information kept did not extend beyond stallholders' contact details, and these lists were often subject to change, depending on how regularly different stallholders attended the markets.

Figure 4: View of Midland Markets, left, and Vasse Markets, right

Interviews and interview findings

Interviewee characteristics

Fifteen interviews were conducted in total. Eight interviewees were from the WA Department of Agriculture, three from regional organisations, and two from each of Local Government and the Swan River Trust. The Department of Agriculture interviewees worked in the areas of land use mapping, natural resource planning, animal and plant health, and communications.

Perceptions of regional biosecurity issues

Interviewees referred to a range of biosecurity issues that they believed were operating in the Swan region (see Table 4). Not all interviewees referred to the same issues. However, most interviewees considered hobby farmers' lack of experience as a biosecurity challenge that posed (general and specific) risks primarily to agricultural industries and biodiversity. Among the most widely noted biosecurity issues was the challenge of effective weed management, which posed risks to biological diversity (e.g. dieback). Several interviewees believed that, similarly to the Department of Agriculture's (2003) prediction, by the year 2005 there would be a total of 40,000 small landholders in the State, many of whom would not have backgrounds in agriculture or land management [a subsequent estimate was considerably higher, 53,000].

Table 4: Regional biosecurity issues mentioned by Swan interviewees

Socio-cultural	Weeds	Pests	Diseases	
			Plant	Animal
Low awareness/ understanding of agriculture among hobby farmers	Salvinia	Foxes	Dieback	Ross River virus
	Water hyacinth**	Feral pigs**	Grape fungus	
	Chincherinchee	Rabbits	Neglected orchards**	
	Patterson's curse**	Starlings		
Lack of hobby farmers' connection to agricultural/NRM services**	Skeleton weed	Deer**	PSTvd – potato disease	
	Parrot hyracuttle	European wasps		
	Cape tulip	European house borers		
		Portuguese millipedes	Liver fluke**	
Poor pasture, stock and overall land management by hobby farmers'**		Argentine ants	Rye grass toxicity**	
		Drywood termites		

** Borne by and/or impacting on humans, animals, plants*
*** Interviewees indicated a direct link with small landholders' practices*

Knowledge about landholders and land use change pressures

Interviewees were asked to discuss what they knew about hobby farmers in general, and any practices they felt posed risks to biosecurity in particular.

To date, there has been little (if any) systematic documentation of hobby farmers' characteristics or practices in the State or region. Interviewees' generally drew their conclusions about hobby farmers' practices from their on-ground observations and accumulated experience working in the area. Most interviewees believed that hobby farmers were a diverse group of people. Some believed this group included small business owners and others who had long breaks from work enabling them blocks of time to work on their properties. They were often described as being well resourced 'baby boomers' who could afford the high costs of rural land, and few younger families were seen to be purchasing this kind of property. Some interviewees also made a distinction between hobby farmers who lived on their land full-time and 'lifestylers' who bought bush blocks and/or lived on their land part-time.

The 'risky' practices most frequently mentioned by interviewees focused on poor land management and the resulting impacts to biodiversity and agricultural production, such as the spread of weed and animal pests (see Table 4). The release of deer in the Swan area, growing aquatic weeds in backyard ponds, a lack of reporting of some feral animals, and the movement of 'dirty hay' and borrowed equipment between properties were practices interviewees linked with small landholders. Interviewees discussed the need to improve small landholders' knowledge about pasture maintenance, fencing of stock, stock rates, fertiliser and irrigation practices, weed management, and protection of remnant vegetation.

There was a common perception among the interviewees that hobby farmers have low awareness of the suite of problems that constitute biosecurity risks, and that many probably had not previously heard of the term biosecurity. In addition, it was believed by some interviewees that many other people involved in natural resource and catchment management and local government might have a low understanding of the term and/or have a greater interest in the impacts of weeds and feral animals on biodiversity than other biosecurity risks, such as animal diseases. Some interviewees suggested that hobby farmers with higher awareness of biosecurity issues were those who had properties in areas with more obvious problems, such as previous outbreaks of disease and/or the presence of foxes and rabbits. Several interviewees suggested that some hobby farmers

believed it was primarily government's responsibility to address these problems, while one interviewee believed that hobby farmers were more cooperative in addressing some biosecurity matters than commercial farmers.

Two interviewees commented on the drivers of land use change in the Swan Canning Catchment. They believed the rise in hobby farms was due to the convenience and aesthetic appeal of particular sites (e.g. hilly areas close to town), farmers favouring subdivision as a means to fund their retirement, and town planning schemes allowing subdivision in agricultural areas. These interviewees also saw that increasing hobby farms in agricultural areas could lead to the fragmentation of resources, higher NRM and biosecurity costs, and land-use conflicts. Mention was made of WA's Statewide Policy on Agriculture and Landuse, which seeks to restrict subdivision in areas deemed to be agriculturally significant land.

Small landholder, land use information and other databases

Department of Local Government and Regional Development and the Regional Development Council

The WA Department of Local Government and Regional Development (DLGRD) seeks to increase the capacity of regional community to develop governmental processes, economic growth, social well being and environmental sustainability. The State's Regional Development Council (RDC) provides advice to the DLGRD on all regional development issues. The DLGRD and the RDC collate and publish general statistical information on population and demographics, regional economics, income and employment, health care, and education and qualifications. The information is based on defined regional boundaries from ABS information sources.

CRIS Database — WA Department of Agriculture

The WA Department of Agriculture maintains a Client and Resource Information System or CRIS (Beeston *et al*., 2002). CRIS provides the technical infrastructure for efficient data storage and delivery of information in a variety of graphical and textual formats. In addition, CRIS data can be spatially represented and analysed with many spatial datasets because it is integrated with agency GIS. Delivery of all data and information products can be through stand-alone workstations or web-based applications.

CRIS uses WA's spatial cadastral database parcel information that is then integrated into properties using data gathered on the activities undertaken on those properties. In CRIS, an agricultural property is defined as a series of contiguous cadastral parcels being managed as a single enterprise. The CRIS database includes information about properties, owners and managers, addresses and information about the Department's dealings with agricultural properties. Other linked data systems in the Department relate to treatment of disease and protection of agricultural land. These include livestock and disease information systems, stock brands registry and field reporting systems (e.g. declared plant and animal inspection visits, programs of required action, records of compliance).

In addition to the information maintained on agricultural properties, the Department recognised the gap in information about small landholders. The Department recently secured funding from the State Disaster Mitigation Program to map hobby farms within the peri-urban areas surrounding Perth. This work is expected to be completed by the end of 2004–05. The database will contain information such as landholders' contact

details (postal address), property size, and the type of activities they undertake on their properties.

Small Landholder Datasets

The WA Dept of Agriculture's SLIS maintains some statistics on small landholders. These data consist of participant evaluations of the Swan Canning Property Planning Project events (see Table 5). The Department maintains the data in an Excel database. The Swan River Trust and the Department are the joint custodians of these data. The database samples provide some information about a selection of small landholders with an interest in land management who heard about the SCPPP programs. However, the sample cannot be assumed to be representative of the public in general or of small landholders in the region in particular. These data are not currently compiled into a single report, but are used by the SCPPP project manager and officers to assess and revise SCPPP projects and activities. The State SLIS activity is similarly collecting data for evaluation purposes, but CRIS systems have not been fully established to allow for comprehensive analysis.

Table 5: Swann Canning Property Planning Project (SCPPP) database fields

Project/program	Data custodian	Type of data	Data subject	Data collection frequency
Heavenly Hectares (HH) seminar evaluation	Swan River Trust, WA Dept of Agriculture	Qualitative	• Name • Daytime contact phone • Address • How they heard about HH • Topics of interest • Practices likely to change • Value of seminar	20 times per year (e.g. after each event)
		Quantitative	• Property size • Attended before • Knowledge before attendance • Knowledge after attending	
Table 5 (cont.)				
Property Planning Workshop evaluation	Swan River Trust, WA Dept of Agriculture	Qualitative	• Name • Daytime contact phone • Address	20 times per year (e.g. after each event)
		Quantitative	• Workshop usefulness ratings*	
Field Days	Swan River Trust, WA Dept of Agriculture	Qualitative	• Name • Postal address • Date participated in SLIS workshops • Practices changed • Topics of interest • What they learned • Areas for improvement	After each event (varies)

Interviewees with responsibilities for agricultural industry development and/or property inspections (in areas with declared plants and animals) pointed to the value of their links to professional staff and community groups at the regional and local scale (see Figure 5). For example, Department of Agriculture field officers networked with community Landcare groups to disseminate information about biosecurity risks and practices. These groups tend to have established, extensive and direct links to landholders, organised activities to present information to, and access to funding for on-ground activities (e.g. the Natural Heritage Trust). Access to these groups present considerable practical advantages to the Department's regional field staff, whose overall numbers have declined somewhat and may also vary, depending on the presence of declared plants or pests in a given region. The SLIS (see earlier) also relies on the natural resource management networks, particularly regional coordinators and local Landcare groups to 'spread the word' about the Service. It was reported that the Department of Agriculture's stock inspectors tend to work with District Veterinarians and on national programs and had more limited contact with small landholders. Some interviewees thought that small landholders with fewer animals (livestock, chickens) would rely on private sector vets to learn about and/or report biosecurity risks.

Several interviewees felt care was needed in considering the potential to use Landcare networks to promote a wider range of biosecurity issues. They noted that the Landcare networks were often quite diverse, and in any given region some groups may place greater emphasis on conserving biodiversity, while other groups had stronger interests in improving agricultural production. In addition, interviewees noted that these community-based groups, comprised of volunteers, were typically led by a small core of interested individuals who had to balance numerous and competing demands on their time. Several interviewees believed that the groups' cohesiveness and functionality varies in any given region or locality, with more functional groups better able to incorporate additional information and imperatives.

One interviewee knew of a highly motivated and innovative collective of small landholders who — drawing on their previous involvement in the Landcare network – organised a formal group on the basis of people's shared experiences of living on small rural holdings (see Box 4).

Box 4: The Blackwood Valley Small Landholders' Group

The Blackwood Valley Small Landholders' Group was established in 1999. A group of like-minded small landholders living in the region recognised their common interests in rural living and their difference from the practices, challenges and communications networks associated with commercial-scale farming. After attending a meeting of a similar group — the York Small-Land Group — these small landholders met to discuss in more detail their special areas of interest. It was then that they identified the need for their own group, and they moved to formally organise themselves. Today the group membership includes both full time residents and visiting owners who have properties ranging in size from 0.5 to over 200 ha and in several Shires in WA's South-west: Bridgetown-Greenbushes, Boyup Brook, Donnybrook-Balingup, Manjimup, Nannup and Dardanup. The Group's members have diverse interests, from those seeking lifestyle bush blocks to those aiming to establish commercial enterprises. The Group's main activities include seminars, workshops and field days, a web site (http://www.smalllandholders.com) and a widely read newsletter which is published seasonally.

Several interviewees pointed out that Councils (through their land use planners, health officers, rangers, environmental officers) were potentially another key player in biosecurity awareness and education campaigns, and in notifying emergencies, and that they are currently part of the NRM and Landcare networks. Local Government's direct access to community groups and residents was seen as an important advantage, and its (formal) responsibilities for matters like public health and planning were seen by some interviewees as important motivators for being involved in biosecurity. Some interviewees pointed to several factors that would need to be considered when identifying Councils' potential to maintain or increase their support for biosecurity communications:

- consulting with regional organisations, such as Catchment Councils and Regional Organisations of Councils, given their understanding of (and direct contact with) the context of particular and multiple Local Governments in their area
- considering each region on a case-by-case basis, given varying regional and Local Government contexts (e.g. geography, biophysical conditions, socio-economic profiles of regions/local areas, political climate, community aspirations).

One interviewee identified opportunities to promote biosecurity through the various stages of decision-making relating to land use change, processes involving State agencies such as the Department of Agriculture, the Department of Planning and Infrastructure, and Councils. For example, the Statewide Planning Policy makes reference to the need for the removal of weeds and abandoned orchards, but does not specifically articulate or differentiate between State and Local Government responsibilities for enforcement. This interviewee also suggested that awareness of these planning provisions is likely to vary across Councils, and could prevent consistent adoption of these provisions. Several other interviewees agreed that there were some 'grey areas' in responsibilities between the Department of Agriculture and Councils, which were of concern to Councils. They also suggested that Councils would have varying capacity to maintain — or to increase — their biosecurity responsibilities (e.g. some Councils do not have dedicated Environment Officers), and would be wary of taking on additional responsibilities without sufficient resources to meet them.

It was also suggested that the land use change environment is highly complex and dynamic, and ensuring that biosecurity did not 'slip through the cracks' would require using a range of different and innovative mechanisms, such as developing Codes of Practice for people purchasing lifestyle blocks and including biosecurity information in Council information packs for new owners of rural land etc. There were some suggestions that the real estate industry might provide support to biosecurity awareness-raising and education campaigns (e.g. providing information about biosecurity to people in the market for rural properties), but interviewees qualified this idea by noting that most real estate companies would be concerned about the risk that potential buyers might be discouraged if they became more aware of their responsibilities for managing biosecurity risks on small rural landholdings.

Media for small landholders

Interviewees did not agree about the effectiveness of particular media for small landholders. One person believed a monthly (glossy) magazine for hobby farmers would be an effective way to reach small landholders. Other interviewees believed that because small landholders were a diverse group of people and it was unclear how they identified themselves (e.g. as a hobby farmer, lifestyler, small landholder, or none of these), no one type of print media or other communications tool would be sufficient. Another

interviewee pointed out that small landholders who lived on their properties full time and who had particular interests, such as keeping horses, did purchase special interest publications, and participated in organised activities (e.g. show-jumping or dressage competitions).

Related projects and research work

Several of the interviewees identified research and project work they believed were relevant to this project. These projects, not limited to WA, included partnerships between governments, scientists, and communities to manage weeds, plant disease and more general biosecurity issues, and were the :

- Sustainable Communities Network — range of projects including qualitative study of people living and working in the South-west region of WA to consider the impacts of environmental change and how people respond to such change, and why people resist imposed change, and how their positive and negative environmental experiences influences their actions (Pierre Horwitz, Consortium for Health & Ecology, Edith Cowan University)
- Centre for Phytophthora Science and Management — undertakes a suite of projects with industry, governments and community to provide science and management training to mitigate threats posed by *Phytophthora cinnamomi*. Best practice & risk assessment: A 12 month review of current best practice for the management of sites in Australia that are or could be threatened by *Phytophthora*, and development of national best practice standards (Giles Hardy, Murdoch University)
- Weed Spotters Network (Kate Blood, Dept of Primary Industries, Victoria)
- management of alligator weed — partnership with State Government and Sri Lankan community to eradicate and prevent re-infestation of this weed of National Significance, which was cultivated under mistaken belief it was a popular green vegetable of Sri Lanka (Lalith Gunasekera, Dept of Primary Industries, Victoria)
- residues, pesticides and chicken husbandry (Sarah Plant, WA Dept of Agriculture).

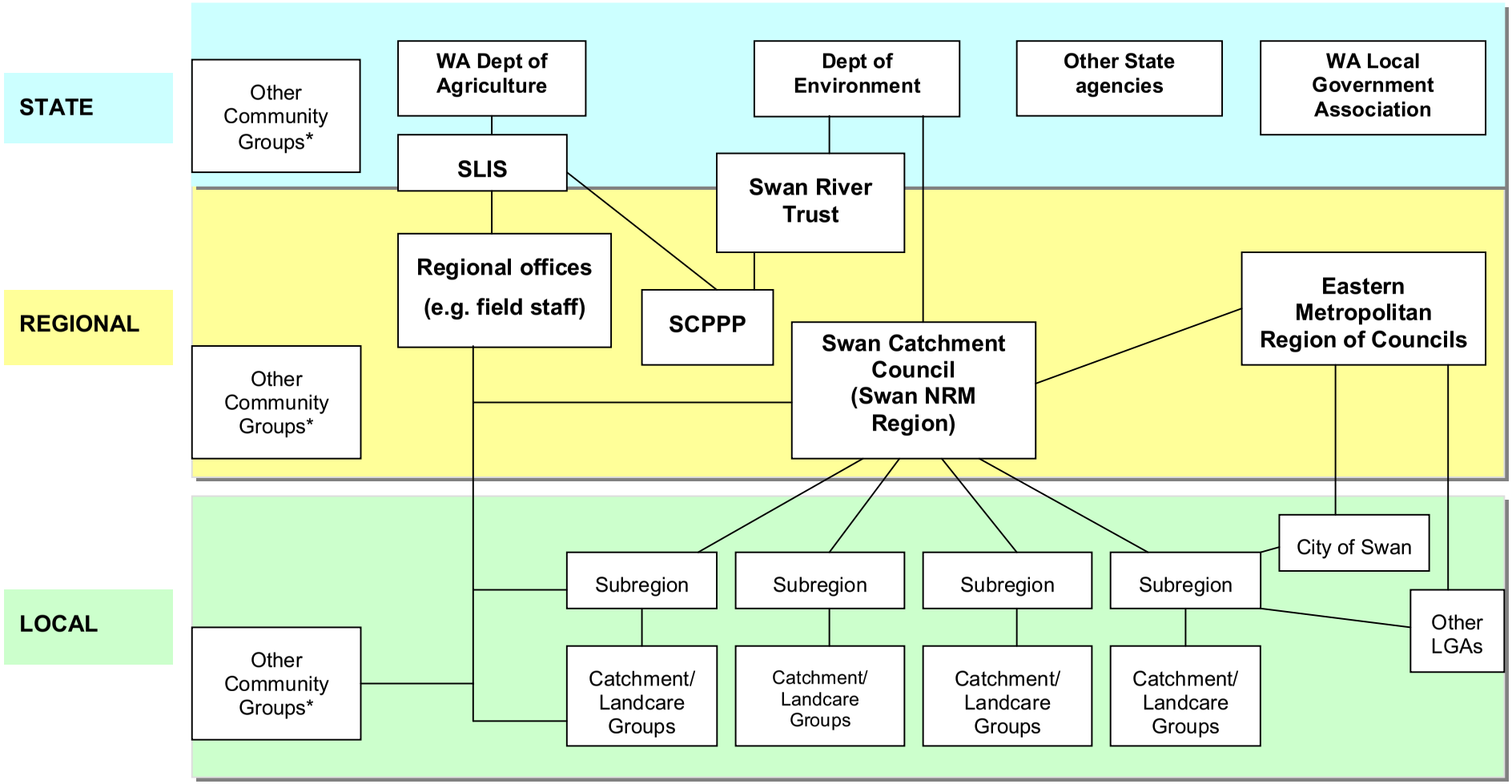


Figure 5: NRM and Landcare networks in the Swan region as described by interviewees

5 Case study 2: City of Greater Bendigo, Victoria

Location and background

This case study focused on the City of Greater Bendigo Council Area or LGA, located approximately 150 km north of Melbourne. The LGA includes the urban centre of Bendigo, which is the third largest urban centre in Victoria, and the major regional centre for north-central Victoria. The LGA has an area of 2,999 sq km. It adjoins the Shires of Mount Alexander and Mitchell to the south, Loddon to the west, Campaspe to the north, and Strathbogie to the east. The City of Greater Bendigo has the second largest population of Victoria's regional LGAs.

