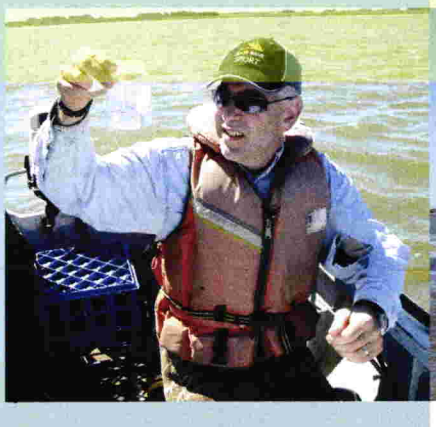
Landcare
action on the ground



Water Quality in the Waituna Catchment

Farmers Perceptions & Management Practices

Katie Nimmo
Social Science Research Coordinator
NZ Landcare Trust

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Sustainable Farming Fund
www.maf.govt.nz/sff

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Executive Summary

Introduction

Fresh water quality has become a highly contentious issue in New Zealand over the last five years. Water quality in areas of intensive pastoral farming is poor relative to the Ministry for the Environment microbiological water quality guidelines, and it declines markedly in lowland streams and rivers in pasture dominated catchments. Over the last ten years, community-based groups have formed all over New Zealand to address fresh water quality issues in their local catchment.

The Waituna wetlands complex in Southland is a site which has not been spared from a trend in declining water quality. Much of the surrounding area of the Waituna wetlands is used for pastoral agriculture, and water quality monitoring by Environment Southland indicates that the Waituna lagoon has poor water quality, with nutrient and chlorophyll a concentrations at times reaching high levels. Tributary creeks can have high nitrate, phosphorus and e-coli concentrations.[1] There are no obvious trends towards poorer or better water quality throughout the catchment, partly because water quality has been poor at most sites from the commencement of sampling.

The Waituna Landcare Group was formed in 2001 due to concerns about the effect of changing and intensive land use was having on the catchment and the wetlands. Funding has been obtained by the group from the Sustainable Farming Fund to explore ways in which a workable balance can be found between environmentally sympathetic and cost-effective land management practices in the Waituna catchment. An important part of achieving this balance involves talking to land managers in the Waituna catchment about their:

- perceptions of water quality or other environmental issues in the Waituna catchment
- current farm management practices relating to water quality
- perception of the Waituna Landcare group

A total of twelve semi-structured, face to face interviews and two semi-structured telephone interviews were conducted by Katie Nimmo (NZ Landcare Trust, Social Science Research Coordinator) with farmers in the Waituna catchment in mid-November 2005. A mix of farm types were included (forestry, dairy, sheep, plus mixed stock units). The research targeted farms placed at the top, middle and the bottom of the catchment. Research participants included relative newcomers to the community, as well as very long term residents.

The recommendations made in this report have been made in the spirit of a 'brainstorm,' by which they signal a range of possible actions which could be incorporated into a future strategic direction if considered appropriate. None of them are 'compulsory' in any sense. They are based on a mixture of best practices implemented by the NZ Landcare Trust, suggestions made by Waituna farmers themselves, plus strategies suggested by other researchers or agencies.

Setting the Scene: Intensification and Drivers.

Social and economic drivers both force and enable Waituna farmers to intensify their operations at a paddock level, and farmers in the Waituna catchment are subject to these drivers like any other farmer in New Zealand.

Most farmers reported intensifying their farming operations over the last five years. Economic drivers reported by Waituna farmers include price of land, rising production costs, commodity prices, government policy, and an opportunity to generate wealth. Technological drivers were not commonly mentioned by farmers, but are likely to have had a significant impact

[1] Environment Southland (2004) *Environment Southland – Waituna catchment water quality sampling.* Environment Southland, Invercargill.

The social fabric within which these drivers operate also have considerable influence on how farming is conducted in the Waituna catchment. These include a favourable attitude towards land development and generating wealth, plus the stage of life of a farmer. The development of dairy farming in the area has brought a lot of wealth and positive benefits to the area, which commands a lot of respect in the local community.

Local community networks have experienced profound changes with the increase in dairy farming. Sharemilkers in particular are reported as having a high turnover, and are less likely to have a long term interest in the local community or the local environment. However dairy farmers are weary of being villainised, and further attacks could create deeper resistance to change.

Recommendation 1: A change or communications strategy should acknowledge and celebrate the benefits dairying brings to the area.

Perceptions and awareness of water quality

Farmers universally perceived waterways on their property as the means by which excess water is drained off their farms, allowing them to maintain the productivity of their property. Drainage networks are therefore very important to farmers.

Farmer awareness of deterioration of water quality in the catchment is variable. Some farmers weren't sure how good it was, others thought it was reasonable, and some perceived that water quality had deteriorated. The geographic location of farmers and length of residence influenced farmer opinions about water quality, which tends to be based on highly localised observations, rather than a good knowledge of catchment wide water quality. Most farmers appear to assume that if the water is clear, the water quality is good, and this is misconception which needs to be addressed.

Not very many farmers visited the lagoon, and most were ambivalent or uninterested in it. They have little personal experience or knowledge about it, and this is a fundamental challenge for the Waituna Management group.

Recommendation 2: Catchment-wide information about water quality needs to be promoted consistently to farmers to counteract a tendency to draw conclusions based on highly localised observations.

Perceptions of influences on water quality

Non dairy farmers tend to assume that dairy farms are the key cause for decline in water quality in the catchment. They also tend to assume that their farms have minimal impact compared to dairy farms. Dairy farmers were more open to the possibility that their farms could have an impact on water quality, but have no way of quantifying that impact and adapting their management accordingly. These perceptions tend to create a blaming 'us and them' culture within the catchment. This culture needs to be addressed if an integrated catchment management approach is to be successful, where all stakeholders in the catchment become involved.

Monitoring and information about water quality

On the whole, farmers do not proactively seek information because changes in water quality at present do not effect their on farm productivity or productivity. most farmers could be described as only mildly interested or indifferent to water quality issues in the catchment, and have currently little or no incentive to change their practices.

- some farmers perceived that there was a lack of consistent, highly visible information about changes in water quality in the Waituna catchment.
- runoff from many farms mingle in the waterways, with no way of telling which farms are truly responsible for the decline in water quality. The fault or responsibility is then transferred to 'other' farmers (e.g. negligent dairy farmers).

- overall, this lack of farm specific data enable farmers to distance themselves from the issue, assume that their own practices are adequate, or assume that their farms have little or no impact. It is doubtful that farmers would change without having more farm-specific information available to them
- quantifying the impact of individual farms on water quality was an important theme for a number of farmers. They stated they were prepared to take responsibility for their impacts, but only want to do so relative to the extent to which they cause the problem. They currently have no information to gauge this.
- a number of farmers stated that was a need for robust scientific research to determine the extent to which water quality was deteriorating, and the true source of the contaminants.
- some farmers were open to having monitoring take place on their farms.

Recommendation 3: information about changes in water quality need to be proactively distributed to farmers on a consistent basis. Care needs to be taken when promoting this information to try and avoid exacerbating the 'us and them' culture prevalent in the catchment.

Recommendation 4: implement a farm specific water quality water monitoring program, incorporating the major land use types in the catchment. If monitoring programme is implemented, scientists and the Waituna Management Group will need to enter a dialogue with farmers to negotiate a programme which is both feasible for scientists and acceptable for farmers.

Farm practices

Farmers were not questioned closely about the measures they take to mitigate the impact of their farm on water quality. It was more important to build trust and avoid a process which scrutinised or tested farmers. Data collected about farm practices is therefore very general, and a more accurate picture would be obtain through farm visits by an experienced manager.

All of the research participants were aware of a number of ways they could minimise they could minimise the impact of their farming on water quality. These tended to cluster around keeping stock out of waterways, managing effluent properly, and taking care when applying fertiliser.

- non dairy farmers are unwilling to fence their waterways. Dairy farmers reported good progress towards fencing off all their major water ways.
- other than spraying plant pests in riparian margins, most farmers were not proactively managing or planting riparian margins.
- problems with maintaining open drains and creeks include steep banks collapsing into the waterway, growth of weeds, and ditch cleanings preventing runoff into waterways. Only one farmer was experimenting with a silt trap.
- most farmers reported a 25-50% increase in the amount of fertiliser applied on their farms over the last five years. Some are now tailing off now that their soils had reached an optimum nutrient profile.
- there is a diverse range of nutrient management practices amongst non dairy farmers. Most make a decision by triangulating information from a range of different sources.
- dairy farmers tested their soils regularly and used the advice of farm management consultants when making decisions about nutrient application.
- dairy farmers were divided about shelter. Some were in favour, and others prefer to remove as much shelter as possible, citing problems with pugging and a preference to keep stock feeding all the time throughout all times of weather.
- only a minority of farmers (or contractors) were re-contouring steep or slumping banks to a shallow profile. None of the farmers had cut-outs to divert runoff from tracks and races.

The above points reveal that some farm practices (e.g. fencing on non-dairy farms or planting riparian margins) are unlikely to be adopted without clear incentives such as subsidies for fencing or plantings. Farmers also make choices about practices that are usually based on a sound logic

that is focussed on maintaining or increasing production. Encouraging change (e.g. establishing more shelter on dairy farms) could be very difficult to achieve.

Farmers perceived that on the whole they could control the impacts of farming practices on water quality, but were challenged by the Southland climate and soil types. Many farmers assumed that their practices were not affecting the water quality, or that their mitigating practices were adequate.

Recommendation 5: Nutrient budgeting tools such as Overseer could be more aggressively promoted, particularly to non dairy farmers. A suitable tool could be used in conjunction with the farm-specific water quality monitoring program, which would demonstrate how the tool can be used in a working farm environment.

Difficulties in dairying

Some of the difficulties dairy farmers in the catchment face include:

- Southland soil types and climate, finding reliable workers who have initiative and willing to learn, plus high stress levels and work load.
- relationships between sharemilkers and land owners can be complicated, with each different party having different attitudes to implementing good practices and willingness to resource them
- the financial structures underlying a sharemilking arrangement tend to act as a disincentive for sharemilkers to take an interest in, and care for a property or its infrastructure like it is their own.
- absentee owners of dairy farms are sometimes viewed by longer term residents as opportunists, who fail to take an interest in the impacts of their farming practices that are implemented on their properties. Agents acting as a go-between absentee landowners and sharemilkers are likely to be a key link within the dairy industry.

Recommendation 5: The project could benefit from further investigation into the relationship between sharemilkers and absentee owners. This could be achieved by searching for, and reviewing any social science research conducted by other agencies on this issue, or implementing further primary social science research in the catchment itself.

Knowledge gaps and sources of information

Most farmers had a patchy understanding of the concept of environmental sustainability. This understanding tends to be focussed on maintaining ecosystems for human needs, rather than intrinsic ecological values.

- some farmers felt that they did not have enough knowledge about how fertiliser leaches through soils, the speed at which this happens, and corresponding best practices related to fertiliser application.
- other farmers assumed that if water quality is clear, then the water quality is good. They did not realise that clear water could also carry a high nutrient loading.
- knowledge about mitigating practices appear have been gleaned primarily from print information. This has been a subtle process by which the information has been absorbed 'by accident' when farmers are seeking other kinds of information.
- only longer term residents reported obtaining information from a landcare group member.
- farmers tended to be focussed primarily on best practices concerning animal health and food safety. It is not clear to what extent the phrase 'environmental best practices' have any meaning or relevance to them.
- information received by farmers can be contradictory or incomplete.
- dairy farmers do not have the time to socialise or attend meetings. The sharemilker community has a very high rate of turnover. Other than school-related associations, community-based

networks generally do not appear be strong around sharemilkers, especially those new to the catchment. Instead, the networks that do tend to cluster around sharemilkers are *industry related.* All dairy farmers interviewed for the project employed an agent or a consultant.