The LGA includes a number of small population centres like Heathcote, Eaglehawk, Elmore and Redesdale as well as Bendigo itself. Some of these small centres have rural residential subdivisions around their peripheries, and both rural residential and suburban sub-divisions are extending around the Bendigo urban area. Population increase is partly due to influx of people from Melbourne seeking cheaper land and house prices, and some of these people continue to commute to Melbourne for work.

The Jarra Aboriginal people were the original human inhabitants of the Bendigo area, but its period of major growth during European settlement was precipitated by the discovery of gold on the Ravenswood sheep run in 1851. As a result, more than 3,000 Chinese immigrants flocked to the area in 1854, and they and their descendants have exerted a major economic and cultural influence. Approximately 22 million ounces of gold have been mined in the Bendigo area since 1851, estimated to be worth nine billion dollars at today's rates.

For a short period during the gold rush era, the city was extremely wealthy and a number of grand public buildings and monuments were designed and built in the city centre. The designer was the German architect Carl Wilhelm Vahland, and the most notable constructions include the Town Hall, the Shamrock Hotel and the Alexandra Fountain. The city's main street is called 'Pall Mall' after its famous London counterpart.

Jurisdictional arrangements and biosecurity issues in Victoria

In June 2004, the Victorian State Government established Biosecurity Victoria, which is not a separate agency but a business unit operating within the State Department of Primary Industries. According to its website, Biosecurity Victoria aims to provide the following economic and social benefits:

- improved access to new markets and export growth
- protection for public health
- a secure food chain to ensure quality and confidence
- a healthier environment for food production
- minimising the effect of adverse biological events
- promoting ethical animal management
- reducing the overall cost of protection and risk reduction.

According to the Ministerial statement accompanying the formation of the unit, it aims to combine existing areas of biosecurity expertise within the Department of Primary Industries (DPI) with stakeholder involvement and substantial financial support from the State Government (DPI, 2004).

The DPI has three other units with responsibilities related to terrestrial biosecurity issues. They are:

- Agriculture Development
- Catchment and Agriculture Services
- Primary Industries Research Victoria.

In addition, the Department's People and Culture, Marketing and Communications, and Information areas, all falling within the Corporate Services unit, could have biosecurity-related responsibilities and activities. At a higher level, reporting directly to the Secretary, the Department's Strategic Policy area could be involved in developing, implementing and evaluating biosecurity policies.

Animal diseases listed on the DPI's 'Animal Health' web page are: anthrax, avian influenza, Bovine and Ovine Johne's Disease (OJD), foot and mouth disease, footrot, and Newcastle disease. The web page has links to information about the NLIS, notifiable diseases, and a ruminant feed ban.

The counterpart Departmental plant health site has specific information about blueberry rust, fire blight, wheat streak mosaic virus, and white blister on broccoli. It also lists the following plant pests: birds and bats (damage to orchard fruit), diamondback moth, fire ants, locusts, Mediterranean fruit fly, potato cyst nematode, Queensland fruit fly, and phylloxera.

The other major Victorian Government Department with responsibilities in the biosecurity area, as the term is used in this report, is the Department of Sustainability and Environment (DSE, formerly the Department of Natural Resources and Environment). In particular, these areas of the Department cover some biosecurity-related matters:

- conservation and environment — weed and pest management, biodiversity protection, *BushTender* and *EcoTender* programs, *Drivers of Land Use Change* project, environmental sustainability framework
- land and water management — catchment protection and catchment health
- planning – land-use planning and development, environment protection, Rural Zones Review
- science and research — biodiversity and ecosystem-related research.

The Department's *Landcare Notes* for February 2004 list the declared noxious weeds of Victoria and their classifications in the different State catchments (DSE, 2004). The 'Pest animals' web page has details relating to European wasps, rabbits, exotic pest animals, foxes and wild dogs.

The two Departments mentioned above work closely together and many regional staff work from integrated office complexes, as is the case at Epsom, north of Bendigo.

The State Government's Environment Protection Authority, EPA Victoria, which has a regional office in Bendigo, also has some biosecurity-related responsibilities. Permits or approvals are required for prescribed commercial and industrial activities, and for transport or discharge of prescribed wastes e.g. from piggeries and intensive poultry farms. However, approvals are not likely to be required for small-scale operations run by hobby farmers.

Geography, natural resources and land uses in the City of Greater Bendigo

The LGA lies in the Murray-Darling Basin, and falls into the North Central Catchment of Victoria. It borders the Wimmera Catchment on the west, the Goulburn-Broken to the east, and the Corangamite to the south. The northern boundary of the catchment is the Murray River. Main rivers are the Loddon and Campaspe, and a small area in the east of the LGA drains to the Goulburn-Broken Catchment. Lake Eppalock has previously been an important water supply and recreation resource in the area, but is currently severely affected by drought.

The area has a generally Mediterranean climate with hot dry summers and cool winters. The average annual rainfall is in the range of 600–800 mm, tending to increase towards the east (Victorian Government Department of Infrastructure, n.d.). Most rainfall normally occurs in winter. Under global warming scenarios, the north-central region of Victoria is expected to experience wetter summers and drier winter and spring conditions (Victorian Government Department of Natural Resources and Environment and North Central Catchment Management Authority, 2002).

Major rural land uses in the area include grazing stock (mainly sheep and cattle) on modified pastures, and dryland cropping, with areas of production forestry, horticulture, nature conservation reserves and other uses. The lack of water limits agricultural production, but there are a number of small vineyards and orchards, including olive groves. More intensive dairying and horticultural areas lie to the north where more irrigation water from the Murray River and its tributaries is available.

As reported by one interviewee (see later in this case study), a quick overview of the main land uses in the region shows areas of hilly grazing country, particularly in the south, with some high profile horse and merino studs; peri-urban areas with lifestyle farms and boutique wineries; some intensive poultry, tomato and pig production; cereal crops and other minor cropping and horticulture; and gold mining. The last is still relatively important to the local economy.

Table 6: Value of agricultural production in the Greater Bendigo City Council Area in 2001. From ABS, 2005a.

VALUE OF AGRICULTURAL PRODUCTION - year ended 30 June 2001	$ million
Value of crops	23.5
Value of livestock slaughterings and other disposals	59.0
Value of livestock products	13.8
Total value of agriculture	96.4

Figure 6: Boutique winery near Bendigo, netted to prevent bird damage

The area has a number of State and Regional Parks, as well as containing the Maiden Gully, Marong, Wellsford and Mandurang State Forests, Diamond Hill Historic Reserve and various flora, fauna and bushland reserves. These parks and reserves conserve some of north central Victoria's natural features, including a variety of eucalypts, principally blue, green, and bull mallee, grey box, and iron bark, and relics from the gold mining and eucalyptus oil industries. Urban expansion is destroying some remaining areas of box-ironbark woodlands that are outside the reserve system.

Socio-economic profile

The entire LGA is considered to fall into the ABS 'Inner regional' remoteness area. Its total resident population in 2003 was 92,960 and the population has shown steady growth of approximately 1.5% per year over the period 1999–2003, higher than the Victorian average of 1.2% (City of Greater Bendigo, 2005 — see Table 7). The average population density in 2003 was 31.0 people per sq km (ABS, 2005a).

Population and age structure

Net in-migration accounts for about one third of Bendigo's population growth. This consists mainly of 30–40 year olds and 15–19 year olds, attracted by educational, employment and other opportunities, and retirees. The outward migration is made up mainly of 20–29 year olds, leaving possibly for further education, lifestyle experience and employment in larger cities.

Table 7 summarises population data provided by the ABS for the period 1999–2003.

Population projections developed by the Department of Sustainability and Environment (DSE) suggest that Greater Bendigo's population is likely to increase at an annual average rate of 1.4% between 2001 and 2006 (DSE, 2005). The greatest change over the next 30 years will be an increase in the aged population, with an extra 26,603 people aged over 60 years expected to be added between 2001 and 2031. Net in-migration is expected to add approximately 30,552 people over this period, with most of the migration being moves from other areas of regional Victoria.

Table 7: Age structure of the population of the Greater Bendigo City Council Area. From ABS, 2005a.

POPULATION — at 30 June	1999	2000	2001	2002	2003
Total - all persons	87,781	88,968	90,449	91,545	92,960
Aged 14 years and younger	19,225	19,288	19,304	19,230	19,152
Aged 15 years to 44 years	36,987	37,244	37,692	37,982	38,391
Aged 45 years to 64 years	19,335	19,907	20,624	21,257	22,039
Aged 65 years and over	12,234	12,529	12,829	13,076	13,378
% of total population					
Aged 14 years and younger	21.9	21.7	21.3	21.0	20.6
Aged 15 years to 44 years	42.1	41.9	41.7	41.5	41.3
Aged 45 years to 64 years	22.0	22.4	22.8	23.2	23.7
Aged 65 years and over	13.9	14.1	14.2	14.3	14.4

Ethnic diversity

At the time of the 2001 Census, Aboriginal and Torres Strait Islanders made up 1% of the population in the City of Greater Bendigo. In total, at this Census, 6% of the City of Greater Bendigo's population indicated that they were born overseas, and came from 30 different countries. Half the overseas-born population was from the United Kingdom or New Zealand.

Income and employment

The area's traditional reliance on manufacturing and primary production has diminished over recent decades, and strong health, education and retail sectors have developed (DSE, 2005).

Estimates of unemployment in the LGA for the September quarter of 2003 indicate an unemployment rate of 5.8%, a decrease from the 7.3% recorded for the corresponding quarter of 2002. In June 2003, 10,172 residents had income support from the age pension, and a further 3,894 received a disability support pension. In total, 25,801 people in the LGA received some kind of government income support in 2003.

Average annual taxable income for residents of the LGA in 2002 was $32,003. For 2001 (the latest year for which this information is available), the major income source for 65.9% of the population was wages or salaries. The second most important income source for residents was a government cash benefit (the most important source for 16.2% of the population).

As some gauge of the demand for new dwellings, including new rural residences, Table 8 shows residential building approvals over the period 1999–2003. There has been an overall growth trend evident, which reflects in part the availability of new residential sub-divisions, both suburban and rural.

Table 8: Building approvals in the Greater Bendigo City Council Area, 1999-2003. From ABS, 2005a

BUILDING APPROVALS — year ended 30 June	Unit of measurement	1999	2000	2001	2002	2003
Private sector houses	no.	648	748	465	865	855
Total dwelling units	no.	672	842	495	956	887
Value of total residential building	$m	75.5	102.1	74.8	137.3	142.5
Value of total non-residential building	$m	41.3	25.9	43.9	40.3	70.0
Value of total building	$m	116.8	128.0	118.7	177.6	212.5

Transport and services

Melbourne's Essendon Airport is only approximately 90 mins from Bendigo by road, and Bendigo has good rail and highway links both to the capital and other regional centres. Melbourne is approximately two hours by train. The city of Bendigo lies at the convergence of three highways with connections to other interstate highways.

Tourism is a major contributor to the local and regional economy, and there is a wide range of accommodation, restaurants, cafés, galleries, museums, and artistic and cultural events designed mainly to attract tourists from elsewhere in Victoria and interstate. Horse races are a significant local sporting event. Conference facilities are available and at the time of the field visit a major Rotary Convention was taking place in the city. The Bendigo Pottery, established in 1858, is a well-known local tourist attraction.

Community groups

Examination of the local *Yellow Pages* telephone directory revealed a range of listings for community groups and professional organisations that could relate to the interests of small and peri-urban landholders, and which could be possible sources of names or could act as communication links. These groups are listed in Table 9.

Table 9: Some community groups and professional organisations represented in the Bendigo area possibly relevant to communicating with small landholders

***Organisation category*/ Local examples**	**Landholder interests represented**
Special plant/animal interest groups	
Avicultural Society of Australia	Keeping and breeding of cage birds, poultry, turkeys, ducks, geese, quail etc.
Bendigo Garden Club	Gardening, rare and exotic plants, new plant varieties
Alpaca and llama breeders	Keeping and breeding of these animals
Agricultural societies	Keeping, breeding and displaying animals and plants, markets
Agricultural Society of Bendigo	Runs Showground Market — venue for produce and animal sales and purchases
Animal welfare organisations	Health and welfare of wild and captive animals, stock inspections
RSPCA	
Private veterinarians, veterinary hospitals and professional veterinary associations	Health and welfare of captive and domestic animals, animal diseases and injuries

Table 9 (cont.)

Migrant/Ethnic organisations Bendigo Chinese Association Bendigo Japanese Association	Common ethnic cultural practices, including practices involving animals and plants
Stock and station agents, saleyards Elders Rural Wesfarmers Dalgety Landmark Bush's Produce Store Bendigo Livestock Exchange	Purchase and sale of stock and stock feed, farm equipment Has sales that specifically cater for smallholders wishing to buy or sell stock
Real estate agents Donaldson Real Estate	Property enquiries and property transactions 'Specialising in farmlets and bush blocks' – landowners seeking this type of property
Landcare groups Bendigo and District	Land management, catchment and biodiversity protection

Communication channels and media

Six radio stations are listed for the Bendigo area — ABC (Bendigo), 'Easy listening' Radio Ten-71, 91.9 Star FM Bendigo, Radio 895 TripleCFF Bendigo, 3BO FM 93.5 Bendigo, and Central Victorian Gospel Radio Harcourt. Local television stations are Prime, Bendigo, and Southern Cross Ten, Bendigo. Newspapers produced locally are the *Bendigo Advertiser*, the *Bendigo Weekly*, and the *McIvor Times* (Heathcote). A range of country newspapers produced elsewhere, such as the *Country News* and *Weekly Times,* is available at local newsagents.

Sites and events visited

Major sites and organisations visited, together with information material collected, are listed in Appendix 5. In addition, the researchers drove widely around the LGA and its immediate surrounds, including parts of the adjoining LGA of Mount Alexander, and visited the smaller population centres of Heathcote, Redesdale, Sutton Grange, Harcourt, Eaglehawk, Campbells Forest, Raywood, Elmore, Ravenswood and Maldon.

Through the courtesy of two local Landcare Coordinators and the landowners in question, a visit was made on 17 March 2005 to a 160 ha property near Maldon, being run as a hobby farm and private conservation area. The husband and wife both had jobs off-farm, the husband working part of the week in Melbourne where he stays during this period, and the wife teaching part-time in a local city. The current owners had lived on the property for ten years and were engaged in weed removal and re-vegetation activities. A major weed they were working to control was wheel cactus. The owners propagated local native plants to use in re-vegetation activities and had boxes of seedlings and cuttings on their house veranda. On the property they kept a small number of poultry, cattle to help keep the grass down, and dogs. At the time of the visit, the owners were proposing to submit an application for assistance with their re-vegetation activities to the Victorian Government's *BushTender* scheme, and had received previous assistance with re-vegetation activities under the *Work for the Dole* scheme.

Figure 7: Rural lifestyle properties near Maldon (left) and Mt Alexander (right)

Markets in the region

One market, the Prince of Wales Showground Market, was visited. It is run by the Bendigo Agricultural Society. The market is advertised as 'Bendigo's busiest market', and opens every Sunday from 8.30am to 3.00pm. A separate farmers' market, previously held monthly, had recently been combined with the Showground Market and was now being held every second Sunday in conjunction with the general market (as advised by the market manager, who is employed by the Showground). A small number of designated farmers' stalls were in a section of the market at the time of the visit. The market is advertised by means of short media campaigns, and the manager estimated that it attracts 8–9,000 visitors per weekend. He reported that the Council is investigating the need to regulate the market for human health reasons. Details of the market observations are in Appendix 5.

In the two undercover pavilions near the Showground entrance, there were a total of 67 stalls. Only six (9%) of these were selling fresh produce or plants, and in only two cases did the stallholder appear to be the producer. Fifteen stalls selling relevant produce and plants were counted in the open area of the market, and, of these, 14 (93%) were run by the producer, either a large-scale commercial or a small 'backyard' producer. A stall in one of the industrial pavilions was selling live birds — the only live animals we observed for sale at this market.

Informal discussions with stallholders at the market revealed the view that Bendigo is not a wealthy area, and that some people describe the city as a 'pensioner town'. One stallholder suggested that many other stallholders were looking to supplement pensions or social security payments, and that they were finding things hard as sales at markets have dropped off and people are being 'very careful with their money'. Another stallholder believed that competition at markets can be intense as more and more people are trying to get into 'cash businesses' since the GST was introduced.

Interviews and interview findings

Interviewee characteristics

Fifteen people were interviewed either in person during the case study visit, or after by telephone. Four group interviews were conducted involving 11 people, and four individual interviews. Five interviewees were from the City Council, one from the North Central Catchment Management Authority, five were from State Government agencies (DPI and DSE), two were independent consultants, and two were Commonwealth-funded Landcare

Coordinators. Informal conversations were conducted with other Council staff, the Showgrounds market manager, two private property owners (as mentioned above), and a staff member of the Bendigo Livestock Exchange. Topics of discussion varied as appropriate to the role and expertise of the interviewees, and not all topics were canvassed with all interviewees.

Perceptions of regional biosecurity issues

Interviewees were asked what they thought were the major biosecurity issues in the region. Table 10 summarises the issues they mentioned which could be related to peri-urban and lifestyle landowners: these tended to fall mainly into the socio-cultural (people and people's practices seen as central), and disease categories. There was general agreement that there were issues associated with small landholders, absentee landholders, and an influx of new people with little experience on the land.

Table 10: Regional biosecurity issues mentioned by Bendigo interviewees

Socio-cultural	Weeds	Pests	Diseases	
			Plant	Animal
Small producers, 'blockies', 'transit people' coming from western and northern Melbourne suburbs, many from ethnic communities (Italian, Greek)	Olives – possibly may become pest	Fire ants – two outbreaks in Vic., came from Qld	Root disease in Melbourne, in pines	Foot and mouth disease
New landholders, often urban people	Wheel cactus			Lice problems with livestock – can spread disease
Absentee owners – often second home owners	Chilean needle grass			Brucellosis
People outside NLIS system – grower to grower exchanges	African lotus flower			TB in goats
People with less NRM background, newcomers and turnover	African orchid			Footrot in sheep
Biggest threat is people bringing foreign plants in	Serrated tussock grass			Avian influenza in 1992 – wild birds to ducks to poultry
Farmers' markets – do get unusual breeds of poultry sold there, possible way a disease outbreak could spread	Paterson's curse			Pig disease – Italian fruit growers in Mildura area slaughter unregistered pigs at home for salami
	St John's wort			OJD
				Rare cattle breeds [possible introduction of new diseases?]