- getting meaningful information to farmers is not easy. Farmers contradict themselves and say that they prefer to go to field days or see examples of good practices, but also state that they are unlikely to attend a field day that focuses solely on environmental issues. They have gained most of their knowledge from print sources, but only selectively skim read. Some farmers value discussion groups, but these tend to focus on production issues.

Recommendation 6: There is a need to improve farmer knowledge and understanding of the concept of environmental sustainability, including how ecological services maintain the productivity of their farm, and how catchment-wide systems work.
Recommendation 7: A communications strategy should seek to improve farmer knowledge and understanding of how fertiliser leaches through soils.

Recommendation 8: A number of farmers assume that if water was clear, quality was high. This is a knowledge gap which must be addressed. Bala Tikkisetti from Environment Southland suggested the following phrase "clear water is not clean water" as a key message to be promoted in a communications strategy.

Recommendation 9: An information strategy may be more effective in the earlier stages of the project by coupling information about sustainable land management strategies with production-related information. This can be achieved through attending events (e.g. Waimumu field days), developing partnerships with production related stakeholders (e.g. Meat and Wool New Zealand or Fonterra), or hosting events that include a mix of the different types of information.

Recommendation 10: Dairy farm agents or consultants may be a good entry point to communicate with dairy farmers. A communications strategy could also specifically target consultants or agents themselves to build knowledge and awareness of water quality issues in the catchment (e.g. through a workshop).

Perceptions of the Waituna landcare group

All of the farmers associated the group with water quality in the lagoon. Fewer mentioned preserving the ecological values of the lagoon, or a whole of catchment approach.

- most farmers thought there was a legitimate role for a community group in catchment management issues. Such roles included acting as a ginger group, providing information, and raising farmer awareness about water quality issues. The landcare group was also perceived as having more flexibility than a regulatory body.
- a small number of farmers reported changing their management practices as a direct result of Waituna landcare group activity.
- overall most of the farmers interviewed for the project had a grudging respect for the Waituna landcare group, but some claimed that some of the solutions proposed by the group were not practicable and lacking in common sense.
- some farmers reported that others in the catchment perceived the group as having little or no credibility. Building credibility can take some time, but can be achieved by using defensible science/monitoring strategies, communicating data appropriately, incorporating farmer knowledge and expertise into the project, and establishing partnerships with other credible organisations.

Recommendation 11: A communications strategy needs to emphasise a whole of catchment approach so as to counter farmers tendency to associate the group with the lagoon only.

Moving forward – working with farmers

Engaging communities to create a shift in attitudes requires a holistic approach, involving a range of stakeholders and different tools. There is no 'one' simple recipe or prescription applicable to all situations. Engaging communities can take time, involve a number of stages, and must be planned strategically.[2]

Engaging farming communities to create a shift in attitudes requires a holistic approach, involving a range of stakeholders and different tools. There is no 'one' simple recipe or prescription applicable to all situations. Engaging communities can take time, involve a number of stages, and must be planned strategically.

- attitudinal barriers which influence farmers ability or willingness to change include a strong culture of individualism, lack of acceptance that there is a need to change, a favourable attitudes towards development and generating wealth, and a lack of understanding about the environmental sustainability of farm systems.
- behavioural barriers include busy work schedules, a preference for practices and information which enhance or maintain production, and a reluctance to adopt complex or time consuming practices
- economic barriers include lack of finances, and lack of any visible or short term benefits of sustainable land management practices.
- institutional barriers to change include lack of regulatory incentives or disincentives to change, lack of industry-wide skills and knowledge, and lack of technology necessary for change.
- farmers are quick to adopt sustainable land management practices that either sustain or increase the production values of properties. New practices more readily adopted are ones that are observable, can be trialled on a pilot scale, and less complex to implement

Recommendation 12: wherever appropriate, promote the benefits of increased production or reduced cost of a sustainable land management practice.

Recommendation 13: Insist that any technical solutions developed by scientists include at least two of the following characteristics – observable, can be trialled, less complex, or fit into existing systems of social or cultural practice.

Recommendation 14: send consistent, low key messages about risk management throughout the life of the project.

Recommendation 15: consider using 'leaving the land in better shape as part of a communications strategy.

Recommendation 16: use other forms of engagement and communication until a meaningful issue arises which can be constructively addressed through a public meeting.

Recommendation 17: involve farmers in a low key manner, embrace or follow through on their ideas, and allow them to pursue their own interests.

Recommendation 18: consider how a communications strategy could address the differences between non dairy farmers and dairy farmers

Recommendation 19: Find ways to track change in community membership, and to send a clear, consistent message to new members of the expectations and values of the local community about farm practices and water quality.

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[2] Aslin, H & Brown, V (2004) Towards of Whole of Community Engagement: A practical toolkit. Canberra ACT. Murray Darling Basin Commission.

Recommendation 20: It is essential that scientists work with farmers to agree on the problems to be addressed, and to identify acceptable and practicable solutions

Recommendation 21: The Gorge Road school may best be used to raise awareness about the ecological values of the lagoon, rather than promote changes in farm practices.

Recommendation 22: Integrate a farm planning process into the science and monitoring strategy.

Recommendation 23: Integrate further social science research into the project, but only where it offers best value.

Recommendation 24: Try to shift an engagement strategy from one that is antagonistic to a more indirect, light hearted way.

Recommendation 25: The Waituna Management group will need to assess if seeking funds for mapping drains will provide sufficient environmental or public good benefits to make such an investment worth while.

Recommendation 26: Disseminate the findings of this report to a wide range of stakeholders in appropriate format, and revisit it regularly.

1. Introduction

This first chapter outlines the purpose of this report, its structure and content, and research methods used to gather data.

Fresh water quality has become a highly contentious issue in New Zealand over the last five years. Water quality in areas of intensive pastoral farming is poor relative to the Ministry for the Environment microbiological water quality guidelines, and it declines markedly in lowland streams and rivers in pasture dominated catchments.[3] Over the last ten years, community-based groups have formed all over New Zealand to address fresh water quality issues in their local catchment.

The Waituna wetlands complex in Southland is a site which has not been spared from a trend in declining water quality, and the Waituna Landcare Group was formed in 2001 due to concerns about the effect of changing and intensive land use was having on the catchment and the wetlands. Much of the surrounding area of the Waituna wetlands is used for pastoral agriculture.

Environment Southland has conducted water quality tests in Waituna Creek since July 1995. Four further sites covering all the major tributaries to the lagoon, and water quality sampling from the lagoon itself started in 2001. Sampling is undertaken on a monthly basis, and are analysed for nutrients, bacteria, dissolved oxygen, Ph and turbidity. Field measurements include temperature, conductivity, clarity and periphyton cover. Monitoring results include:

- nitrate concentrations are high for all stream sites (except Currans Creek Tributary), in particular the Waituna creek where concentrations are consistently above the guidelines for excessive algal growth.
- Levels of dissolved oxygen concentrations in Moffat Creek, Currens creek, and Currens Creek Tributary reach levels that could be detrimental to aquatic life.
- phosphorus levels are high and consistently above guidelines for Moffat Creek and Currans creek
- e-coli concentrations are high for all sites, except Currans Creek Tributary, often exceeding the guidelines for recreational bathing
- the Waituna creek (at Marshall road) as estimated by the Macro Invertebrate Community Index has 'probably moderate pollution'.[4]
- The Waituna lagoon has poor water quality.[5] Nutrient and chlorophyll 'a' concentrations at times reach high levels in the Waituna lagoon, particularly when it is closed.

There are no obvious trends towards poorer or better water quality throughout the Waituna catchment, partly because water quality has been poor at most sites from the commencement of sampling.

The Waituna wetlands complex is of national and international significance. It comprises an area of approximately 3,556 hectares, and encompasses the lagoon along with adjacent peatlands, plus numerous ponds and lakes. Conservation of flora and fauna, and protection of wildlife are the primary uses of the wetland. Other uses include sport fishing and game bird shooting.

The wetland is a designated Ramsar site because it meets three general criteria for identifying such sites. The Waituna wetlands

1. support an appreciable assemblage of endemic and/or threatened species and communities

[3] Parliamentary Commissioner for the Environment (2004) *Growing for good: Intensive farming, sustainability and New Zealand's environment.*
[4] Environment Southland (2005?) *Environment Southland – Waituna catchment water quality sampling.* Environment Southland, Invercargill.
[5] Ibid

2. has special value for maintaining the genetic and ecological diversity of the region
3. provide a habitat for plants and animals at critical stages of their biological cycles.[6]

One of the special features of the wetlands is a cushion-bog community containing many species adapted to cold, peaty conditions, including some typically found in montane or sub alpine conditions rather than at sea level. Pingao, tufted hair grass, and a locally uncommon species of mat daisy also grow in the area.

A large number of wader species (including up to 18 species of trans-equatorial waders) utilise the mudflats. A significant aspect of the migratory wader population is the number of rare species (by New Zealand standards) that have been recorded in the reserve. These include Mongolian Dotterel, Grey Plover, Marsh Sandpiper, Sanderling and the Asiatic Whimbrel. The wetlands form the Southland stronghold for the Australasian Bittern, South Island Fernbird, Spotless Crake, and the Marsh Crake. All these species have declined elsewhere due to loss of habitat in Southland. The wetlands also serve as an important moulting refuge for the New Zealand Shoveler. Overall, 76 species of birds have been recorded in the area.

Sea-run brown trout are found in the Waituna Lagoon, and the tributary streams provide spawning grounds for trout and native fish. Native fish species include several endemic species, some of which are rated as vulnerable. Many of the insects and some plants are typically sub-alpine species. Over 80 species of moth alone have been found in the Awarua Bay/Waituna wetlands complex.[7]

Over the last ten years, community-based groups have formed all over New Zealand to address fresh water quality issues in their local catchment. The Waituna Landcare Group was formed in 2001 due to concerns about the effect of changing and intensive land use was having on the catchment and the wetlands. The aims of the group are to

1. look after the Waituna Stream and other waterways that impact on the Waituna Lagoon
2. encourage sustainable land management within the Waituna Lagoon catchment
3. monitor the water quality of all streams going in to the Waituna Lagoon
4. encourage riparian fencing of waterways where practicable
5. liaise with Environment Southland, Department of Conservation, Fish and Game and local iwi to understand and encourage baselines to be drawn on the management and water quality for the Waituna catchment
6. provide information to the community through newsletters, meetings and field days about the state of the local environment, and ways to help it. [8]

Funding has been obtained by the Waituna Landcare group from the Sustainable Farming Fund to explore ways in which a workable balance can be found between environmentally sympathetic and cost-effective land management practices in the Waituna catchment. An important part of achieving this balance involves talking to land managers in the Waituna catchment about their:

- perceptions of water quality or other environmental issues in the Waituna catchment
- current farm management practices relating to water quality
- perception of the Waituna Landcare group

The aim of the research is to *identify and explore* key farm management-related issues that can be used to:

1. inform the future strategic direction of the Waituna landcare group
2. support further applications for funding

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[6] Source: (http://ramsar.org/about/about_infopack_5e.htm). Accessed 25/11/05

[7] Rance, B. & Cooper, W. (1996) Department of Conservation. *Case Study 3: Waituna Wetlands Scenic Reserve.* Source: .http://www.ramsar.org/lib/lib_bio_2.htm#c8cs3. Accessed 25/11/2005

[8] Waituna Landcare Group Constitution. Source: pers, comm., email from Gay Munro, 25/11/2005

Guide to this report

Chapter Two: Setting the scene outlines the wider social and economic drivers that both force and enable Waituna farmers to intensify their operations at a paddock level.