Interviewees with animal health responsibilities made comments about possible biosecurity risks posed by markets. They thought these markets could contribute to the spread of animal diseases. Specific comments were made about sales of rare breeds of poultry and it was suggested that the DPI may do spot checks at these markets, but markets are not part of their 'core business'. Clearly further action would be needed if a poultry disease or other outbreak occurred.

Knowledge about landholders and land use change pressures

Interviewees were asked what they knew about peri-urban landholders and hobby farmers in the area, as well as what was occurring in relation to land use changes. Several referred to problems with absentee landholders, sometimes occupying good agricultural land. They pointed out that some of the area is environmentally sensitive and subject to salinity and soil acidification. Landcare membership was discussed and it was reported that 40% of the community is in Landcare groups.

Other interviewees thought there is strong pressure for development in the area and the population is growing rapidly (which tends to be confirmed by ABS statistics reported above). There is also demand for urban consolidation. Much of the Bendigo area already had relatively small land parcels, dating from subdivision during the gold mining days. One interviewee reported that much of the recent rural residential sub-division in the Shire occurred in the 1980s and 1990s, but another suggested considerable fragmentation also occurred over the period 2000–2002, with the number of rural holding increasing by 11,000 from an original total of 166,000. There is population movement from Melbourne, which tends to be concentrated in favoured amenity areas such as Upper Spring Creek, near the border of Bendigo and Loddon Shires. Many newcomers are taking advantage of reasonably priced land, for example blocks priced at $100,000–$150,000 in the Heathcote and Kyneton areas.

Other drivers for sub-division include some farmers' desire to use their land as a substitute for superannuation — dividing it into as many blocks as possible to enable them to retire. This often requires re-zoning of the land in question, sometimes controversial. It was reported that some farmers' organisations have lobbied against previous reviews of zonings because of their constituents' interest in sub-division to generate retirement assets, and that proposed planning and zoning restrictions have been 'watered down'. However, new planning legislation and zoning reviews in the Shire required by the State Government will place further restrictions on subdivisions and require further land capability assessments and possibly landholder surveys.

Generally it was reported that there were no systematic surveys currently being done of small landholders — one interviewee thought that this was because they contributed little to agricultural production, which was increasingly being concentrated among large producers. By contrast, one interviewee indicated that 12 out of 18 catchments in Victoria are now dominated [numerically] by small landholders, particularly those catchments near the Hume Freeway.

In terms of small landholder practices, interviewees thought that hobby farmers and small landholders 'are strapped for time' and engage in practices that are not demanding in time or labour. Many run a few beef cattle (rather than sheep as they are 'too time critical'), and at the last census conducted by the State Government, there were 35,000 cattle owners in Victoria. Other small landholder land use practices mentioned were growing fruit and olives, and keeping boar goats. Several interviewees mentioned interest in alternative farming practices and new industries, for example emu, rabbit and ostrich farming, and herb production. The Seymour Alternative Farming Expo was mentioned as an event likely to attract some of these landowners. Water supply is a critical issue for many small landholders.

There was discussion of a range of suspect or illegal activities these people may undertake, including drilling illegal bores, living in sheds, and being ignorant of good animal husbandry practices. Conflicts were occurring between commercial farmers and hobby farmers in some rural living zones in the Shire. These conflicts went both ways, with hobby farmers complaining of smells from 'chook farms', dust from ploughing, use of pesticides and herbicides, and the water entitlements of commercial producers; while commercial poultry

farms, for example, were concerned about poor control of rodents on hobby farms, particularly those with ducks and poultry. It was reported that some of the bigger poultry farms were buying up adjoining land to avoid these conflicts.

Several interviewees reported that there are small clusters of ethnic communities from European backgrounds (Romanian, Italian, Greek, Yugoslav) in rural areas of the Shire, and that language problems contribute to issues involving unregistered animals. People from non-English-speaking backgrounds may be ignorant of the existing livestock identification system (tail-tagging), and stock and station agents sometimes refer them to the relevant State Government Departments. However, loss of State Government advisory services or introduction of fees for these services, for example veterinary advice, had meant that hobby farmers who previously used these services now went to the private sector for help, resulting in a loss of contact between landholders and government.

Small landholder, land use information and other databases

Interviewees mentioned several previous surveys that could provide information. These included the Heathcote Pipeline Survey, ABS and ABARE surveys, and biodiversity-related surveys e.g. of owners with box-ironbark woodland areas. Many interviewees pointed out that Council ratepayer databases provide the most comprehensive listing of landholders, and that specific searches can be done to generate lists of ratepayers in particular planning zones, for example the Rural Living Zone, or in specific geographical areas if the lists are geo-coded. These searches could generate lists containing many small landholders and hobby farmers. Use of the ratepayer database would be subject to approval by the Council's CEO and would require help from the Council's GIS Coordinator. One interviewee had used the ratepayer database for mail-outs of information material but had received a poor response.

Another database mentioned was that of the State Government's land valuers, who use a rapid rural appraisal method to update land valuations, and who build on existing property information provided by Councils. One interviewee had proposed a study based on this information source.

Interviewees working in the animal health area had a number of databases that would include some small landowners and hobby farmers as well as commercial producers. These included lists of cattle and pig owners developed to help manage disease outbreaks. As part of investigating livestock deaths, interviewees had made contacts with a range of specialist small livestock owners, for example alpaca, deer, and goat breeders. They pointed out that there was no database for horse owners in the area, although there are large commercial stud farms as well as many hobby farms with horses, as horse owners go to local vets with their animal health problems.

When implemented, the NLIS will provide a more comprehensive listing of cattle owners than currently exists, as anyone wishing to sell cattle through saleyards and use stock and station agents will have to register and obtain ear tags. However, the DPI previously did cattle censuses in association with its tail-tagging system (which will be superseded by the NLIS).

Small landholders and communication channels/networks

Interviewees mentioned a range of possible communication channels and networks appropriate to contact small landholders, some of which they used themselves (see Table x). However, a number of interviewees pointed out that there is no single or easy way to contact all these landholders — they are socio-demographically varied and have a wide range of interests. One interviewee commented 'they are a diverse and changeable and mobile group of people', and 'a complex social landscape results from changing land use. It requires that we work more sensibly and strategically to address challenges'. There were general comments to

the effect that government authorities do not have the resources to maintain contact with these people and therefore these authorities adopt a reactive or *ad hoc* approach in the face of particular emergencies. It was pointed out that many people are already overwhelmed by increasing numbers of government regulations, and that existing community groups are often held together by a small number of overstretched individuals. This led to the view that it is unproductive to burden existing groups with more information unless the matter is of direct interest to them.

A number of comments were also made about lack of government extension or engagement staff to carry out these communication activities.

In addition to suggestions about specific networks and communication channels, some interviewees made more abstract comments about the nature or orientation of communication programs needed for this segment of the population, or to effectively communicate about biosecurity issues generally. One such comment was about whether both a place-based and issues-based approach is required, and whether place-based policies and programs are needed from government rather than sectoral ones. Another comment was to the effect that local contacts need to be involved in communication activities, and local people need to be empowered to achieve a personal approach and tap into informal networks that outsiders will not necessarily know about.

Table 11: Communication channels and networks interviewees suggested to contact small landholders

Network/communication channel	Comments
Landcare network	Big salinity problems in Bendigo area [awareness of these problems possibly encourages landowners to join Landcare groups?] 150 Landcare groups in region [referring to North Central Catchment] — it is where Landcare was born The Landcare model does not translate well for these people — need to avoid relying [on it] too heavily Network of Landcare Coordinators
CMA networks and staff	Using CMAs — if looking for support to do surveys or to include biosecurity materials … would need to provide money/partnerships Could also work through State-wide communications officers to help target extension, workshops, field days North Central Community Engagement Network — professional network of natural resource management and other communicators
Local Government	Local Government Environment officers — good link to community and help us distribute materials Rate notice mail-outs Council channels — need to get up to speed on issues Through planning process 'Welcome' or information packs for new landholders — varies from LGA to LGA, some Melbourne real estate agents use them … Would be good if Councils notified us when farm parcels changed hands, then we could let the new owners know what their animal health responsibilities are
Conservation/environment networks and programs	*Bushcare* and [process of] getting conservation covenants on title
Mass media	21 newspapers in the region [North Central Catchment] Radio, local paper … — [Departmental] communications officer tracking media coverage of relevant topics
Newsletters (existing or new)	Catchment Management Authority considering producing a quarterly newsletter on weeds Quarterly DPI news magazine targeting people in north-central Vic. School newsletters
Existing events	Farmers' markets Field Days and Expos e.g. Seymour Alternative Farming Expo

Table 11 (cont.)

Internet, web-based	Considering ways to better provide Internet-based information e.g. using different languages or referring people to interpreter services in a similar way to *Centrelink*
Through other existing organisations/interest groups	Using regional organisations – important to tie in with what is happening in the region Schools, senior cits, Permaculture, Country Fire Authority, small co-ops Could be state or national [interest] groups e.g. horses, rare breeds Communication via DPI Newcomers' networks
Stock and station agents	Through stock agents talking to people at saleyards, managers of saleyards (who are employed by the respective city council) Crucial source of information for these landholders
Industry/producer groups and industry-based programs	Farm forestry, *Topcrop*, egg producers, angora and cashmere goats, viticulture, olives – growers networks
Property transactions and real estate agents	Offers opportunities … they are at the beginning of the 'food chain'
Rural services and contractors	For example fencing contractors

As reported by one interviewee, Landcare membership may be relatively high among landholders in the Bendigo area as Landcare began in this region of Victoria and has a high profile. In the *North Central social benchmarking project (*Pepperdine & Thomson, 2002), 63.8% of survey respondents in the sections of the catchment surveyed were members of a Landcare group, but this survey only included landholders with properties larger than 8 ha. One interviewee cautioned about depending too heavily on Landcare networks, and it is possible that small lifestyle and hobby farmers will be less likely to belong to a Landcare group than mainstream producers. Also, typically Landcare has a focus on natural resource management, and while this corresponds well with biosecurity issues relating to managing pests and weeds, the scope of interests may need to be extended to include plant and animal health issues and disease outbreaks.

The North Central CMA produces a range of information material and manages relevant networks and projects. It produces a bi-monthly newsletter with 500 subscribers, has a website, places items in local media, and organises special events, for example writing and photographic competitions. These may all reach small landholders and hobby farmers. The CMA also runs its own Community Engagement Network for natural resource management professionals. CMAs are themselves networked at a higher level and communicators from a number of CMAs may meet to discuss their work, and consider State-wide communication activities or partnerships to deliver particular initiatives. These activities could include biosecurity-related matters.

Landcare and catchment management arrangements are linked – in the North Central region, there is a regional Landcare coordinator who oversees seven Landcare Officers, who are often housed in their respective LGAs and provide a communication channel to landholders in that LGA.

Most interviewees suggested Local Government has a role to play in biosecurity communication. Suggestions included sending out information material with new landholders' 'Welcome' packs or with rate notices. There were also opportunities to communicate with landholders when they seek Council planning permissions for activities on their land, and when Council officers conduct property inspections. [It was pointed out that some similar opportunities may arise if permissions are needed from the State Environment Protection Authority.] Council environmental officers were seen as important players. These officers often have well-developed contacts with landholders. Bendigo City Council's Community Environment Officer, for example, works with landholders to develop their

environmental management plans, which address weed and pest issues. He also has a role in developing environmental education material (for example the land management guide mentioned above, and a weed field guide) for landholders in conjunction with other groups. Council may also require land developers to prepare information packages for new landholders, and these requirements could include providing biosecurity information. A number of interviewees had used Council ratepayer lists for communication activities — for example a GIS-based search had been used to contact landholders with particular remnant vegetation associations on their properties.

Several interviewees considered issues associated with communicating with NESB landholders but most (with the exception of the animal health interviewees), considered that this group was 'not a large enough demographic' in the area to warrant emphasis in their activities.

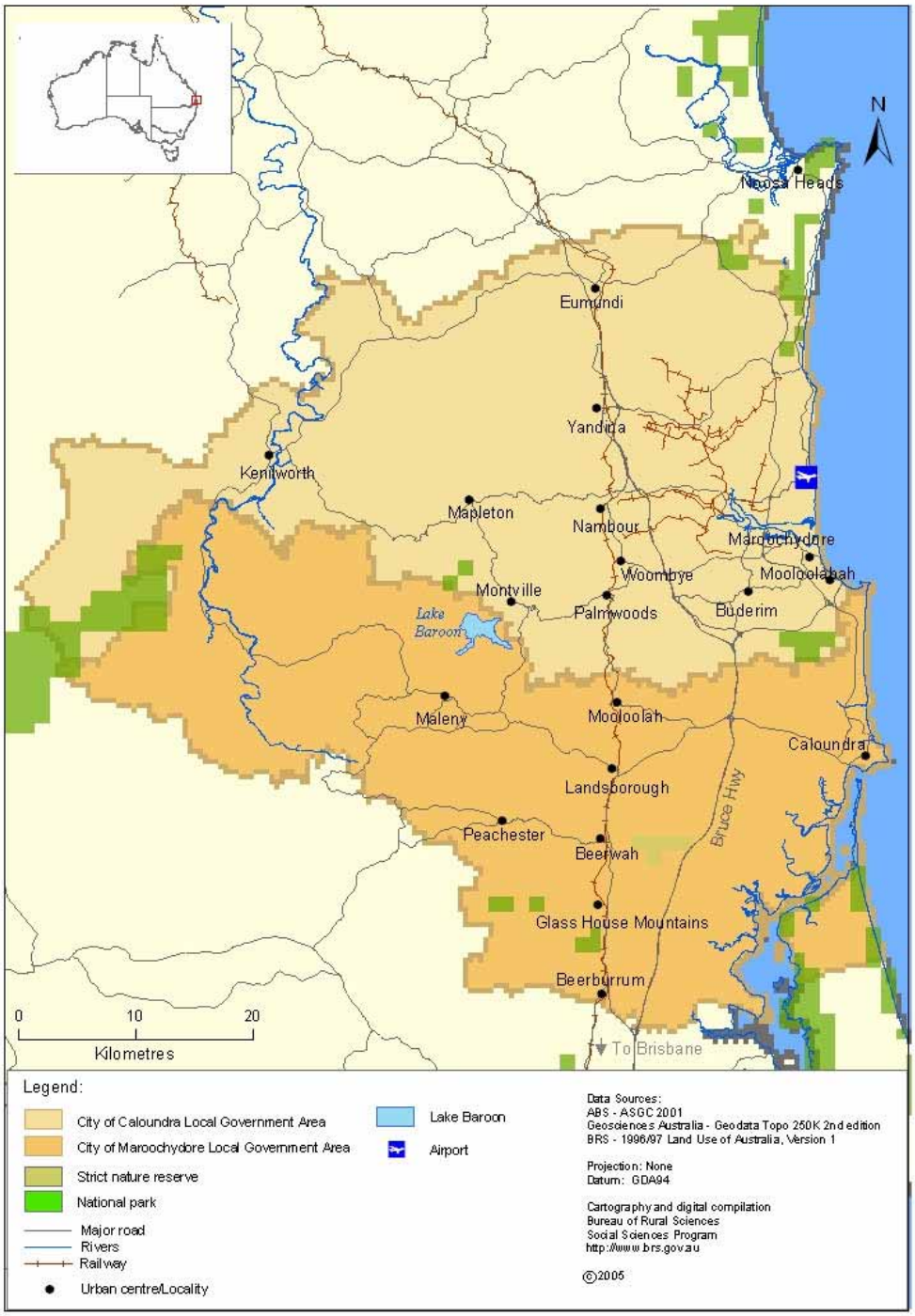
Related projects and research work

Previous or current projects and research work mentioned by interviewees included:

- the 'Drivers of land use change' project — this project has a focus on biodiversity outcomes but considers broader land use change and planning issues (see *Newsletter Drivers of land use change*, Issue No. 1, September 2003; Hollier, Reid & Francis, 2003; and Crosthwaite, 2003)
- development of a land management guide for the North Central Catchment Management Authority (McRostie, in prep.)
- previous DPI work on small farms, small farm diversification, and farmers' markets (see 'Small farms — the program', 'Should I diversify my farm business?' *Agriculture Notes*, March 2001, Department of Primary Industries, and 'Farmers' markets', *Agriculture Notes*, March 2001, all at http://www.dpi.vic.gov.au, and Coster, 2004)
- the project 'Entering the hearts and minds of absentee landholders in the Macedon ranges and Mt Alexander Shires' — an initiative of the Mt Alexander/Macedon Ranges Shire-based Landcare Coordinators' Advisory Committee (see http://www.nccma.vic.gov.au)
- North Central CMA 'Community engagement and regional communication' project (see http://www.nccma.vic.gov.au)
- a project that involved students at five peri-urban schools in improving their parents' understanding of the animal welfare code (done by Jessica Connor, a DPI staff member at Tatura)
- the 'North Central social benchmarking project' (Pepperdine & Thomson, 2002) — funded under the NAP.

Several interviewees commented that relevant projects had finished or been discontinued and there was little or no research currently being conducted in the region with a particular focus on small landholders.

6 Case study 3: Brisbane and Sunshine Coast Hinterland, Queensland



Location and background

Queensland's Sunshine Coast extends from the vicinity of Caloundra in the south to as far north as Rainbow Beach, just south of Fraser Island (see http://www.noosa.qld.gov.au/data/SunCoast.jpg). It begins approximately 100 km north of Brisbane, and includes three LGAs, Caloundra City in the south, Maroochy, and Noosa in the north. All these LGAs have both coast and hinterland areas, and extend approximately 60 km inland. The three Councils have formed a regional grouping, SunROC (Sunshine Coast Regional Organisation of Councils).

The total area of the entire Sunshine Coast and hinterland is approximately 3,119 sq km (Department of Local Government and Planning, 2004).

Time limitations in this study, and the work locations of people with formal responsibilities for biosecurity matters, meant that field work was largely confined to Brisbane, Caloundra City Shire and Maroochy Shire. The two shires cover the main hinterland rural residential areas and associated towns near the Glasshouse Mountains and the Blackall Ranges. In the background information below, the focus is mainly on Caloundra City and Maroochy Shires.