Chapter Three: Perceptions and awareness of water quality explores farmer perceptions and awareness of water quality in their creeks and drains on their farms, and in the lagoon itself.

Chapter Four: Perceptions of influences on water quality examines farmer perceptions of how their farm influences water quality in the Waituna catchment.

Chapter Five: Monitoring and information about water quality outlines farmer opinions about water quality monitoring in the catchment.

Chapter Six: Farm practices related to water quality outlines farmer responses to a questionnaire about practices which mitigate the impact of their farms on water quality, and some comments about these practices. It also examines the extent to which farmers think they have control over these impacts, and any practices they would not be prepared to implement.

Chapter Seven: Dairy issues looks at some of the difficulties which dairy farmers face when managing the impacts of their farms on water quality.

Chapter Eight: Sources of Information, networks and learning outlines some knowledge gaps identified by farmers, where they obtain information about good practices, and their preferred style of learning.

Chapter Nine: Perceptions of the Waituna Landcare group examines farmer perceptions about the Waituna landcare group, what it is trying to achieve, and the means it has used to influence farming practices.

Chapter Ten: Other stakeholders reports briefly on comments made by farmers on other stakeholders involved in the management of the Waituna lagoon.

Chapter Eleven: Moving forward – working with farmers on water quality issues This chapter explores some of the barriers and incentives to change for farmers, and suggests some recommendations for action.

Who was interviewed?

A total of twelve semi-structured, face to face interviews and two semi-structured telephone interviews were conducted by Katie Nimmo (NZ Landcare Trust, Social Science Research Coordinator) with farmers in the Waituna catchment in mid-November 2005. A mix of farm types were included.

Farm Type	Number of Interviews
Forestry	1
Dairy*	4
Sheep only	4
Mixed sheep and beef	3
Mixed sheep and wintering dairy cows	2

*Dairy farm interviews included sharemilkers (1) and owner-managers (3).

The research targeted farms placed at the top, middle and the bottom of the catchment. Research participants included relative newcomers to the community, as well as very long term residents.

Limitations of research

This research is not intended to be representative in a sense of 'counting' the number of farmers who hold a particular set of opinions about an issue. Such research would require a full census of all of the land managers in the catchment. Whilst NZ Landcare Trust researchers endeavoured to explore a wide as range of opinions as possible, it is likely that the farmers who agreed to take part in an interview have different sets of values, attitudes and farming practices from those who have not been interviewed. The Waituna landcare group should anticipate encountering a wider range of opinions and experiences than this document outlines.

Acknowledgements

The author would like to thank all farmers who participated in this review, plus the members of the Waituna Landcare group who assisted with this research project. Graeme Broad, coordinator for the Waituna Catchment project provided invaluable logistical support. The time and expertise contributed by all parties is gratefully acknowledged.

2. Setting the scene

The October 2004, the Parliamentary Commissioner for the Environment released a report *"Growing for good: Intensive farming, sustainability and New Zealand's environment"*, which examines the environmental sustainability of more intensive farming in New Zealand. The report found that farming in New Zealand has intensified over the last ten years, primarily due to a set of a wider socio-economic drivers which are mostly outside of farmers control. These drivers both force and enable farmers to intensify their operations at a paddock level.

The Commissioner also argues that the environmental cost of economic, social and technological drivers is too high. The cumulative impacts of intensification of farming and subsequent degradation of natural capital place the future of farming in New Zealand at risk. International and domestic markets are forcing us to 'eat our rivers', and new ways of farming must be found that address these problems.[9]

This chapter outlines the extent to which farmers interviewed for this project had intensified their farming, and some of the drivers behind the intensification.

Intensification of farming in the Waituna catchment

A third of research participants interviewed for this project reported they had changed their land use, primarily by converting sheep farms to dairy, or sheep farms wintering dairy cows for part of the year. Two land managers reported that they were planning to develop some rough blocks into better pastures.

Nearly all of the land managers had intensified the production of their farms over the last five years. Intensification included increasing the numbers of stock units, and/or increasing production from the same numbers of stock. Some also stated that they had reached the limits of their production levels. Restraints to further intensification included a desire to maintain a certain quality of life rather than increase their workload, soil types, climate, and the need for more research and development on better quality grasses. Two farmers had not intensified their farming operations, and had no intention to do so because they were close to the end of their farming career.

Drivers

Farmers in the Waituna catchment are subject to the same drivers to intensify their farming operations as any other farmer in New Zealand. The following section outlines some of these drivers.

Economic pressures

Research suggests that New Zealand farmers tend to be most strongly influenced by economic factors, underpinned by the need to be financially viable.[10] Economic drivers identified by research participants include increasing land prices, commodity prices, the rising costs of farming, and an opportunity to generate wealth.

Land prices

Farmers buying new properties are faced with high levels of debt, requiring them to increase their income stream by improving the production of their farms. The rising price of land in Southland also makes rough, undeveloped land attractive to farmers who may not have considered purchasing and developing this kind of land ten years ago.

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[9] Parliamentary Commissioner for the Environment (2004), *Growing for Good: Intensive farming, sustainability and New Zealand's environment.* Wellington. Pp 126-127.
[10] Ibid, Pp 55-81.

"With the price of land escalating it is now profitable to develop existing land than it is to buy land. In the past when people have looked at rough ground, it may be more economic to buy better land that doesn't have the problem of manually having to pick up timber. Now that land has doubled in price that rough land is being bought instead."

One farming family reported purchasing a block of new land helped them to spread their risk by expanding their operations to finishing beef stock. However it has been a real struggle to service the debt, and they were anticipating that it would be some time before their quality of life would improve and stress levels drop.

Commodity prices
Volatile or dropping international commodity prices force farmers to produce more outputs to maintain their income levels.