Council head offices for Caloundra City are in Caloundra, on the coast, and for Maroochy Shire in Nambour, in the hinterland. Maroochy Shire also has a customer service centre in Maroochydore.

The Blackall Ranges area was explored in the late 1800s by white settlers seeking red cedar trees to cut for timber, much of which was shipped to Europe and the United Kingdom. Another major reason for the settlement and clearing of the higher parts of the hinterland was that it was climatically much more suitable for dairying than the adjacent lowlands.

Jurisdictional arrangements and biosecurity issues in Queensland

The principal State Government agency with responsibilities for biosecurity matters in Queensland is the Department of Primary Industries and Fisheries (DPI&F). It divides the State into five regions: Northern, Central, Southern, South-East and Western Queensland. DPI&F is highly regionalised with an extensive network of offices throughout the State. It has officers with biosecurity-related responsibilities in offices throughout the regions and in its central Brisbane office. Each office may have stock and/or plant health inspectors, veterinarians, and some also have apiary inspectors. There are Departmental veterinary laboratories in Brisbane, Townsville and Toowoomba (see http://www.dpi.qld.gov/health/4085.html). In addition to these office contacts, DPI&F has a central call centre and an Animal Disease Watch Hotline for notifying animal disease emergencies.

In its current organisational structure, DPI&F has a division devoted to biosecurity, headed by an Assistant Director–General. Within this division currently there are units for Plant Biosecurity, Animal Biosecurity, Animal Welfare, and the Fire Ant Control Centre. In addition, the Department's Policy Analysis, Policy Coordination and Development, Research and Development Strategy, Information and Communication Services, and Strategic Communication and Marketing areas are likely to be involved with relevant aspects of biosecurity issues. There are also functional units within the organisational structure for the five regions, each headed by a Regional Director. DPI&F has many controls on the entry and movement of plants and animals to or within the State. They include the 'tick line', which attempts to keep cattle ticks out of a large area of inland Queensland extending from the NSW border in the south to Mount Isa in the north by regulating livestock movements; and the other

is a road block for fruit fly control at Coen in Far North Queensland — where all vehicles must stop on their southward journey.

DPI&F provides information about a wide variety of specific biosecurity threats on its biosecurity webpages (see http://www.dpi.qld.gov.au/health/).

DPI&F has set up a Biosecurity Advisory Council which has the primary purpose 'To initiate, develop and evaluate strategic animal and plant health biosecurity policy and provide recommendations to the Minister for Primary Industries and Rural Communities' (see http://www.dpi.qld.gov.au/health/10416.html). The Council is responsible for providing strategic policy advice and establishing complementary organisational arrangements with relevant bodies in other jurisdictions, including Animal Health Australia and Plant Health Australia at the national level.

The Queensland Department of Natural Resources and Mines (DNRM) also has biosecurity-related responsibilities. Among its other functions, DNRM:

- creates and transfers title to land in the State
- provides information on land titles, land valuations and other resource-related information
- oversees State-based catchment management arrangements and projects funded under the National Action Plan for Salinity and Water Quality
- administers leasehold and other land tenures over 70% of Queensland
- supports landholders throughout the State in managing pest animals and weeds
- does plant and animal research for sub-tropical and tropical application, including studies into biological control of weeds and pests.

DNRM produces an extensive set of fact sheets dealing with pest animals and weeds.

The Queensland Environmental Protection Agency (EPA) and the Queensland National Parks and Wildlife Service (QNPWS) are also relevant agencies. The EPA is responsible for managing Environmentally Relevant Activities, which include agricultural activities like intensive poultry farming, piggeries and cattle feedlots. It assesses applications to conduct these activities, while responsibilities for administering and enforcing conditions placed on them are shared with Local Government, with the exception of pig farming and cattle feedlots, which are delegated to DPI&F. The EPA produces guidelines and technical manuals for relevant activities, including one for the chicken industry (see http://www.epa.qld.gov.au/environmental_management/planning_and_guidelines/environmentally_relevant_activities/).

QNPWS administers publicly-owned parks and forests in Queensland, and is responsible for managing pests and weeds within them. It has a five-year pest management plan giving details of how this is to be done.

Geography, natural resources and land uses in the Sunshine Coast Hinterland

Much of the Sunshine Coast and its hinterland fall into the Lockyer-Burnett-Mary Catchment as defined in the NAP — this is a large catchment abutting the Condamine-Balonne-Maranoa and the Burdekin-Fitzroy Catchments. The catchment as a whole extends well beyond the Sunshine Coast and hinterland. Baroon Pocket Dam and Lake Baroon, a 380 ha man-made lake south-west of Montville, is a major water storage and recreational area in the hinterland.

Climatic information for Caloundra City Council indicates that monthly maximum daily temperatures near the coast range between approximately 19 and 28°C, and monthly minimums between approximately 11 and 22°C. Temperatures in the higher parts of the hinterland are approximately 5°C cooler than the coast.

In the south of the Hinterland are the Glasshouse Mountains, unusually shaped volcanic plugs rising steeply from the surrounding countryside. They include Mounts Tibrogargan, Beerwah and Coonowrin.

Figure 8: Smallholding with orchards in the Glasshouse Mountains area

The Blackall Ranges, lying to the west of Maroochydore and to the north of the Glasshouse Mountains, are also volcanic and formed from ancient lava flows. Their soil is very fertile and the climate is considerably cooler and wetter than that of the adjoining coastal plain, due to the elevation. Many locations in the Ranges have excellent views over surrounding countryside. The Ranges are a popular tourist area with a wide range of accommodation, restaurants and shops, particularly near Montville and Maleny.

Pockets of remnant rainforest and forest re-growth remain in the area, some of which are protected in national parks or scenic reserves. Other rainforest is within State Forests. The fertile soil and mild climate allow a wide range of produce to be grown, including pineapples, citrus fruit, coffee and tea. Dairying is still a major industry although the number of dairy farmers in the area has fallen dramatically as a result of industry re-structuring. Near Maleny there is a local cheese factory, a winery and an emu farm.

Table 12 gives 2001 figures for the value of agricultural production in the two council areas. Livestock are of considerably greater economic significance in Caloundra than Maroochy.

Table 12: Value of agricultural production in 2001 in Caloundra City and Maroochy Shires. From ABS, 2005

VALUE OF AGRICULTURAL PRODUCTION — year ended 30 June 2001	Caloundra $ million	Maroochy $ million
Value of crops	40.0	38.7
Value of livestock slaughterings and other disposals	39.8	4.1
Value of livestock products	13.2	6.8
Total value of agriculture	93.0	49.5

Socio-economic profile

The two shires are classified as falling into the ABS 'inner regional' category, which implies slightly poorer access to services than metropolitan areas.

Population and age structure

The population of the entire Sunshine Coast region was estimated to be 265,800 people at June 2003, but is growing rapidly. An estimated 30% of the population lives within one kilometre of the coast, and 60% within five kilometres, indicating that the hinterland is very sparsely populated in comparison with the coast. The coast is rapidly being overtaken by suburban expansion and high-rise developments. The total population of Caloundra City Shire in 2003 was 82,998, and Maroochy Shire, 136,617. The average population density in Caloundra was 75.9 people per sq km in 2003 and in Maroochy, 117.5 people per sq km. These averages are not very meaningful because of the great differences in density between coast and hinterland.

Table 13 gives population age structure information for Caloundra and Maroochy Shires from the respective ABS regional profiles (ABS cat. no. 1379.0.55.001, ABS, 2005b, 2005c).

Table 13: Population age structure and increase in Caloundra City Shire. From ABS, 2005b, 2005c

Population — at 30 June	1999	2000	2001	2002	2003
Total - all persons	71,942	73,982	76,207	78,879	82,998
Aged 14 years and younger	14,646	14,882	15,168	15,507	15,994
Aged 15 years to 44 years	26,867	27,225	27,580	28,443	30,060
Aged 45 years to 64 years	17,748	18,634	19,566	20,512	21,702
Aged 65 years and over	12,681	13,241	13,893	14,417	15,242
% of total population					
Aged 14 years and younger	20.4	20.1	19.9	19.7	19.3
Aged 15 years to 44 years	37.3	36.8	36.2	36.1	36.2
Aged 45 years to 64 years	24.7	25.2	25.7	26.0	26.1
Aged 65 years and over	17.6	17.9	18.2	18.3	18.4

Figure 9: Sunshine Coast Hinterland looking east from Montville in the Blackall Ranges

Table 14: Population age structure and increase in Maroochy Shire. From ABS, 2005b, 2005c

POPULATION — at 30 June	1999	2000	2001	2002	2003
Total - all persons	119,494	123,151	127,202	131,530	136,617
Aged 14 years and younger	25,516	25,907	26,383	27,107	27,698
Aged 15 years to 44 years	48,738	49,594	50,594	52,016	53,715
Aged 45 years to 64 years	28,427	30,019	31,743	33,367	35,298
Aged 65 years and over	16,813	17,631	18,482	19,040	19,906
% of total population					
Aged 14 years and younger	21.4	21.0	20.7	20.6	20.3
Aged 15 years to 44 years	40.8	40.3	39.8	39.5	39.3
Aged 45 years to 64 years	23.8	24.4	25.0	25.4	25.8
Aged 65 years and over	14.1	14.3	14.5	14.5	14.6

Tables 13 and 14 show there has been a substantial increase in the populations of both LGAs over the period 1999–2003. Caloundra gained approximately 11,000 people and Maroochy 17,000 over these five years. Over the ten-year period to 2001, the Sunshine Coast as a whole had an annual population growth rate of around 4% (SGS Economics and Planning, 2004). A 2003 population projection from the Queensland Department of Local Government and Planning suggests that the Sunshine Coast could have between 376,600 and 402,600 people by 2016 (Department of Local Government and Planning, 2004). South East Queensland has been the fastest growing region in Australia since the 1980s, and it has been predicted that it will have four million people by 2026 (Office of Urban Management, 2004).

Land supply for residential development in Caloundra and Maroochy has been analysed using the categories 'urban residential' (conventional and townhouse development) and 'low density residential' (lots greater that 4,000 sq m or a 'yield' of less than three lots per hectare). This analysis indicates that there are 1,489 ha of low density residential land available in Caloundra with an expected 2,070 new dwellings to be built on this land, and 2,677 ha in Maroochy, with an expected 2,824 new dwellings (Department of Local Government and Planning, 2004).

Ethnic diversity

There is a relatively low level of ethnic diversity in the region as a whole. If the number of multi-lingual residents is used as a measure, only 3.5% of the Sunshine Coast population spoke a language other than English. This is low in comparison with South East Queensland as a whole, where 9% of the population was multi-lingual. A large proportion of South East Queensland's NESB population is concentrated in the Brisbane metropolitan area (SGS Economics and Planning, 2004).

Income and employment

The official unemployment rate in Maroochy Shire for the September quarter of 2003 was 8.3% and in Caloundra, 8.6%. The rates in both shires decreased between 2002 and 2003.

The average annual taxable individual income in Maroochy Shire in 2002 was $32,717, and in Caloundra the comparable figure was $32,453. In 2001, wage and salary earners earned 57.7% of total personal income in Caloundra, and 61.5% in Maroochy. Government cash benefits comprised 19.2% of total personal income in Caloundra in 2001, and 17.0% in Maroochy.

The Hinterland economy is becoming more broadly-based with expansion in service and retail sectors, associated with expanding tourist and lifestyle interests, and population increase. Agriculture has been diminishing in significance, with marked decreases in employment in some industry sectors, for example dairying. In Caloundra City as a whole, information from the 2001 Census indicates that the clerical, sales and service sector is the major employment sector, with trades, professionals and associate professionals being the next most important sectors. The largest industry employer is the retail trade (18.8% of total employment), followed by construction (10.3%), health and community services (9.9%), and manufacturing (9.5%) (Caloundra City Council, 2004).

House and land prices have been increasing rapidly in the area. Figures given in *Caloundra Economic Update*, November 2004 show median house price increases of 40.5% in Landsborough, 36.5% in Glass House Mountains, and 28.6% in Maleny for the year leading up to the September quarter of 2004 (Caloundra City Council, 2004). Hinterland median house prices are, however, still well below those of the coast.

Transport and services

The main highway link to Brisbane is the Bruce Highway. In addition to reasonably close proximity to Brisbane Domestic and International air terminals, the Sunshine Coast (Maroochy) also has its own airport south of Coolum. A bus service provides door to door shuttle services connecting with flights. There are other local and inter-city bus services connecting with Brisbane and the Gold Coast.

Queensland Rail operates a regular service to and from Brisbane, stopping at the hinterland towns of Beerburrum, Glass House Mountains, Beerwah, Landsborough and Mooloolah.

Community groups

The Hinterland population has a reputation for being environmentally oriented or 'green', and having an 'alternative lifestyler' segment. The latter is reflected in a number of cooperative

enterprises in Maleny, including the Cooperative Credit Union and the Maple Street Coop (a food and produce store) run by the Maple Street Cooperative Society, which has as its mission statement 'Providing our community with healthy, ethical and progressive choices for personal and planetary well-being'. The existence of permaculture and organic food groups also demonstrates these kinds of interests in Maleny, as does the availability of alternative health practitioners (naturopaths, iridology, natural therapies), and education services (Ananda Marga).

There is an active Landcare group in the Maleny area, Barung Landcare. It takes the form of an incorporated association and lists 15 staff members in the February-March 2005 edition of its newsletter, *Barung Landcare News*. Barung Landcare runs a plant nursery and bookshop, offers land management contracting services, and conducts working bees, seminars, workshops and guided walks focusing on identifying and managing native vegetation, controlling weeds, and collecting native plant seed for re-vegetation activities. Some of the courses also cover matters like safe use of agricultural chemicals.

Natural resource and catchment groups in the area include the Burnett Mary Regional Group, the SEQ (South East Queensland) Western Catchments Group, and Natural Resource Management SEQ. These groups all administer funds from the NAP and the NHT, and manage approved projects.

Communication channels and media

The Sunshine Coast and hinterland receive the mainstream television channels, ABC, Seven, Nine/WIN, Ten, and SBS.

The following 15 radio stations are listed for the Sunshine Coast region as a whole: Coast FM ABC Radio – 90.3FM, Maroochydore; Noosa Community Radio, Noosa; Noosa 96.1 FM, Noosa Junction; Radio 4GY, Gympie; Rhema FM 106.5, Nambour; 91.1 Hot FM, Maroochydore; 91.6 Sea FM, Maroochydore; 92.7 Mix FM, Maroochydore; ABC, Maroochydore; ClassicHits 107.1FM, Noosa; Radio 4OUR, Caboolture; Radio Centre Gympie, Gympie; Sunshine Coast FM Tourist Radio, Moloolaba; Sunshine Coast Christian Broadcasting Association, Nambour; and Sunshine FM 91.9, Coolum Beach.

The main local newspaper is the *Sunshine Coast Daily*, published in Maroochydore. However, one interviewee commented that it tends to be read by people living on the coast, not by 'Hinterlanders', who see their identity as distinctly different. There is a free weekly Hinterland paper, *The Range News*, published in Maleny (see http://www.rangenews.com.au/). A retiree/senior citizens' newspaper is produced in the region, *Sunshine Coast Seniors Newspaper.*

Sites and events visited

The main sites, events and organisations visited, and information material collected, are listed in Appendix 6.

In addition to the sites mentioned in the Appendix, the towns of Yandina, Mapleton, Flaxton, Landsborough, Buderim, Glasshouse Mountains, Peachester and Caboolture were visited. Stops were made at roadside stalls with fresh produce, tourist information centres, and areas where land subdivisions were being advertised.

Markets in the region

Many markets operate in the Sunshine Coast and hinterland region. An information leaflet collected during the visit lists 26 markets. In addition, large farmers' markets are held in Brisbane and Noosa. An interviewee advised that one of the largest of the more broadly-based markets in the hinterland, with possible small landholder involvement, was the Eumundi Market. This market was visited, and details of observations are provided in Appendix 7.

Eumundi Market opens each Saturday (6.30am to 2pm) and Wednesday (8am to 1pm), and is located in the main street of Eumundi, Memorial Drive, near some of the town's historic buildings. The market is run by the Eumundi & District Historical Association. An information brochure is available about the market, which was established in 1979, and at least three local bus companies offer tours to it, with pick-up in Caloundra, Maroochydore, Mooloolaba, Coolum Beach or Noosa. The market has a website: www.eumundimarket.com.au, and advertises a policy of 'Make it, bake it, design it, sew it or grow it'. The information brochure indicates that the market has more than 500 stalls, offering a wide range of goods. It claims to be the 'Sunshine Coast's Premier Tourist Attraction'. Two other markets are held in Eumundi as well, the Old Eumundi Butter Factory Markets and Brewery, and the Eumundi Courtyard Village Markets.

On the Eumundi Market's website, under the heading 'Organics & Fresh Produce', six stalls advertising fresh produce are listed, and are presumably 'regulars; while under the heading 'Plants, Gardening & Ornamentals', ten stalls mention plants or flowers for sale (see Appendix 7). Contact details are given on the website for these stallholders but they are all likely to be mainstream commercial producers, not hobby farmers.

A systematic attempt was made to visit all fresh produce and plant stalls at the market, to note the nature and origin of the produce or plants, and talk to the stallholder(s) if possible. Details are given in Appendix 7. However, conversations were difficult because the market was busy and crowded, and stallholders wary. Writing up observations also attracted some attention. Virtually all stalls were under canvas at the time of the visit, and a few were housed in buildings on the site, including the School of Arts Hall, and on the adjoining main street of Eumundi. An ATM was available at the front of the Hall to facilitate cash transactions. There was a wide variety of goods on offer, including furniture, fabrics, clothing, handicrafts, prints and jewellery, and also personal services, including massage treatments.

No live animals were seen for sale at the market, but camel rides were being offered. The market website states that 'Due to food and hygiene regulations we do not permit animals in the market', although this advice is given in the context of advising visitors not to bring pets with them.

While these observations are incomplete, they suggest that a small number of the total of 21 stalls noted could be selling plants or, less commonly, produce, from 'backyard' or small-scale producers. Mainstream commercial producers appeared to be running the large majority of the produce and plant stalls, and some had formal brand names and relevant certifications displayed. Some stalls were an alternative sales outlet for shops in the Eumundi main street — owners taking advantage of the crowds attracted to the market. Much of the produce for sale came from hinterland locations like Woombye and Gympie.