"Sheep farming is getting worse. We are getting less for lamb and wool is almost non-returnable."

**

"To some extent we would pay out either reducing or staying the same over time. We had our highest pay out two years ago, we got $4.50 odd and this year it was $4.33 last year and now we get $4.35 so now. We have to increase production and reduce costs just to maintain profitability let alone increase it."

Costs of farming
Whilst commodity prices are dropping, the costs of farming have increased, resulting in a continual narrowing of profit margins. In general, farmers interviewed for this project tended to be more focussed on the increasing costs of on-farm inputs, rather than compliance costs.

"To maintain or improve profits I had to carry more and produce more off the stock I had. We have seen our profits go up and we are now going to see them eroded by costs. We are going to have to maintain our profit level. Across the board, everything has gone up, particularly in the last two years. Certainly the things I am purchasing are going up. Fertiliser has gone up. My big expenses are fertiliser, interest rates have gone up in the last twelve months, repairs and maintenance, mechanics charge-out rates are higher now, parts tend to be dearer. Drainage, diggers for drainage and overflow has probably held its thing although may have gone up in the last six months."

Government policy
Some farmers recognised the influence of past and present government policies designed to accelerate development and production levels.

"I suppose I abused (the wetlands), put diggers in there, tractors and drained water holes and ponds. Looking back now I wonder why I ever did it. Because that was the done thing, the government said "here you are here is the money go and do it."

Generating wealth
Occasionally farmers simply stated that the opportunity to improve their income was the key reason why they intensified their farming. *"It's just the opportunity to make more money off your own property, running the farm more efficiently".* They did not identify any other driver as such.

Other economic drivers
Other international economic (and related) drivers identified by the Parliamentary Commissioner for the Environment but not by Waituna farmers include:

- international trade policies
- consumer values and expectations overseas
- requirements of overseas retailers such as supermarkets
- exchange rates
- access to energy sources (especially oil) and their costs.

Domestic economic (and related) drivers identified by the Parliamentary Commissioner for the Environment but not by Waituna farmers include:

- New Zealand's open market based economic system and trade policy
- Processing, marketing and exporting agencies
- Financial institutions – access to economic capital and debt servicing.[11]

Technological drivers

Technological drivers which enable land managers to intensify their farming practices were not commonly mentioned by Waituna farmers. Nonetheless they are likely to have had a significant influence. One technological innovation identified by a farmer is scanning pregnant ewes and managing them according to the number of lambs they carry.

Social or cultural influences

Economic drivers which intensify farming practices are underpinned and reinforced by social influences. These include attitudes towards developing land, knowledge and understanding of the concept of 'environmental sustainability', the stage of life of a farmer, and a shift in attitudes towards generating wealth.

The intensification of farming has also had a profound influence on the social structure of the community in the Waituna catchment. This has implications for farmers awareness of, and attitudes towards water quality in the catchment, and should be taken into account in any future change or communications strategy.

Attitudes towards development
A strong cultural driver underpinning the drive towards intensification in the Waituna catchment concerns land development. Farmers in Southland have a proud tradition of improving the productivity of their land. This tradition has been successfully pursued for over 150 years, and is a source of deep satisfaction and sense of self worth as a 'good farmer'. Good stewardship is associated with developing rough, swampy blocks into farms that look good and have impressive production figures. This pride was evident in the participants interviewed for this project, and in land managers who were interviewed in 2004 about their experiences of farming Environment Southland leasehold land.[12]

> *"I've always wanted to improve things. I have always owned a bulldozer and if I see a bit of scrub I tend to get itchy fingers. If I see a swampy bit I want to drain it and fill in the hole."*

This attitude is a strong cultural driver, and explains why many farmers fail to see any appeal in the lagoon, or swampy parts of their farm.

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[11] Ibid
[12] Nimmo, K (2005) *Farming Environment Southland leasehold land: Farmer attitudes and experiences.* NZ Landcare Trust, Christchurch.

Developing and intensifying a farm is a step-change process. Improved production from one block of the farm is reinvested in other, rougher parts of the farm. This is achieved primarily through paddock subdivision and renewing pasture. The intended long term effect is to improve the capital value of the farm. A farm which conforms to prevailing expectations of good infrastructure and levels of production has a better resale price than a farm that is less developed.

Farmers often described development as an essential part of the economic health and wealth Southland. Despite expressing frustration about the impacts of dairy farming, (see pages 16-17 for further discussion about this) farmers often referred to the dairy sector and the economic benefits it has brought to Southland.

> *"The dairy industry does employ a lot of people locally. From what people say it was like in the 80's and early 90's it was quite a depressed area and since dairying has moved in it does generate a lot of revenue that gets spent within the community and keeps things going. It supports the schools, it supports the transport businesses, it supports the fertiliser companies".*

The respect dairying commands in the area suggest that a change or communications strategy in the Waituna catchment could benefit from findings ways to acknowledge and celebrate the benefits of dairying to the area. Dairy farmers are weary of being villainised, and further attacks are likely to create deeper resistance to change, or discourage dairy farmers who genuinely feel that they are doing their best under difficult circumstances. A change or communications strategy should try to acknowledge and celebrate the benefits dairying brings to the area (Recommendation 1).

The impact of development on ecological values in the catchment is seen by some as inevitable sacrifice.

> *"I think you have to strike a balance between human development and the environment. There are certain areas where you have to be able to maintain (the environment) without really affecting the quality of life of the human population as well (for an example in Fiordland). And there will be certain areas are going to have to be sacrificed. The value of land close to main population centres is going to be more, and people are going to have to get the best return to afford that land. Unfortunately that is going to mean intensive land use. What goes with intensive land use is a significant amount of pollution. Everyone tries to stop it but everywhere where there is dairy works, a meat factory, human nature being what it is there are going to be accidents."*

Whilst this perspective was not explicitly vocalised by the other research participants, some commented that it was a prevailing attitude amongst a number of farmers in the catchment. Farmers also stated that because they had benefited from development in the past, it would be unfair to prevent other people from earning a livelihood by placing a moratorium on development.