Figure 10: Views of Eumundi Market

Interviews and interview findings

Interviewee characteristics

Eleven people were interviewed, two in a group interview. Three of the interviews were conducted by phone. The majority of interviewees (9) were from Queensland State Government agencies (DPI&F and DNRM), one was from Local Government, and one was an independent consultant and local landholder. In addition, informal conversations were conducted with Local Government information officers at Nambour, Caloundra and Caboolture, and with a researcher from Sunshine Coast University.

Perceptions of regional biosecurity issues

This question asked interviewees to indicate what they thought were the main biosecurity issues in their jurisdictional or interest area. Table 15 summarises the responses that could relate to peri-urban and lifestyle farmers, or components within this group (e.g. retirees).

Table 15: Regional biosecurity issues mentioned by Brisbane and Sunshine Coast interviewees

Socio-cultural	Chemical residues	Weeds	Pests	Diseases	
				Plant	Animal
Many people 'coming and going' Retirees travel – can be exposed [to diseases], go back to rural areas Animal and plant production 'right slap bang' up against urban development People bring material in illegally e.g. fruit budwood, seeds in envelopes etc. Unaware people sending items in mail [People] feeding food scraps to animals in country towns Food scraps being fed to pigs, swill feeding	Organo-chlorines (from cattle dipping) Spray drift and illegal plant sprays	Groundsel Rats-tail grass – people don't understand methods of transmission	Wild dogs – not domestic, self-sustaining populations Fire ants – still ongoing, affects everyone Papaya fruit fly Varroa mites on bees	Banana diseases – Fusarium, bunchtop, black cigatoka Citrus canker – big industry in State	Arbovirus e.g. blue tongue – have to maintain sentinel herds TSE – BSE and scrapie Tick fever Black leg Avian influenza Hendra virus – couple of recent small outbreaks Foot and mouth disease

Queensland has many issues of concern, associated with warmer climates that make it possible for tropical and sub-tropical weeds, pests and diseases to survive and spread. Many disease issues mentioned were particular problems in northern Queensland and were linked to movement of people, animals (including migratory birds and flying foxes), and plants across Torres Strait from Papua New Guinea and Indonesia to the north. The Northern Australia Quarantine Service and the Northwatch Program (the latter focusing on plant diseases) were discussed in this context.

Johnes' disease was not considered a major problem in Queensland, but there were other animal diseases that were serious issues, particularly avian influenza. An outbreak in which 20,000 chickens died had occurred several years ago and the affected property had been disinfected. Hendra virus (passed on by flying foxes and affecting horses and people), was still a concern and both a horse and a human death had been recorded from this disease since the original outbreak.

Chemical residue issues were part of Queensland interviewees' biosecurity concerns, and several referred to issues associated with spraying plants to combat diseases (use of illegal chemicals, spray drift etc.), or dipping animals to combat parasites like ticks. These practices could lead to unsafe chemical residue levels in food, for example organochlorines.

Interviewees also discussed animal welfare issues as part of biosecurity. It was reported that Queensland has rigorous animal welfare legislation but there are major issues associated with keeping horses, a common practice of hobby farmers. DPI&F is responsible for welfare issues but has arrangements with the RSPCA to deal with problems involving animals considered to be non-commercial, including horses.

Many interviewees discussed details of recent emergencies and campaigns to deal with them, particularly the current fire ant control measures, citrus canker outbreak, and control of banana diseases. Interviewees with animal health responsibilities discussed the tick control line and how it is maintained. There was also discussion of biosecurity false alarms, including reports of chicken manure being fed to cattle — on investigation these reports could not be substantiated.

Two specific examples were cited in which an emergency disease investigation or campaign had involved peri-urban producers — one was a possible outbreak of foot and mouth disease three or four years ago, and the other a recent banana disease outbreak in which 60% of infections had been found to be in non-commercial plantings.

Knowledge about landholders and land use change pressures

General comments were made to the effect that these landholders are diverse, have diverse reasons for being on the land, and engage in many activities. Interviewees commented that they were a poorly understood group and there was little systematic work on them. Some small landholders in the hinterland in particular were seen as being 'alternative lifestylers' with an interest in local and organically grown produce, and free-range eggs. Other components of the small landholder group were retirees and property investors, the latter attracted by recent large increases in property values. Another group of small landholders were hobby farmers in the more conventional sense, and were supplementing their incomes through local cash trade. Comments were made about absentee and weekender landholders as being a 'separate category'. One interviewee thought there were two major groups of small landholders: (1) affluent lifestylers — 'are educated and want to learn'; and (2) those who can't afford to live in the city and are a 'typical blockie' with 'an attitude to government'. Another interviewee commented that small landholders are often intelligent and well-educated, but some tend to be 'pie in the sky', extremist, or to have short lived interests. Other social differentiation was noted in the form of the view that 'greenies' lived in the south coast hinterland, while as you moved further north, small landholders became less and less sophisticated.

A number of comments were made to the effect that small landholders are rarely the target of government campaigns and do not fall into anyone's jurisdiction except that of Local Government.

Common land uses on lifestyle properties were described as being keeping poultry and horses, possibly small numbers of other livestock, and growing fruit and vegetables. Specialist plant production, including cultivating new varieties of garden plants, was also mentioned.

It was pointed out that many smallholdings already existed in the hinterland as a result of soldier settlement schemes and tobacco farming. Industry re-structuring and decline in commodity prices had resulted in many properties changing hands. Since the 1970s, 'fringe-acreage living' had expanded rapidly. However, it was reported that there was strong pressure for further subdivision in some areas. In Maleny, for example, three substantial subdivisions with an additional 90 allotments were coming onto the market. It was reported that in some parts of the hinterland, land values had increased 250–300% over the last two years, providing strong incentives for sale or sub-division. On the coast, prices were such that the demand was only for house blocks, but in the hinterland, people could often afford larger holdings. This in itself was suggested to be leading to a 'reverse sea change' phenomenon in which people living on the coast could afford to buy larger blocks and better houses if they moved inland.

Some conflicts between commercial producers and lifestyle landowners were mentioned. One, for example, involved a commercial pig producer whose property was described as 'pig heaven', but whose neighbours complained to the Qld EPA and local council. Similar issues were associated with commercial poultry farms. These conflicts often resulted from hobby and commercial farms abutting one another.

In relation to ethnic diversity, one opinion was that in the hinterland, NESB landholders are not a major group, and landholders with these backgrounds tend to be more concentrated in the outer suburbs of major cities. (This could be checked by examining relevant Census data.)

Small landholder, land use information and other databases

Many of the responses to this question indicated that there was a lack of systematic or comprehensive information on these kinds of landholders.

Information sources mentioned most frequently were DPI&F's Agricultural Property System (APS), and, in the future, the NLIS. Unique Property Identification Codes — PIC numbers — are assigned to properties in the APS. Owners of more than 11 head of cattle, sheep, goats or camelids (alpacas or llamas), are required under the Queensland *Stock Act 1915*, to register their property, and obtain tail tags if they wish to sell cattle. DPI&F also asks owners with less than 11 head of livestock to register so they can be assigned an organochlorine residue status, but this is not compulsory. In registering their properties, landholders complete a two-page form including their contact details, property address, property size, when they purchased the property, and lot or plan numbers. Owners with more than 11 head of livestock are also required to notify sale of their entire property, purchases of additional land, or sale of part of the property. Owners must be registered in order to sell livestock through saleyards and vendor declaration forms are required as part of sale transactions. Interviewees pointed out that the APS is not a comprehensive source of information about small landholders, and also mentioned that many people 'don't want their names on lists' and are suspicious of government.

Many more property registrations are likely to result from implementing the NLIS. Nonetheless, one interviewee thought that many people will not register as they may have one animal used as a 'lawnmower', and will continue 'to sit off the radar'. Also an evolution of the NLIS was needed to progressively incorporate livestock other than cattle.

DPI&F stock inspectors previously examined horses, but these inspections have been discontinued. They could have provided information and contact details for horse owners. Horse owners now tend to contact private vets with any animal health problems they experience. However, horse owners do still contact DPI&F if they need to apply for permission to take their horses across the tick line.

Interviewees with plant and animal health responsibilities reported that they have access to disease testing databases compiled as part of the process of certifying that properties are free from notifiable diseases. This certification is required if owners wish to export.

Other possible information sources mentioned included the Qld Household Survey conducted by the State Government Statistician. It surveys 200 households in each Qld Statistical Division, and new questions of interest to particular State Government agencies can be added. DPI&F included questions on swill feeding in a previous survey — responses indicated low awareness of issues associated with this practice, and a wide range of communication preferences among respondents. (The Household Survey does not focus on rural landholders and many respondents are likely to be urban-based.)

EPA licensing requirements were mentioned as another potential source of information, as were community service Departments including the Qld Department of Communities and the Qld Department of Health.

Local Governments and ratepayer listings were identified as a major source of information, but ratepayer listings do not identify land uses.

Industry groups, for example GrowCom, could cover some of the landholders of interest and might have lists and information about them.

Interviewees reported that State Government-held information can be used for other legitimate State Government purposes, and legal rulings have been made to this effect. Some information would be subject to confidentiality and privacy requirements.

Another possible source of information mentioned was landholder surveys funded under the NAP. Ten projects are currently funded in the South-East Queensland region, and reports are due soon. One interviewee was also aware of a current survey of landholders in the Queensland Murray-Darling Catchment [being undertaken by BRS], and thought that catchment management groups may succeed in obtaining funding for further surveys of this kind. Obtaining unpublished information or raw data from these surveys would be subject to approval by the relevant groups and funding agencies.

Markets were also mentioned as a possible source of information if stallholders could be traced back.

Small landholders and communication channels/networks

The communication channels interviewees thought could be used to contact small landholders are summarised in Table 16. These covered generic networks and media widely used throughout Queensland to some specific to the Sunshine Coast Hinterland, for example Barung Landcare networks and *Range News*. One interviewee noted the differentiation of communication networks and interests between ‘hinterland people’ and ‘coasties’, highlighting the fact that there can be marked social differences over relatively small distances.

Several interviewees commented that they would use their own knowledge and organisational contact lists to communicate with relevant people. Others commented that there is no one way to contact such a diverse group of people.

In regard to the communication networks they used themselves, some interviewees had been directly involved in emergency response campaigns and tended to emphasise the one-to-one, highly targeted methods that had been used. These often involved ‘door knocks’ as well as high profile mass media campaigns. For example, in the recent outbreak of endemic banana disease in which 60% of infections had been in non-commercial plantings, these infections were detected by working systematically from household to household in affected areas. If disease was detected in gardens, owners were required to destroy their banana plants. Directions were placed on properties and legal action taken if owners did not comply. Most people were cooperative and some even provided ‘tip-offs’ about other possible infection sites. Commercial and non-commercial growers were required to take the same actions.

Table 16: Communication channels and networks interviewees suggested to contact small landholders

Network/communication channel	Comments
Mass media	TV – community service announcements Local newspaper [in Hinterland] – *Range News* Ethnic newspapers Country and local newspapers Lifestyle programs Gardening Australia Small farmers' magazine produced in Sydney [*Town and Country Farmer*?] Use Margaret Gee's media guide
Local Government	Include info with rate notices
Existing events and public locations	Annual Royal Show (Brisbane) NLIS Field Days – critical to cattle producers Field days – wide range of these
Landcare network	Barung Landcare News-sheet Landcare groups
Industry/producer groups	AgForce Meat and Livestock Australia GrowCom
Through other existing organisations/interest groups	Neighbourhood Watch meetings Pony clubs Organic food growers Permaculture groups
Markets	Through farmers' markets Produce stalls
Stock and station agents/sales	Stock and feed stores, vaccine sales Cattle sales – people come and ask questions Blanket mail out using list of sellers from saleyards – entitled to do this under Stock Act
Rural services and contractors	Hardware stores Plant nurseries Retail sector – most are keen to cooperate

A number of interviewees were involved in responding to direct public enquiries via Departmental call centres, e-mail or letters. They also interacted directly with landholders when doing livestock or property inspections, and these visits offered opportunities to raise awareness of biosecurity issues.

There was discussion of 'spinning off' other media campaigns e.g. the AQIS *Quarantine Matters* campaign. It was thought that the heightened awareness of quarantine issues generated by this campaign could be used to good effect in pre-border or domestic quarantine campaigns aimed at the general public.

Some comments, including the ones pointing out the differentiation between coast and Hinterland people, highlighted the importance of a sense of community and community involvement in communication flows, and suggested that if this sense of community is mobilised there can be strong support for biosecurity campaigns. Related comments indicated that some campaigns, including the current fire ant program, have been very successful in involving communities and gaining widespread support.

Related projects and research work

Relevant projects and research that interviewees were aware of included:

- a report to the Council of Australian Governments (COAG) discussing the significance of peri-urban landholders in relation to cattle and control of foot and mouth disease (DAFF, 2005)
- work funded by the Research and Development Corporations

- Meat and Livestock Australia work on the export aspects of the beef industry
- feral animal and weed control work being undertaken by DNRM and QNPWS, and coordinated by an interagency pest management committee
- Qld EPA activities related to livestock industries
- activities of the Qld Biosecurity Advisory Committee
- activities of the Rural Women's Network (the interviewee was not sure about the extent of this group's involvement)
- NAP-funded projects being undertaken by CSIRO (Smith and Hearn) and the University of Queensland (Ross)
- the Northwatch Program and activities of the Northern Australia Quarantine Service.

7 Discussion and conclusions

This chapter provides an opportunity to consider the information obtained from reviewing previous work and conducting the case studies, and to examine how this information contributes to achieving the project's desired outcomes.

In this chapter, the findings across the three case studies and the literature review are summarised and compared, and are related to the study's original aims as set out in Chapter 1. In addition, some general conclusions and recommendations are developed.

Specific findings in relation to study aims

Identifying who may be being missed in existing biosecurity awareness campaigns

There is a segment of the population (as pointed out in the Queensland interviews in particular) that actively avoids and is suspicious of government, and who 'don't want their names on lists'. This segment is a particular challenge in communicating about and dealing with biosecurity risks. Campaigns using the two ends of the spectrum (mass media or direct door-to-door approaches in the case of emergencies) may reach them, but non-government, independent sources that they regard as credible and trustworthy also need to be enlisted. Community leaders and champions have a role in these efforts. These communication considerations apply to many NESB communities as well as the Australian-born population. Mistrust of government and other authority figures is a pervasive feature of modern societies and was also highlighted in a recent study of community perceptions of the aquaculture industry (Mazur, Aslin & Byron, 2005). The principles developed in previous studies, including those focusing on ethnic communities, can be applied. Legislative back up is needed for those community members who are uncooperative but they are likely to be a small minority in relation to biosecurity issues.

Absentee landowners, second and holiday home owners and newcomers who lack experience on the land comprise part of the peri-urban and smallholder population in many areas. These people are a challenge for communicators to reach and maintain contacts with, although they will be on ratepayer lists and these can serve as a way of contacting them. Interviewees suggested using Council 'Welcome' packs, newcomer networks, and working with real estate agents to contact new purchasers of land in regions of interest.

The diversity of the small landholder population, commented on by many interviewees, further emphasises the need to set priorities. It is extremely difficult to maintain ongoing links with a diverse and mobile population and requires considerable resources, as pointed out by one Bendigo interviewee. Under these circumstances, specific and targeted campaigns run as issues arise may be the only feasible option.

The peri-urban and rural lifestyle landowner category includes groups of people from both English- and non-English speaking backgrounds who actively avoid and are suspicious of government. It also includes absentee landowners, and second and holiday home owners who may be difficult to contact. The category as a whole is diverse and may be highly mobile. These characteristics mean that communicators need to set priorities and work strategically to contact and maintain links with the different segments within this broad landholder category, and to see that they receive basic information to raise their awareness of biosecurity risks.

Identifying practices of concern

Interviewees linked some biosecurity risks directly to small landholders and their practices. These included:

- the spread of existing pests and weeds (the most common link made – also supported in the study by Creeper & Nicholson, n.d.)
- risks related to poor pasture, land management or animal husbandry
- as specific evidence-based examples, the spread of banana disease and a suspected previous foot and mouth disease outbreak in Queensland.

Walsh's unpublished study in the Sydney Basin also implicated small and non-commercial producers in contributing to risks associated with swill feeding of pigs – a more specific aspect of poor animal husbandry practices. There was fairly widespread agreement from interviewees that many of these kinds of landowners lack experience on the land and do not know how to manage existing pests, weeds or diseases, and indeed may not be aware of risks associated with them at all. This was a common theme in all the case studies.

Risks most commonly associated with peri-urban and lifestyle landholders were risks of spreading existing pests and weeds; and risks associated with poor pasture, land management or animal husbandry practices. There was widespread agreement that many of these landholders lack experience on the land and may be unaware of biosecurity risks related to their practices.

Identifying how these people can be contacted, incorporated into biosecurity communication networks, and targeted in education and awareness campaigns

Many interviewees pointed out that there is no simple way of communicating with all these landowners, other than by very broad-brush approaches using the mass media, particularly television, or possibly through general mail outs using ratepayer lists. These broad-brush approaches are appropriate for general awareness raising. However, many different interests are represented among these landholders and many special interest groups exist related to different land uses, hobbies and other activities – specific examples of these groups were given in each of the case studies. Relevant groups need to be identified on a case-by-case basis by tapping into local knowledge and networks, and using local, regional and State-based experts, as was done in the case studies reported here.

At the level of individual landowners in regions of interest, communicators need to know about and use existing communication channels these landowners are familiar with wherever possible, not invent new ones. The work of Hollier and her colleagues in Victoria, and findings in this study, indicate that small lifestyle landowners tend to use horizontal not vertical networks. These are the often relatively informal networks that reflect their voluntary interests and do not relate to formal industry structures.

This study suggests that while networking possibilities vary widely by location, there are opportunities to tap into existing networks, particularly Landcare networks and communication channels established by Local Governments and CMAs. Biosecurity issues relating to pest and weeds fit well within their existing scope of interests and responsibilities, but dealing with other kinds of biosecurity issues may require some broadening of their scope.

Further discussions could be held with relevant umbrella organisations and regional groupings, and surveys done to investigate the capacity of these organisations to broaden their role in biosecurity risk communication and emergency responses.

Case study interviewees made many suggestions about other networks and service providers that could be used to contact small landholders — for example linking into real estate transactions via agents and brokers, and working through stock and station agents. These are all worth considering as part of communication campaigns.