Some farmers expressed the view that most of the intensive development in the catchment had happened already, especially before and during the 1970s. Therefore there was little land left to develop, and the impact of present land development was relatively minor.

Stage of life

A number of research participants noted that stage of life and levels of debt had a strong influence on a land manager's attitude to farming. Younger farmers with debt levels are forced to intensify to service their debt. Sharemilkers especially are on a constant treadmill of building their assets in order to purchase their own farms one day. Two of the older land managers admitted that whilst they felt upset at the impact of development and intensification of farm land in the Waituna catchment, they recognised that had benefited financially from a similar process earlier in life, and why it was important for younger farmers.

"I suppose I am guilty myself. It was making money and damn the consequences."

A few farmers described the drive to generate wealth in a more negative light:

"It was in the last ten years since the economy picked up and there is a dollar or two in farming. A lot of principals have gone out the door and it's me, me, me, money, money, money, quick grab it why you can.... It's driven by greed."

**

"...there is probably a greed factor as well as the cost of everything rising."

Changes in the Waituna community

Long term residents in the catchment reported considerable changes in the Waituna community, primarily due to the increase of dairy farms in the catchment.

"...the community dynamics have changed, I am virtually a stranger in an area that I have lived all my life."

**

"I have good neighbours but the community has changed over the past few years.

(Q) How do you feel about that, is that for the better or worse?

It's hard to say, probably for the better. Everybody used to be a lot more relaxed. It is a lot more business orientated now."

Sharemilkers were often singled out by other farmers as 'temporary' members of the Waituna community.

"Sharemilkers are only here for at the most three years, in some cases one to two years. Their object is to go from 300 to 400 to 500 cows and eventually sell all those cows and get a farm of their own."

Not only does the dairying community have a very high turn over, sharemilkers are very busy, and find it hard to become part of the social fabric of the community.

"When you are flat out busy you don't have time to socialise."

These comments indicate that social connections around the dairy industry (especially concerning sharemilkers) never have the chance to become established, and are continuously broken as sharemilkers move into, and out of the catchment. This has significant implications for a 'traditional' model of a landcare group, which in the past has relied on relatively stable community networks to encourage change, or make certain farming practices unacceptable. For further discussion on this issue, please see pages 57-58.

Key points

Farming in New Zealand has intensified over the last ten years, primarily due to a set of a wider socio-economic drivers which are mostly outside of farmers control. These drivers both force and enable farmers to intensify their operations at a paddock level. Farmers in the Waituna catchment are subject to the same drivers to intensify their farming operations as any other farmer in New Zealand.

- most farmers reported intensifying their farming operations over the last five years
- economic drivers reported by Waituna farmers include price of land, rising production costs, commodity prices, government policy, and an opportunity to generate wealth
- technological drivers were not commonly mentioned by farmers, but are likely to have had a significant impact

The social fabric within which these drivers operate also have considerable influence on how farming is conducted in the Waituna catchment. These include a favourable attitude towards development and wealth generation, plus the stage of life of a farmer. Dairy farming in particular has brought a lot of wealth and positive benefits to the area, which commands a lot of respect in the local community. Dairy farmers are weary of being villainised, and further attacks could to create deeper resistance to change.

Local community networks has experienced profound changes with the increase in dairy farming in the area. Sharemilkers in particular are reported as having a high turnover, and are less likely to have a long term interest in the local community or the local environment. This issue will be discussed in greater detail in Chapters Eight and Eleven.

Recommendation 1: a change or communications strategy should try to acknowledge and celebrate the benefits dairying brings to the area.

3. Perceptions and awareness of water quality

This section explores farmer perceptions and awareness of water quality in their creeks and drains on their farms, and in the lagoon itself.

Creeks and Drains

Farmers universally perceived waterways on their property as the means by which excess water is drained off their farms, allowing them to maintain the productivity of their property.

> *"They are vital. The key to unlocking most of this land is drainage."*

A few commented noted that drains and creeks functioned as a habitat for wildlife. They did not consider this function as being significant for their farm operations.

Farmers used a range of indicators to assess the quality of water flowing through their farms, including:

1. water clarity
2. water flow
3. presence of weeds in waterways and ditches
4. colour (usually associated with dairy effluent)
5. smell (associated strongly with dairy effluent)
6. debris and siltation (associated with development)
7. presence of algae
8. presence of wildlife in the water
9. temperature
10. potability
11. variability through seasons

The first five indicators were the mostly commonly cited. Research participants equated clear, flowing water with good water quality. They associated discoloured, foul-smelling water, plus the presence of weeds, debris and algae with low water quality.

Research participants were more confident in their comments about the water quality in waterways *on their own farm,* compared to water quality in the catchment as a whole. Farmer knowledge of water quality in the Waituna catchment tends to be *highly localised, and relative to their location in their catchment.* The comments below illustrate this point.

Some of the farmers who had lived in the region for a long time commented that they had seen a change in water quality in their creeks and drains. Those at the top and middle of the catchment cited growth of weeds in their waterways as an indication of an increase of nutrients in the water. They often stated that the water quality flowing through their own farms was reasonable, but it might deteriorate further down stream due to the incremental impact of nutrient runoff from multiple farms.

Long term residents at the bottom of the catchment were far more vocal about their observations of changes in the water quality in their streams. They cited a wider range of indicators, and a greater magnitude of change.

> *"I came here 36 years ago. The creek was relatively weed free. You could sit there and watch trout a good four foot long swimming in it. They used to dig it up something terrible... the whole bottom of it would be turned up with holes and dams. No one was very environmentally conscious back then but that was the way it was, it was eels and trout in abundance and our children used to play in it.*

It is important that I stress I am not anti-dairy or anti-dairy cockies, but it wasn't until the advent of the dairying that we first noticed that the kids, when they were playing in the creek, when they came home they had to have a wash because you could smell it. That was the first change. They gave up playing up in the creek because of the smell. It changed from pristine to dirty and looking back that was when the dairying started to intensify.... The fish virtually disappeared. The creek changed to a stinking cesspit."