This study found that many databases and lists exist in different jurisdictions and different agencies that cover some of the landowners of interest and could be used to contact them. These databases are associated with specific agency functions and responsibilities — examples were disease and chemical residue testing databases, and databases compiled as a result of requirements for livestock owners to register their properties in order to sell their stock through saleyards or stock and station agents. In relation to cattle, many interviewees pointed out that full implementation of the NLIS will provide more comprehensive listings of cattle owners than previously existed, but will not capture all the people of interest. Many smallholders do own a few livestock, so the NLIS and its evolution to include livestock in addition to cattle will help identify these owners. Nonetheless, people involved in cash transactions and those who keep livestock as pets or 'lawnmowers' are not likely to seek ear tags for them. Horses have been identified in this study as a major gap — many smallholders and hobby farmers do own horses but there is no requirement for them to register their ownership and ear tags are not appropriate for horses. Lack of information about horses and horse owners could be an issue if there was another outbreak of Hendra virus, for example. The fact that horse ownership is so widespread does seem to offer a possible conduit to many smallholders. There are large numbers of horse interest groups (pony clubs, equestrian, show-jumping, dressage, horse breeds etc.) that could be used to contact owners but will not include them all.

The only comprehensive and universally available listings of landholders are likely to be Local Government ratepayer listings, which include all landowners in the respective Council areas not only rural ones. In some cases, Local Governments have additional information in their databases or GIS links that allow specific searches to be done for landholders in particular planning zones or with properties of particular sizes. It seems clear that Local Government, as the direct and familiar face of government for many people, must have a major role both in communicating biosecurity risks and responding to emergencies. Local Government often sees itself as under-resourced and has limited capacity to take on additional biosecurity responsibilities without resources being provided (ALGA, 2005). A coordinated approach to Local Government may be warranted. This could involve ALGA, the Regional Organisations of Councils, CMAs and regional NRM groups as well as individual Councils.

In terms of providing services and designing communication and extension programs for small landholders, and showing how biosecurity can be incorporated, the Western Australian SLIS and SCPPP provide models that could be applied in other jurisdictions and regions where there are many small landholders. The Western Australian examples show how biosecurity can be included into mainstream NRM programs and activities, but also demonstrate the need for appropriate resourcing for these additional functions. The kinds of services and programs needed are ones that allow interactive dialogues; provide opportunities for people to engage with, discuss, learn and deliberate on issues; and allow them to build relationships, not merely receive information (Petts & Leach, 2000).

There is no simple way of communicating with all these landholders other than through very broad-brush, mass media approaches, particularly those using television advertisements, or general mail outs using Local Government ratepayer lists. These landholders have many different interests and many special interest groups and services exist related to their different land uses, hobbies and other activities. Relevant groups need to be identified on a case-by-case basis by tapping into local knowledge and networks, and using local, regional and State-based experts as appropriate to issues and locations. In terms of targeted and ongoing communication and extension services, the model provided by the Western Australian SLIS and SCPPP should be considered for possible application to other regions where there are many small lifestyle landholders.

How to motivate this audience

As mentioned above, appropriate ways of communicating with members of this audience include using their relatively informal networks and communication channels that support their current values and interests, and tap into a sense of community, either place-based or interest-based. Using community-based networks, developing a sense of community ownership of issues, and building broad community support are likely to increase the chances of campaigns being successful. This was reported as being a major contributor to the success of the fire ant control campaign in south-eastern Queensland.

Because of the broad characteristics of these landowners and the fact that their incomes do not necessarily depend on how they manage their properties or animals (these are value- and interest-based activities not purely economic ones), communication and extension activities need to apply adult learning principles, group-based approaches, tap into non-utilitarian value sets, and offer activities outside normal working hours as exemplified in the SCPPP in Western Australia. Mobilising existing values and relating biosecurity activities to these values is the best way of motivating these kinds of small landholders to take action. The existing values of many people in this landholder segment relate to community, family, lifestyle, environment, sustainability and intergenerational concerns.

The case studies suggested that many of these landowners express a willingness to cooperate with government when biosecurity issues are raised directly with them (as indicated by the study of apple and pear orchards in the Adelaide Hills and interviewee reports of reactions to measures to deal with outbreaks of banana disease in Queensland). They may not be aware there is a problem until they are contacted directly. General awareness raising is clearly needed as many of these landholders have limited experience on the land and are not linked into producer networks where they might hear about biosecurity issues and how to deal with them.

Even well-intentioned landowners face barriers to participating in communication and extension activities and taking action to reduce biosecurity risks on their properties — these barriers are the familiar ones of lack of knowledge and expertise, and lack of time. Communicators and extension officers need to try to reduce the opportunity costs of being involved in these activities and avoid over-burdening community-minded volunteers who may already have a number of other roles and responsibilities. Time not money may be the main issue for landholders who have off-property income sources. Incorporating communication and extension into their familiar routines; employing the information sources, people and networks they already use and trust; and making it as easy as possible for them to participate in activities aimed a improving their ability to manage biosecurity risks; are the approaches most likely to be successful in reaching them and motivating them to act.

Appropriate ways of communicating with members of this audience include using the often relatively informal networks and communication channels supporting their current values and interests, and mobilising their sense of community, either place-based or interest-based. Communication and extension activities for them need to apply adult learning principles, group-based approaches, tap into non-utilitarian value sets, and offer activities outside normal working hours. Mobilising these landholders' existing value sets and relating biosecurity activities to these values is the best way of motivating them to take action. Existing values of many in this landholder segment relate to community, family, lifestyle, environment, sustainability and intergenerational concerns.

General points

Biosecurity and its scope

Biosecurity is a relatively new and holistic concept that tends to be perceived differently by different groups. As observed in this study, interpretation, scope and focus vary among organisations and among professional agency staff working in these organisations. This was demonstrated in the definitions cited in Chapter 1, and by the differing interpretations from people interviewed in the case studies. For example, the Queensland interviewees included chemical residue issues and also discussed animal welfare as part of biosecurity — these aspects were not a focus for interviewees in the other case studies. This difference relates to how biosecurity responsibilities are integrated into existing departmental structures and related to traditional departmental responsibilities like chemical residue testing, as well as to the different kinds of risks faced in different jurisdictions. While the Food and Agriculture Organisation's definition of biosecurity included specific mention of GMOs, they were not mentioned in the interviews, probably because GMO issues are being dealt with in different agencies from the ones that interviewees came from, or in parts of agencies that are separate from biosecurity functions.

A conclusion arising directly from these observations is that few if any current government agencies have sufficiently broad responsibilities, legislative mandates or expertise to be able to consider biosecurity in a comprehensive way. This relates to the fact that biosecurity cuts across existing departmental boundaries and legislative responsibilities, and does not fit neatly within existing agencies. This is particularly so when the possible need for involvement from the human health sector is also considered. Issues relating to coordinating and integrating biosecurity research or communication activities need to be taken up to a higher strategic level, and formal inter-agency cooperation sought if biosecurity is to be dealt with in a comprehensive way and whole of government approaches or cross-sectoral cooperation achieved.

Agency responsibilities and landowner contacts

The interviewees in this study saw peri-urban landowners and their practices through somewhat different 'lenses' according to their respective roles and responsibilities, and had correspondingly different kinds of knowledge about them. Interviewees' knowledge of these kinds of landowners came largely from their direct interactions with them in carrying out assigned responsibilities, for example, WA interviewees who conducted seminars for small landholders as part of the SCPPP, and Qld interviewees who carried out stock inspections as part of their animal health responsibilities. In many cases, these activities were not specifically focused on small landholders but included them incidentally as part of activities

aimed at protecting agricultural production, particular industries, catchments or the environment, improving land management practices, or dealing with planning matters.

In view of the importance of these interactions in allowing both small landholders and agency staff to learn about one another, interviewees expressed concern that a number of programs and activities which previously created opportunities for interactions no longer existed. Examples were advisory and inspection services for horse owners in Victoria and Queensland, and Victorian programs focused on farming futures and small farm diversification. Victorian interviewees reported an increasing emphasis on mainstream commercial agricultural producers, and both Queensland and Victorian interviewees mentioned services previously provided by the State Government being outsourced (for example the tick spray stations in Queensland).

Local Government tends to have the most direct interactions with small landholders, but Councils have greatly varying resources and capacity to deal with biosecurity issues, and do their best to incorporate these new concerns within their existing responsibilities and using their existing staff. Few Councils would be likely to have the capacity to set up programs specifically aimed at small landholders.

Significance of the peri-urban landholder segment

In spite of a relative lack of direct focus on these kinds of landholders, interviewees in all three case studies agreed that small and non-farmer landholders were an increasing segment of the rural land-owning population in their areas, and that pressure for further rural land sub-divisions to cater for this segment was continuing. This view is supported to some extent by quantitative information presented about sub-divisions, availability of new land parcels, housing approvals in Victoria and Queensland, and the number of farms less than 100 ha in size in Victoria (Barr & Karunaratne, 2001). It is also supported indirectly by the socio-demographic data about 'population turnaround regions' presented in Burnley & Murphy (2004). However, much existing information about population movements does not distinguish between people moving to urban versus rural situations outside the major cities, or between people moving to existing rural properties versus new subdivisions. The view expressed by Hodges (2005) that numbers of peri-urban farms are *declining* may be due to the fact that the ABARE small farms and other industries survey focuses on commercial farming activities, which peri-urban landholders may not be involved in at all. The decline in numbers of peri-urban *farms* (in the primary production sense) reported by Hodges could, for example, reflect the fact that some of these farms are being overtaken by sub-divisions or are being taken out of primary production in other ways.

Markets and direct selling

Observations were made in this study and in the report by Coster (2004) on increasing numbers of farmers' markets, mixed markets and, to a lesser extent, roadside or farm-gate sales where producers sell directly to consumers. While the rise of these markets has been interpreted as evidence of consumers wanting to source fresh produce cheaply, deal directly with producers, or support local economies, it can also be interpreted as indicating that the cash economy is becoming more important both for producers and consumers. By its very nature, this informal economy is very hard to 'get a handle on'. The limited observations made in this study indicate that a small proportion of stallholders at the mixed markets visited in the case studies were backyard or hobby farm producers, mainly selling plants. Regulation of these markets is an issue as there appears to be no uniform approach from governments or formal acceptance of responsibilities for checking that produce is free from biosecurity risks. In some cases State or Local Governments are checking markets or imposing conditions. A degree of self-regulation was apparent in the form of stallholders displaying certifications at

markets visited in this study, and by market managers requiring stallholders and visitors to comply with certain conditions.

Research issues

It appears from this study, bearing in mind that the case studies only covered locations in three States, that there is relatively little research currently being conducted specifically on peri-urban landholders, on the socio-economic aspects of biosecurity, or on the intersection between the two. With the exception of the small landholder research in Victoria; the mapping and database research proposed for the SLIS, within the Western Australian Department of Agriculture; and the incidental inclusion of small, non-farmer landholders in a range of catchment-based landholder surveys funded under the NAP; there is little focus on this group even though there is evidence they are an expanding segment of the rural landholder population. This expansion was noted in different ways in all the case studies, including the Western Australian one where a Department of Agriculture estimate is that there are now 53,000 landholders of this kind in the State. The relative lack of research on these landholders contrasts with extensive research focused on commercial farmers and their families. It should be noted, however, that definitional issues arise as small and peri-urban landholdings can be commercial farms depending on definitions used, and farm families' dependence on primary production, and ratio of on- to off-farm income can vary greatly from year to year.

Some specific landowner surveys have been done using ratepayer lists, mainly for catchment management purposes. These surveys have not focused on biosecurity issues or risk practices, although they provide useful information about landholder characteristics, values and attitudes, and general land uses. Assessing biosecurity risks requires more detailed knowledge about landholder behaviour, and purpose-designed surveys asking about identified risks in particular locations are needed to collect this kind of information.

As Green (2001) concluded in reviewing biosecurity-related research in New Zealand, there is a need for more attention to multidisciplinary research, including social and economic research, to ensure that biosecurity measures are developed that meet economic and social expectations, and enable cross-sectoral communication and integrated responses to emergencies. At present, biosecurity research appears to be largely focused on biological aspects of particular risks, often takes a single species or single issue approach, and in many cases has an industry focus. This kind of research is of course vital and needs to be complemented by approaches from other disciplines and by a balancing focus on social and economic aspects of biosecurity.

Research and communication priorities

Because of the complexity of the issues and the need for a coordinated national approach, priorities both for biosecurity research and communication need to be first identified at the national level. A multi-criterion approach drawing on a number of sources of information can be applied to help develop priorities. The national audit of peri-urban agriculture recently completed by Houston (2005a), for example, provides information about the value of agriculture in peri-urban areas Australia-wide. This could be used as part of a priority setting exercise that includes considering extent of threats to agricultural production. The concentration of agricultural production in peri-urban areas means that many of these threats could be very serious from an economic viewpoint.

Once national and regional priorities are identified, the approach taken in the case studies, which uses social profiling techniques and taps into local knowledge, could be applied to develop specific research and communication strategies within priority regions. This approach resembles in some respects the one taken in the NAP, but does not require new groups or

organisations to be set up if current ones are already incorporating biosecurity into their agendas or are prepared to do so. As pointed out earlier in the report, weeds and pests are already on the agenda for many NRM and environmental groups, but not necessarily other biosecurity threats. Existing groups are of course likely to require additional resources to take on broader biosecurity responsibilities than they have at present.

Research and communication strategies

This study suggests that a multi-level or 'nested' approach is needed both to developing biosecurity research strategies and biosecurity communications campaigns. Strategies and campaigns also need to identify agency and organisational responsibilities at each level (Figure 11). As you move to lower levels, so the range of potential players and possible communication channels increases. Similar issues of organisational responsibilities and coordination among jurisdictions have been raised in evaluating the national foot and mouth disease simulation exercise, Exercise Minotaur (DAFF, 2005).

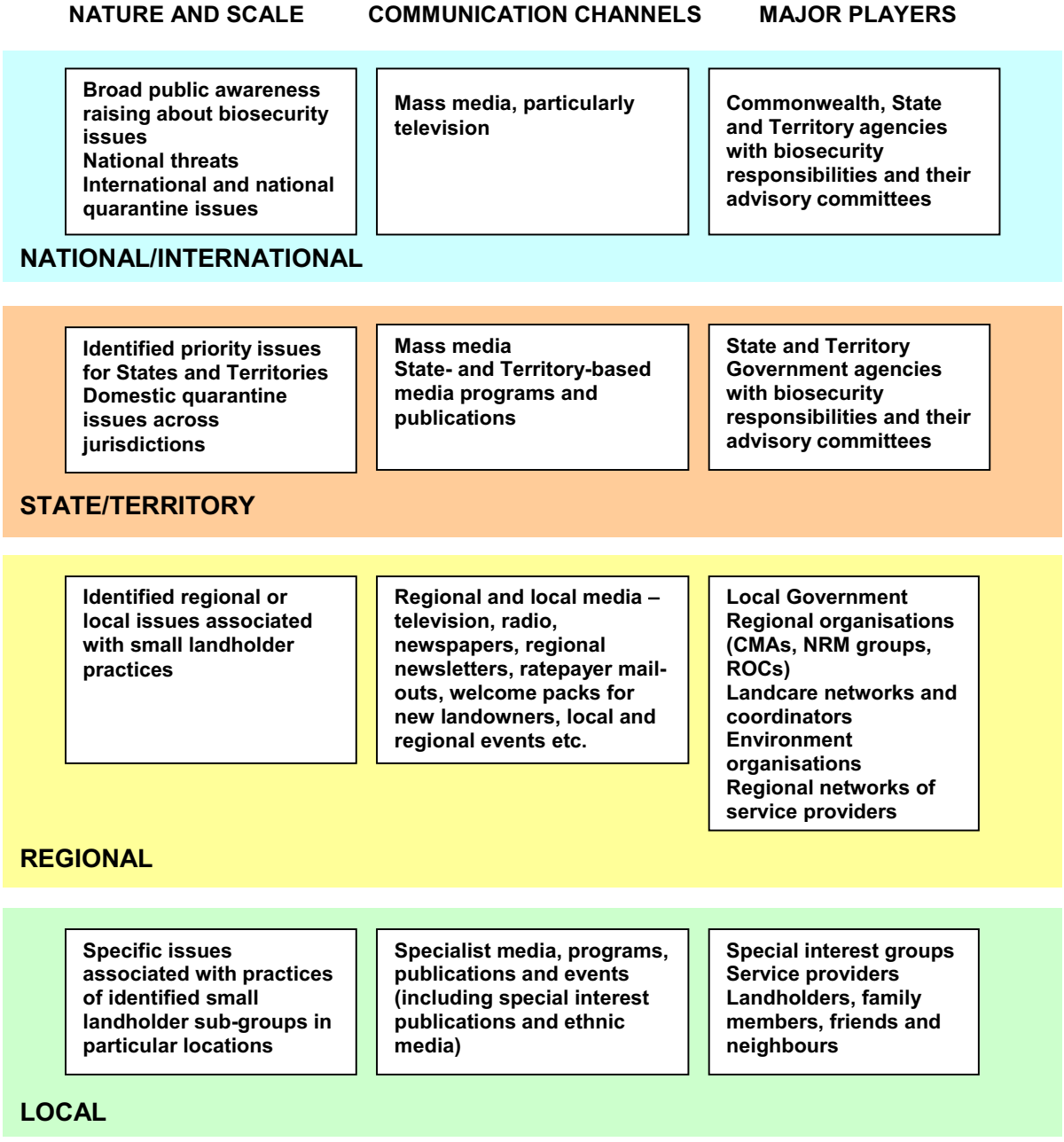


Figure 11: Multi-level communication strategy for biosecurity issues involving small landholders

Communication strategies can cover a wide range of activities from those that have an aim of raising general public awareness of broad biosecurity issues, through to highly specific campaigns directed at addressing particular threats posed by identified sub-groups. The level, nature and scale of the campaign, and the issues it aims to address, are critical in deciding what networks and communication channels to employ. As described in the case studies, highly targeted and localised campaigns have been run where particular issues or emergencies have arisen (for example outbreaks of banana diseases, citrus canker and avian influenza); and on the other hand, high profile and broadly based public awareness campaigns have been used that focus on general topics (animal and plant health for example, as in the case of the public service announcements being run by the Queensland DPI&F). Broad campaigns by their very nature need to employ the mass media — there is no other easy way to contact large numbers of people rapidly. However, to come to grips with specific segments among small landholders and to communicate effectively about specific risks associated with their practices, a much more targeted and strategic approach is needed, and one that attempts to anticipate emerging risks rather than being purely reactive.

The case studies completed in this study, and particularly the communication channels and networks identified in each, demonstrate how this targeted approach can be developed at a regional level to reach peri-urban landholders in general, or particular segments within this broad category whose practices raise biosecurity concerns.

References

ABARE 1997 Changing structure of farming in Australia. *ABARE Current Issues*, July 1997, no.4, pp.1–7.

ABS 2005a National regional profile for the Greater Bendigo City Council Area. ABS, Canberra.

ABS 2005b Regional profile. Caloundra (C) ABS cat. no. 1379.0.55.001. ABS, Canberra.

ABS 2005c Regional profile. Maroochy (S). ABS cat. no. 1379.0.55.001. ABS, Canberra.

Aslin, H., Kelson, S., Smith, J. & Lesslie, R. 2004 *Peri-urban landholders and bio-security issues — a scoping study*. BRS, Canberra.

Australian Local Government Association 2005 *2004–05 National NRM survey of coastal Councils*. Australian Local Government Association, Canberra.

Barclay, E. 2005 *Biosecurity on farms: summary of the main findings of a survey of producers.* RIRDC, Canberra.

Barr, N. & Karunaratne, K. 2001 *Victoria's small farms*. NRE Technical Report. Centre for Land Protection Research, Department of Natural Resources and Environment, Bendigo.

Beeston, G.R., Hopkins, A.J.M, & Sheperd, D.J. 2002 *Land-use and vegetation in Western Australia: National Land and Water Resources Audit Report.* Western Australian Department of Agriculture, Perth.

Barnes, P. 2002 Approaches to community safety: risk perception and social meaning. *Australian Journal of Emergency Management*, Autumn 2002: 15–23.

Black, A., Duff, J., Saggers, S. & Baines, P. 2000 Rural communities and rural social issues: priorities for research. RIRDC Publication No. 00/130, RIRDC, Canberra.

Bunker, R. 2003 Prospects for the rural-urban fringe in Australia: observations from a brief history of the landscapes around Sydney and Melbourne. *Australian Geographical Studies* 41(3): 302–323.

Burnley, I. & Murphy, P. 2004 *Sea change: movement from metropolitan to Arcadian Australia*. University of NSW Press, Sydney.

Caloundra City Council 2004 *Caloundra economic update.* Vol. 3, November 2004.

City of Swan 2004a http://www.swan.wa.gov.au, accessed 20/04/05.

City of Swan 2004b City of Swan: a basic statistical profile. City of Swan, Midland, Western Australia.

Conkey, H. 2004 National crisis communication arrangements for agricultural emergencies. *Australian Journal of Emergency Management* 19(3): 43–46.

Coster, M. 2004 *The value of 'new generation' farmers' markets to the community: perspectives of market managers.* DPI, Melbourne.

Creeper, D. & Nicholson, H. (n.d.) *Derelict pome orchards in South Australia. Examining removal and management strategies.* Primary Industries and Resources South Australia, Adelaide.

Creeper, D., Nicholson, H. & Willing, K. (n.d.) *Derelict pome orchards in South Australia. Codling moth host identification: helping to reduce pesticide use in the Adelaide Hills.* Primary Industries and Resources South Australia, Adelaide.

Crosthwaite, J. 2003 Current ideas on ways to get long-term involvement in biodiversity maintenance. Proceedings of the Conference on Rural Land Use Change, DSE, Melbourne.

Curtis, A., MacKay, J., Van Nouhuys, M., Lockwood, M., Byron, I. & Graham, M. 2000 *Exploring landholder willingness and capacity to manage dryland salinity: the Goulburn Broken Catchment.* Report No. 138, Johnstone Centre, Charles Sturt University, Albury.

DAFF 2003 *Review of the National Landcare Program*. DAFF, Canberra.

DAFF 2005 *National foot-&-mouth disease simulation. Exercise Minotaur evaluation report.* A report to the Council of Australian Governments. DAFF, Canberra.

Daniels, T. & Bowers, D. 1997 *Holding our ground: protecting America's farms and farmland.* Island Press, Washington DC.

Department of Infrastructure (n.d.) *Regional matters: an atlas of regional Victoria.* Department of Infrastructure, Melbourne.

Department of Local Government and Planning 2004 Sunshine Coast overview. Broadhectare study — Sunshine Coast. Department of Local Government and Planning, Brisbane. http://www.lgp.qld.gov.au/

Department of Natural Resources and Environment and North Central Catchment Management Authority 2002 *A regional response to climate change: land use change and revegetation in North central Victoria*. (Pamphlet) Department of Natural Resources and Environment and North Central Catchment Management Authority, Melbourne.

Department of Primary Industries 2004 *Biosecurity Victoria. Ensuring a safe food chain for growing Victoria's primary industries.* Department of Primary industries, Melbourne.

Department of Sustainability and Environment 2005 *Victoria in Future 2004. Summary. Greater Bendigo (C).* Department of Sustainability and Environment, Melbourne.

Eggleston, G. & Koob, P. 2004 The role of local government in agricultural emergencies. *Australian Journal of Emergency Management* 19(3): 29–31.

EMD Multicultural Marketing and Management 2001 *The Agriculture-Advancing Australia Campaign: communicating to non-English speaking primary producers.* EMD Multicultural Marketing and Management, Chippendale, NSW.

EMD Multicultural Marketing and Management 2004 *An education and awareness campaign on biosecurity for primary producers from non-English speaking backgrounds.* EMD Multicultural Marketing and Management, Chippendale, NSW.

Farmar-Bowers, Q. 2003 Trying to understand 'why' people change land use. Proceedings of the Conference on Rural Land Use Change, DSE, Melbourne.

Gorrie, G. 2004 Review of quarantine systems and biosecurity management. Report for the Tasmanian Department of Primary Industries, Water and Environment, Hobart, Tas.

Green, W. 2001 *Review of current biosecurity research in New Zealand.* Wren Green Ecological Consultants.

Hamilton, C. & Mail, E. 2003 *Downshifting in Australia: sea-change in pursuit of happiness.* Australia Institute, Canberra.

Hodges, A. 2005 *Literature review of peri-urban farm activities. A report prepared by ABARE for the National Landcare Program Monitoring and Evaluation Project 2003–06*. ABARE, Canberra.

Hollier, C., Francis, J. & Reid, M. 2004 Rural-peri-urban interface and extension. National Extension Policy Forum. http://www.extensionpolicy.com.au/papers.php?arid=34, accessed 23 November 2004.

Hollier, C., Reid, M. & Francis, J. 2003 Small and lifestyle farms: has the horse bolted for biodiversity gains? Proceedings of the Conference on Rural Land Use Change, DSE, Melbourne.

Houston, P. 2005a Identification of peri-urban regions. [CD containing Word, PDF and Excel files showing national analysis using ABS data, produced for RIRDC project, 'National audit of peri-urban agriculture'.]

Houston, P. 2005b Re-valuing the fringe: some findings on the value of agricultural production in Australia's peri-urban regions. *Australian Geographical Studies* 43(2): 209-223.

Hugo, G. 2002 Regional Australian populations: diversity dynamism and dichotomy. Paper presented at the Academy of Social Sciences Session on Rural Communities at the *Outlook 2002* Conference, Canberra, 5–7 March.

Johnson, T.G. 2001 The rural economy in a new century. *International Regional Science Review* 24(1): 21–37.

Johnson, N.L., Kelleher, F.M. & Chant, J.J. 1998 The future of agriculture in the peri-urban fringe of Sydney. Proceedings of the 9th Australian Agronomy Conference, Wagga Wagga, pp.613–616.

Kelleher, F.M., Chant, J.J. & Johnson, N.L. 1998 Community expectations and perceptions of agriculture in peri-urban regions. Proceedings of the 9th Australian Agronomy Conference, Wagga Wagga, pp.617–620.

Lesslie, R., Barson, M., Bordas, V., Randall, L. & Ritman, K. 2003 *Science for Decision Makers: land use mapping at catchment scale: information for catchment solutions*. BRS, Canberra.

Mackay, H. 1998 *Mind and mood.* The Mackay Report No. 91. Mackay Research, Sydney.

Martin, M.A. 2001 The future of the world food system. *Outlook on Agriculture* 30(1): 11–19.

Murphy, S. 2003 'Urban sprawl'. *Landline* 2/3/2003. http://www.abc.net.au/landline/stories/s791453.htm , accessed 28/1/05

Mazur, N., Aslin, H. & Byron, I. 2005 *Community perceptions of aquaculture: final report.* Bureau of Rural Sciences, Canberra.

McKenzie, F. 1996 *Beyond the suburbs: population change in the major exurban regions of Australia.* Australian Government Publishing Service, Canberra.

McRostie, P. (in prep, 2005) Land management guide for small rural landholders. North Central Catchment Management Authority, Huntly.

Morgan, W.C. 2003 Communication with Asian non-English speaking background vegetable growers. RIRDC Publication No 03/034, RIRDC, Canberra.

New Zealand Controller and Auditor-General 2002 *Ministry of Agriculture and Forestry: management of biosecurity risks.* Wellington, New Zealand.

Office of Urban Management 2004 *Draft SEQ Regional Plan. Summary. South East Queensland: Our future, our choice.* Office of Urban Management, Brisbane.

Parker, F. 2000 *The safe use of farm chemicals by market gardeners of non-English speaking background.* RIRDC Publication No 001/180, RIRDC, Canberra.

Pepperdine, S. & Thomson, D. 2002 *North Central social benchmarking project. Final report.* Landscape and Social Research, Mount Lonarch.

Penman, D.R. 1998 *Managing a leaky border: towards a biosecurity research strategy.* Report No. 81, Ministry of Research, Science and Technology, Wellington.

Petts, J. & Leach, B. 2000 *Evaluating methods for public participation*. R&D Technical Report E135, Environment Agency, Bristol.

Primary Industries Ministerial Council 2004 National communication arrangements for pest and disease emergencies. Resolution No: 5.15. Primary Industries Ministerial Council, Adelaide, 19 May 2004.

Salt, B. 2001 *Big shift: welcome to the third Australian culture: the Bernard Salt report.* Hardie Grant Books, South Yarra.

Salt, B. 2005 'Homing workers seek lifestyle roosts.' *The Australian*, 17 February, p.48.

SGS Economics and Planning 2004. *Sunshine Coast regional economic development strategy*. SGS Economics and Planning.

Smailes, P.J. 2002 From rural dilution to multifunctional countryside: some pointers to the from South Australia. *Australian Geographer* 33(1): 79–95.

Stimson, R. 2001 Dividing societies: the socio-political spatial implications of restructuring in Australia. *Australian Geographical Studies* 39(2): 198–216.

Walsh, N. (unpublished) Trading patterns and disease risk factors in pigs in the Sydney Basin. Final year B.Sc.Ag. project, Faculty of Veterinary Sciences, University of Sydney, Sydney.

Western Australian Department of Agriculture 2003 *Biosecurity for small landholders*. Western Australian Department of Agriculture, Perth.

Western Australian Department of Agriculture 2002 Farmnote no. 71/2002, Western Australian Department of Agriculture, Perth.

Yin, R.K. 1989 *Case study research: design and methods*. Second edition. Sage Publications, Thousand Oaks, California.

Yin, R.K. 1993 *Applications of case study research*. Sage Publications, Newbury Park, California.

Glossary

ABARE — Australian Bureau of Agricultural and Resource Economics (Australian Government)

ABN — Australian Business Number

ABS — Australian Bureau of Statistics (Australian Government)

AHA — Animal Health Australia (Australian Government)

APS — Agricultural Property System (Qld)

AQIS — Australian Quarantine Inspection Service (Australian Government)

BRS — Bureau of Rural Sciences (Australian Government)

BSE — Bovine Spongiform Encephalopathy ('mad cow' disease)

CBD — Central Business District

CMA — Catchment Management Authority

COAG — Council of Australian Governments

CRIS — Client Retrieval Information System (WA)

DAFF — Department of Agriculture, Fisheries and Forestry (Australian Government)

DEH — Department of Environment and Heritage (Australian Government)

DLGRD — Department of Local Government and Regional Development (WA)

DPI — Department of Primary Industries (Vic.)

DPIWE — Department of Primary Industries, Water and Environment (Tas.)

DPI&F — Department of Primary Industries and Fisheries (Qld)

DNRM — Department of Natural Resources and Mines (Qld)

DSE — Department of Sustainability and Environment (Vic.)

EPA — Environment Protection Authority or Agency

GIS — Geographic Information System

GMO — Genetically Modified Organism

GST — Goods and Services Tax

LGA — Local Government Area

MRST — Ministry of Research, Science and Technology (NZ)

NAP — National Action Plan for Salinity and Water Quality

NESB — Non-English Speaking Background

NHT — Natural Heritage Trust

NLIS — National Livestock Identification System

NRM — Natural Resource Management

OJD — Ovine Johne's Disease

PaDIS — Pest and Disease Information Service (WA)

PHA — Plant Health Australia (Australian Government)

PIAPH — Product, Integrity, Animal and Plant Health (Division of DAFF)

QNPWS — Queensland National Parks and Wildlife Service

RDC — Regional Development Council

RLPB — Rural Lands Protection Board

ROC — Regional Organisation of Councils

SCC — Swan Catchment Council (WA)

SCPPP — Swan Canning Property Planning Project (WA)

SLA — Statistical Local Area

SLIS — Small Landholder Information Service (WA)

SRT — Swan River Trust (WA)

TSE — Transmissible Spongiform Encephalopathy ('mad cow' disease and scrapie)

WALGA — Western Australian Local Government Association

Appendix 1: Small Landholder Information Service and Swan Canning Property Planning Project communication materials

Type of product/ programme	General topics covered	Biosecurity topics covered
Booklets	*Property Planning Manual for the Swan-Canning Catchment* — steps and tools for property planning, setting goals, plan implementation and monitoring, property management problems	• dieback • weeds and weed control • insect and animal pests • key livestock and horticultural management practices
	Practical guide for owners of small rural landholdings — Department services, benefits and requirement of property planning, managing land degradation, native vegetation protection, water management, orchard and vineyard management, pasture carrying capacity, being good farm neighbours, contacts and further information	• weeds and weed control • insect pests and management • animal pests and management • livestock diseases • notification requirements
	Stocking rate guidelines for rural small holdings — definitions of small holdings and stocking rates, stocking rate units, landscape systems, further information	• not specifically
Brochures	*SLIS* — alerts landholders to existence of SLIS and issues facing landholders	• controlling weeds • controlling feral animals • caring for animals' health • effective insect control • recognising animal and plant pests and diseases
	It's your land — introduces the SCPPP activities, includes mail-in form for further information form	• the need for weed control
	Biosecurity for small landholders — biosecurity definition for small landholders, the need for good farm planning, common biosecurity risks, contacts for further information (including SLIS)	• see previous column
	Pasture management — benefits of good practices, value of property planning, soil and pasture types, fertiliser use, grazing management, sprinkler irrigation	• control of weeds • insect control
	Declared plants & other weeds — pictures of common and declared weeds, their locations, and their impacts on stock, contacts for further information (including SLIS)	• control of weeds
	General property care — benefits of property planning, how to get involved, contacts for further information	• not specifically
	Land management issues in the Swan and Canning Catchments — introduction to catchment management, land degradation, water supply, fire control, contacts for further information	• control of weeds • vermin control • animal (stock) health
	Agricultural definitions for small landholders — list of definitions for common WA agricultural terms, further reading	• includes definition of biosecurity, some diseases, and practices
Farm note series	*Preventing soil erosion and tree damage on small holdings* — soil and pasture types, stock carrying capacity, grazing management, fertiliser use, further reading	• not specifically

	Sprinkler-irrigated pastures for small holdings — pasture establishment, fertiliser use, water quality & quantity, further reading	• not specifically
	Buying a small landholding — challenges of owning small holdings, need for good planning, criteria for choosing sites, required approvals, further reading	• not specifically
	Livestock on small landholdings — regulations for keeping stock, general considerations for keeping stock, further reading	• weed control • purchasing and keeping healthy animals
	Selecting tree varieties for small landholdings — how to choose tree types, rainfall, soil types, site preparation, native species, uses for trees, further information	• weed control
	Annual pasture establishment in Central Swan Coastal Plain and Hills region — reseeding, soil testing, methods for pasture establishment, soil types, further reading	• spring weed control
	Oaten hay production in Central Swan Coastal Plain and Hills region — hay varieties, sowing time, soil testing, site preparation, harvesting practices, production per hectare	• not specifically

Appendix 2: Market observations from the City of Swan case study

Details of markets visited in the City of Swan and neighbouring region

Bunbury Growers' Market

- located in outskirts of Bunbury
- sole occupant of a one story building (small warehouse)
- sells a range of fruits and vegetables and eggs
- all produce sourced from commercial farmers; Market Manager specified that smaller-scale producers are a quality control risk, and that he prefers to work with experienced growers with whom they have established relationships
- only keep contact details on those producers
- their producers also sell on to other suppliers
- bigger growers don't like to deal with smaller markets, as they cannot take on bigger quantities of their produce

Vasse Markets

- small scale, outdoor market with temporary 'stalls' (mostly people selling at tables set up next to their vehicles) and using an old building in a small town
- a mixture of plants, fruit and veg, eggs, baked goods, clothing, nic-nacs, condiments, some hot food
- Market Manager leases site from Vasse Local Government; she was formerly a stallholder; she must comply with standard Health Dept requirements re: serving food
- She had little information about the stallholders apart from their names and telephone numbers; but mentioned there was a core of the same stallholders, some attended seasonally; stallholders made cash payments directly to her
  - **Stallholder 1**: Woman selling native plants; she used to be in the commercial nursery business, now grows plants on her small property for ½ the year; she believed there are others in similar situations – people with commercial experience who are now in the business on a part-time basis and sell at markets like this; conversely there are people who sell at markets for a hobby and make a bit of money on the side; she believed it was easy to discern the differences between the two types
  - **Stallholder 2**: Retired man selling 12 and 18 month old chickens out of the back of his utility; he buys them as chicks and raises them on his ½ acre property; while selling three of them to a young couple, he mentions that they have been vaccinated
  - **Stallholder 3**: Man selling vegies; a potato farmer with two properties (80 ha and 400 ha); brings his excess corn harvest to the markets, the bulk of which he sells to the big Perth markets; the corn is grown after the potatoes are harvested
  - **Stallholder 4**: Men selling organic produce and pickles; run a organics store
  - **Stallholder 5**: Woman selling water hyacinths; runs a commercial nursery
  - **Stallholder 6**: Man selling lilies; also runs a commercial nursery; the lilies were overflow from his nursery supplies
  - **Stallholder 7**: Woman selling a mix of (potted) plants; lives outside Busselton on 5 acres that is zoned for intensive agricultural use; purchases seedlings and seeds from a nursery, grows them to medium-large size plants & sells them at markets, etc.; considers herself a 'commercial' producer
  - **Stallholder 8**: Man selling eggs; labelled as 'hormone free from free range chickens'; his cousin recently purchased a working farm; they have 2,000 chickens and hope to double that amount to get into commercial-scale egg production; are not certified yet; hope to run farm tours as well
  - **Stallholder 9**: Man selling proteas; bought a small farm parcel (4 acres); starting up what he intends to be a commercial nursery specialising in proteas, native and herbs (for which he imports organic seeds); he was also selling cherry tomatoes grown by his neighbour

Midland Growers' Market

- primarily fruit and vegetables grown by commercial farmers from the region
- stall set up in a line down a side street of Midland
- some hot food (e.g. sausage sizzle), baked goods, pickles, gifts
- no live animals were being sold
- **Stallholder 1:** Man selling mix of plants; he just moved to a farm closer to Midland; starting up a commercial nursery; the markets are an important way for him to advertise his new business (and products)
- **Stallholder 2:** Woman selling flowers: lives on a half acre in the Swan Valley; her husband works full time; she grows the flowers and sells them at the market for additional income

Midland Military Markets

- large, undercover market in a warehouse type facility
- one large fruit and veg stall (occupied about an eighth of total floor space); numerous hot food stalls; clothing, arts and crafts, butcher, seafood, jewellery

Appendix 3: Community-based conservation and environment groups in the City of Swan and Swan region

Area/Group	Purpose
City of Swan	
Fauna Rehabilitation Foundation	Care for injured wildlife
Swan Animal Haven Inc	Provides homes for stray and unwanted dogs
Men of Trees	Promote growing and planting of trees for soil conservation
Friends of Shenton Bushland	Promote, recognise and protect Shenton Park Bushland reserve
Friends of Hollywood Reserve	Promote, recognise and protect the Reserve
Midland Friends Restoring Our Green Spaces (FROGS)	To protect, promote and enhance the community space of the Blackadder Creek Wetlands and other degraded sites in the Midland area
Belhus Rural Protection Group	Protection of the rural environmental and visual impacts of the Belhus and upper Swan Valley
Wandoo Heights Preservation Group	Care and management of Wandoo Heights walking trails
Henley Brook-West Swan Catchment Group	Working with other groups on restoration and management of local waterways and riparian environment
Blackadder Woodbridge Catchment Group	Creekline conservation and restoration projects
Urban Hills (LCDC) Landcare Group	Promotion and protection of the environment
Wooroloo Brook (LCDC) Landcare Group	Large scale tree planting projects, river restoration, and small landholder seminars
Swan Region	
WA Naturalists' Club/Darling Range Branch	To encourage the study of natural history and to protect native flora and fauna
Wildflower Society of WA (Eastern Hills Branch)	To foster an appreciation and awareness of nature through preservation, propagation and revegetation of WA wildflowers

Appendix 4: Major sites and organisations visited during Bendigo field trip

Site	Date visited	Notes and materials collected
Bendigo Visitor Information and Interpretive Centre, Bendigo	13/3/05	Maps and information material collected. Information includes a notice about the Bendigo Farmers' Market and a flier about a Flower Show being conducted by the Bendigo Garden Club
Prince of Wales Showground Market, Bendigo	13/3/05	Detailed notes made of produce and animal stalls, conversations with stallholders, market manager interviewed by phone (see below)
City of Greater Bendigo Council Chambers, Bendigo	15-18/3/05	Interviews conducted with Council staff, brochures and planning material collected. Information includes pamphlets about the Bendigo Cheese Company, Campaspe Grove olive farm, Bendigo Winemakers Festival 2005, information sheet *Living together in rural Victoria: Agricultural industries and their impacts*, planning details and permitted uses in the Rural Living Zone, and a copy of *CouncilNews* (the Council's news-sheet)
North Central Catchment Management Authority, Huntly	15/3/05	Interview with staff member, brochures and information material collected from information centre. Relevant information includes the pamphlets *A regional response to climate change*, *News and Views: North Central Victoria's farming newsletter*, *Managing our natural resources in north central Victoria*, information on a *Land management guide for small rural landholders*, *Streamline: Newsletter of the North Central Regional Catchment Strategy*, and *Summary of the Rabbit Management Action Plan 2000-2005*
Dept of Sustainability and Environment/Dept of Primary Industries regional office, Epsom	16-17/3/05	Interviews with staff members and consultants, relevant information material collected. Relevant pamphlets and brochures include *Ovine Johne's Disease: Keeping OJD out of your flock*, *NLIS: Your guide to the use of NLIS ear tags* and *Lifetime traceable: An emerging market requirement*, *Beef measles (Cysticercus bovis)*, *Anthrax in livestock*, *Fire ant alert*, *Prevention & control of anthrax in livestock*, *Pest animals project: Servicing the Loddon, Campaspe, Avoca and Avon-Richardson catchments*, and *Assurance Based Credits (ABC) Scheme and the Animal Health Statement*
Private property near Maldon	17/3/05	Informal discussions with owners and interview with local Landcare Coordinators, and property inspection

Appendix 5: Market observations from the City of Greater Bendigo case study

Details of fresh produce, plant and animal stalls at the Prince of Wales Showground Market, Bendigo

Location/ stall no.	Produce for sale	Notes
Pavilion 1 (undercover)		
Stall 1	Marrows, pumpkin, squash, tomatoes, almonds, zucchini, figs, garden plants	Produce is claimed home-grown with no insecticides, fungicides, pesticides or sprays, and fresh-picked. Produced at Eaglehawk. Stallholder is producer and only sells at this market. Proceeds are to supplement aged pension.
Stall 2	Plants and seedlings, mainly native species	Local disabled pensioner in wheelchair sources stock from a range of locations, is not grower but is on-selling. Also sells at Murrumbit Market.
Stall 3	Few plants with clothing and handicrafts	Backyard producers, elderly pensioner couple supplementing aged pension.
Stall 4	Plants, eggs, baked goods (bread in unlabelled bags, cakes), herbs, eggs in cartons from a range of producers	Stallholder is not producer, sources products from a range of producers and on-sells.
Pavilion 2 (undercover)		
Stall 1	20 different kinds of fruit and vegetables	Stallholder runs fruit shop in Echuca and buys produce in markets in Footscray. Market is alternative sales outlet.
Stall 2	Range of fruit and vegetables	Stallholder has been buying from wholesalers for 20 years, is not producer. Spends most of time at Castlemaine Markets.
Industrial Pavilion (near main gate)		
Stall 1	Live chickens and bantams, ducks, turkeys, King and European quail, stock, pet and poultry feed, aviaries and pet supplies	Chickens raised from hatching, sold at different ages. Stallholders live in the bush at Heathcote. Display information about healthy poultry.
Outside		
Stall 1	Native plants	Medium-sized plants grown from cuttings by stallholder who lives on 10 ha bush property. Does the rounds of local and regional markets
Stall 2	Grapes	Commercial grape producer with 40 acre property. New to market selling. Does most of business selling direct to exporters
Stall 3	Bric-a-brac, cacti, succulents, exotic plants	Stallholder grow plants herself from cuttings and seeds, lives on ½ acre property in Bendigo area
Stall 4	Cacti and succulents, other plants	Commercial farmer with 1,500 ha property, grows plants from cuttings, market provides 'a bit of money on the side'
Stall 5	Rose bushes, gardenias, other plants	Stallholder buys plants from range of commercial producers and very occasionally from 'backyard growers', is on-selling
Stall 6	Hydroponic tomatoes	Commercial grower with large property outside Bendigo, growing only tomatoes in glasshouses

Stall 7	Honey	Apiarist stallholder has several hives in region, sells to retailers and at markets
Stall 8	Quinces	Backyard producer with home-grown produce
Stall 9	Bags of potatoes	Commercial producer
Stall 10	Range of fruit and vegetables	Commercial producer from near Stanhope, also sells to SPC
Stall 11	Boxes of tomatoes	Commercial hydroponic producer
Stall 12	Range of fruit and vegetables	Commercial producer based at Werribee South
Stall 13	Plants and seedlings	Backyard producer
Stall 14	Plants	Backyard producer
Stall 15	Range of plants including roses and lillipillies	Commercial nursery near Swan Hill, alternative sales outlet

Appendix 6: Sites, events and organisations visited during Brisbane and Sunshine Coast field trip

Site	Date(s) visited	Notes and materials collected
DPI&F head office, Brisbane	5/4/05 7/4/05	Interviews with staff, information centre and bookshop visited. Info material: leaflets *Food scraps: an important warning about feeding animals, Thinking of food: biosecurity with the Department of Primary Industries and Fisheries* (deals with use of chemicals to control pests and diseases); *Register it right: it is now the law* (registration of properties with cattle, sheep, goats or camelids); brochures *Ornamental fish can become monumental pests*; *Native fish for aquariums*; *Noxious fish alert: Tilapia*; four leaflets on fire ants; leaflet, poster and flier on citrus canker; brochure *DPI Stockies* (role of Qld stock inspectors); and *Beeftalk* (newsletter for beef producers)
Maleny and Montville, Sunshine Coast Hinterland	5-6/4/05	Interview with local resident, visited Maleny District Library, Maple St Coop, info centre and State Government shopfront. Info material: *Maple Street Coop News* (newsletter) and information leaflet, two brochures on Barung Landcare and *Barung Landcare News* (newsletter); flier re need for a hinterland council; brochure on Maleny Dairies; local map and leaflet on Maleny
DNRM, head office, Brisbane, and regional office, Nambour	7/4/05 8/4/05	Relevant information area visited and brochures collected. Includes two leaflets giving general info about the Department; wide range of fact sheets, NRM Facts Pest Series, including *Feral cat ecology and contro*l, *Prohibited pets*, *Declared animals of Queensland*, *Pest animal management in settled areas, Sodium fluoroacetate (1080)*, *Crazy ants*, *Cane toad*, *Pet rabbits*, *The fox*, and on many individual weed species; colour leaflets on *Understanding pest plants*, *Environmental weeds*, *Rubber vine*, *Red-eared slider turtle* and *American corn snake*; *Environmental weeds list* (produced by Qld Herbarium); info on range of datasets - General Purpose 2004, Property Boundaries, and Vegetation 2004; and *Guidelines on use of statutory covenants in Qld* and *Property Resource Management Planning: guidelines for landholders*; leaflet *Local partnerships in natural resource management*; *Regional NRM Planning* (newsletter on NHT/NAP projects in Qld); and *Bush telegraph* (news-sheet from QNPWS)
DPI&F Yeerongpilly Animal Research Institute, Brisbane	7/4/05	Interviews with staff
Nambour	7-8/4/05	Visited Maroochy Shire Council offices, library, regional office of DNRM (see above)
DPI&F Maroochy Research Station, Nambour	8/4/05	Interviews with staff
Eumundi Market, Eumundi	9/4/05	Notes made of produce and plant stalls (see below). Information material collected on market and individual stalls or products
Caloundra	9/4/05	Visitor Information Centre — range of general information material and maps collected. Issue of *Caloundra City Living* (council magazine) — carries article on controlling fireweed infestations.

Appendix 7: Market observations from the Brisbane and Sunshine Coast Hinterland case study

Information from Eumundi Market website: www.eumundimarket.com.au

Under the heading 'Organics & Fresh Produce', these stalls advertising fresh produce are listed:

- *Hermitage Country Crafts* — Preserves, Handmade Breads, Pesto/Sauces, Cakes/Slices and free range eggs.
- *Hinterland Organics* — Certified Organic & Biodynamic Fruit, Vegetables, Dried Fruits, Nuts, Honey, Special Dietary Confectionary, Gluten/Soy/Dairy Free products
- *Meze Gourmet Delights* — Olive products
- *Ron Bray's tomatoes* — 'Australia's best tomatoes'
- *Sandy and Kelly's organics* — Organic Fruit & Vegies, Natural Honey, Nuts & Dried Fruits
- *Vive Elan* — organic herbal teas.

Under the heading 'Plants, Gardening & Ornamentals', these stalls mention plants or flowers for sale:

- Artrees — Decorative Trees — Grown in ornamental Australiana features
- *Austine enterprises* — Flowering orchids for every season and for all occasions. Orchid growing essentials and large hanging ferns
- *Bonsai Noosa* — Bonsai trees, lessons, tools, supplies
- *Bunyama Valley Nursery* — Wide selection of nursery grown plants, trees, shrubs and seasonal cut flowers. All grown at Bunyama Vallery Nursery Kandanga.
- *Graham Verren Plants* — Cacti and other succulent plants, tillardsias and other bromeliads, bamboo plants and poles
- *Living Flowers* — Calla Lily Bulbs and Potted Gerberas
- *Orchids in bloom* — Tropical flowering orchids and home grown produce
- *R & J Propagations* — All locally propagated and grown herbs, grevilleas, natives and ornamentals
- *Rainforest Cabinet Timbers* — Local rainforest trees with edible fruit and spectacular flowers
- *Wolfgang & Edith Lanz* — Freshcut flowers, Pecan Nuts and Mangoes.

Details of fresh produce and plant stalls observed at Eumundi Market during site visit

Location/stall no.	Produce for sale	Notes
Adjoining main street, to right of hall		
Stall 1	Fresh flowers, mango and passionfruit jam, ginger root, seed in packets, bulbs	Commercial producer couple, Mangun, Qld. Bulbs sourced from Sylvan, Vic.
Stall 2	Range of fruit and vegetables — pumpkins, okra, rosella fruit, bananas (fresh and dried), mangoes, lemonade fruit, limes, eggplant, radishes	Commercial producer. 'Organic' dried banana sourced from Amamoor, near Gympie
Back from main street, to right of hall		
Stall 3	Wide range of fruit and vegetables —	'Country Garden' selection – claims no

	pineapple, custard apple, lemonade fruit, lemon, lime, capsicum, eggplant, flowers, chutneys, jams (mango and rosella)	sprays, but not certified organic. Eumundi is only regular market outlet but sometimes sells at others
Stall 4	Packaged nuts	Producer with brand name and ABN on packets, located near Gympie, claims to be working towards a sustainable future
Stall 5	Range of fruit and vegetables, also packaged nuts, honey, confectionery	Most produce certified by NAA Board, claimed organic. Not producer, is on-selling.
Stall 6	Pot plants, including orchids	Source unclear
Stall 7 (near exit to car park)	Potted hibiscus (in open and on ground, no stand)	Grown near Gympie, commercial producer, goes to other markets e.g. Southport
Stall 8	Range of fruit and vegetables	'Home grown' fruit and vegetables, some sub-standard and under-sized, local woman producer with small acreage near Gympie. No labels except on avocadoes ('Eerwah avocadoes')
In front of hall		
Stall 9	Cheese and butter, fruit and vegetables, including 'Farmers' avocado'	Sourced from 'Gympie Farm' — commercial producer with brand name
To left of hall		
Stall 10	Fresh flowers and pot plants —calla lilies, sundews	Grown at Pomona, small nursery
Stall 11	Tomatoes, orchids in pots	Stallholder indicated that orchids were 'an overgrown hobby' pursued for many years, and did not produce a living, grown near Woombye
Stall 12	Fruit and vegetables, leeks, lettuce, custard apples, onions, snow peas, macadamias in shell	Commercial producer
Behind hall		
Stall 13	Large fruit and vegetable stand — eggs, hydroponic lettuce, bagged potatoes, carrots etc.	Not producer, is on-selling as retailer. Produce sourced from range of locations, including 'Hinterland farm fresh eggs'
Stall 14	Small plant stand — cacti and succulents, no labels	Backyard producer
Stall 15	Range of plants, herbs, creepers etc.	No labels, source unclear
Near main entrance to market (off main street)		
Stall 16	Flowers, bamboo	'Backyard' producer
Stall 17	Pineapples, tomatoes, cucumbers, pesto, hommous	Small producer retiree couple, from near Gympie
Stall 18	Mushrooms	Commercial producer near Woombye
Stall 19	Agaves in pots	Commercial producer?
Stall 20	Wide variety of fruit and vegetables — ginger, tomatoes, herbs, herb seed	Certified organic producer displaying license no., produce grown at Yandina, claimed 'home grown'
Stall 21	Pot plants	No labels, source unclear

Appendix 8: Member groups of the Sunshine Coast Environment Council

Source: Sunshine Coast Environment Council's website: http://www.scec.org.au/main/memGroups.html

Group	Website
Alex Forest Preservation Association	
Barung Landcare Association Inc.	www.barunglandcare.com.au
Bat Rescue Inc.	
Blackall Range Independent School	
Blackall Range Land Use Association	
Bribie Island Environment Protection Association Inc.	
Bribie Island High School	
Caboolture Daytime Branch of Society for Growing Australian Plants	
Cedarton Foresters Co-Op	
Chenrezig Institute	www.chenrezig.com.au
Conondale Range Committee	www.exploreconondales.com
Cooloola Coastcare	
Cooloola Nature	
Crystal Waters Co-Op	www.crystalwaters.org.au
Crystal Waters Permaculture Village	www.crystalwaters.org.au
CSIT (Cooloola Sunshine Institute of Technology)	
Eumundi & District Historical Association	
Fraser Island Defenders' Organisation	www.fido.org.au/
Glasshouse Mountains Advancement Network	
Global Eco-Village Network (Oceania/Asia) Inc.	http://genoa.ecovillage.org/
Gold Coast Environment Council	www.gecko.org.au
Gympie & District Landcare Group	www.gympielandcare.org.au
Lake Baroon Catchment Care	
Landsborough Area Community Association	
LETShine [Nambour]	
Maleny Community Credit Union	www.malenycu.com.au
Maleny Wood Expo From Chainsaw to Fine Furniture	www.malenywoodexpo.com
Manduka Co-Operative (Frogs Hollow)	
Maple St Co-Op	
Maroochy Permaculture	
Maroochy Waterwatch	www.waterwatch.org.au
Mooloolah River Waterwatch and Landcare Group	
Mooloolah Valley Community Associated	
Najara Centre [Good Samaritans]	
Nambour Community Centre Inc.	
Noosa & District Landcare Group	
Noosa Koala Squad	

Permaculture Noosa Inc.	
Petrie Creek Catchment Care Group	
Queensland Folk Federation	www.woodfordfolkfestival.com
Save Emu Mountain's Surrounding Environment	
Starlight Community	
Sunshine Coast Bushwalkers	
Sunshine Coast Hang Gliding Club	
Sunshine Coast Hinterland Awareness Group	
Sunshine Coast Organic Growers	
USC Environment Collective	
Walsgott Animal Law Service Inc.	
Wildlife Preservation Society of Caboolture Shire	
Wildlife Protection Society Sunshine Coast and Hinterland	www.wildlife.org.au
WILVOS (Wildlife Volunteers Association Inc.)	www.wilvos.com
Witjuti Grub Bush Foods	
Yandina & District Community Associates	
Yandina Community Centre Inc.	