**

"The creek is disgusting. One day I was down there, I was thirsty and I did a silly thing and drank it. I got very crook."

One farmer said he didn't know how good the water quality was on his farm.

"As far as the creek is concerned, I would say it is probably not too bad. But without taking samples it would be hard to say. You really have to have scientific evidence to back it up."

Not all farmers were convinced that there had been a significant change in the water quality in creeks and drains on their own farms.

"Do we have a water quality problem in the Waituna or do we foresee we are going to have one in the future? I have seen nothing to suggest our practices are having a huge negative impact. I know we have to be careful and we have to adopt good practice to prevent and improve if there is a huge issue and the quality is going bad. I haven't read anything to that effect."

One stated that it could be improving due to changes in his own farming practices.

"I would think the stream running through this property is better quality now than it used to because I have stopped stock going in and out (of the waterways."

One long term resident concluded that since the bulk of farm development in the catchment had happened, water quality in the catchment had, and will continue to, stabilise.

"I looked at (the Mokotua creek) a month ago and I thought it was not too bad.... I thought it looked good for the way it used to be. Way back in the 70s I thought the water was quite bracken but now it was clearer. I would presume most of the swampland had been drained up in the area."

A mixed stock farmer stated that any water on a farm in the Waituna catchment was likely to be 'swamp water', and it needed to be drained off a farm. He did not consider swamp water to be high quality. The only thing that would make it 'worse' would be dairy effluent.

In order to counteract a tendency to draw conclusions based on highly localised observations, catchment-wide information about water quality needs to be promoted consistently to farmers to counteract (Recommendation 2).

Lagoon and wetlands

Most farmers interviewed for this project very rarely visited the lagoon. If they did pay a visit, it was usually to fish or hunt. On the whole ecological and aesthetic values were not commonly mentioned by those who did visit. Two had never been there, citing lack of time and interest. Only a minority were able to comment on changes in water quality on the lagoon based on first hand experience.

> *"Christ I get emotional about it. It is something I have treasured all my life, the finest brown trout waters in the entire world. I get gutted. I used to be able to go out there until less than ten years ago; we could go floundering at night. I go out there now and what do I get? Nothing, if you're lucky you might get one or two and what's changed? With the silt coming down it has covered all the sandy beds out there. It has filled all the channels in with trash and litter and flax bushes from development. It is high in nitrate and ammonia, so if you were a fish would you want to live there?"*
>
> **
>
> *"I used to go fishing in the lake but it's a bit weedy for baiting. It is deteriorating for recreational reasons."*

Some farmers were aware of the potential incremental impact farming could have on the lagoon.

> *"Everyone's little bit of runoff ends up in the lake so it has to make an impact."*
>
> **
>
> *"All that stuff is going to end up in the creek eventually.*
>
> Q) Does that concern you?
> *Yeah in the long term I think it is. It's going to be a problem.*
>
> Q) What do you mean long term?
> *Possibly, it's not going to affect the water way, we're not going to notice it. But in ten years time go down to Waituna Lagoon and there will be quite a few toxic places. Not just the lagoon, places in general where the water ends up... I'm not a scientist but I presume all this like the nutrients and fertiliser based stuff will poison the water, I'm not sure."*
>
> **
>
> *"It can't be having a flash effect on the lagoon, I do know with the odd conversation that the lagoon is in a bit of a state. The way I look at it is that I have been able to look at a micro section of what is happening further down stream, it only has to be detrimental. Everything ends up down here."*

Two farmers assumed that if the lagoon was opened to the sea regularly, it would remain healthy.

> "Q)Have you noticed any changes in the lagoon itself?
> *The Waituna has to be let open to the sea regularly to allow the salt to get in there to clear away the weed out. The salt kills the weed, that probably fixes it. I don't know. Everyone has a different opinion and who really knows."*

Most research participants knew that the lagoon had significant ecological values, but only in very general terms. This knowledge was obtained through:

- Environment Southland publications
- word of mouth through their school-age children
- the Waituna Landcare group newsletter
- road signs.

Only two farmers cited specific details about these values (e.g. unusual plant communities or rare birds).

Valuing the lagoon
A minority of farmers valued the lagoon for different reasons. One was passionate and very knowledgeable about the unique plant and birdlife living in the wetlands complex.

> *"Are we not better to put it aside and farm our better land and allow this land to support its own inhabitants? Where will the Fern bird and the Bittern survive? If we continue to drain and develop the way we are going, what's left at the other end?"*

Another farmer recognised the possible economic value the lagoon might have to the wider Southland community through potential for tourism.

> *"I am reasonably proud that we live near it and it is a resource that we need to look after otherwise we won't have it. If it deteriorates then we lose potential for tourists and other people coming to see it. In that point I am concerned, I don't want to see anything deteriorate as far as that goes."*

Two were concerned about water quality in the creeks and lagoon from a moral standpoint, connected to cross-generational issues.

> *"I have just starting thinking we are stuffing the environment and that is not a flash indictment for the next generation. It is unacceptable and the cost is too high."*

**

> *"I think that we have to protect our environment and pass it on in good shape. It is far more important that productivity."*

A number of the research participants were ambivalent or uninterested in the lagoon, principally because it does not impact on their daily working lives, or possess other valued qualities that they value (e.g. recreational).

> *"It probably should matter to me but I do nothing about it. I don't think it directly effects the farmer. If we are using the water as stock water it would directly affect our livelihood but because the water is there for drainage. I don't think it affects us."*

Key points
Farmers universally perceived waterways on their property as the means by which excess water is drained off their farms, allowing them to maintain the productivity of their property. Drainage networks are therefore very important to farmers.

Farmer awareness of deterioration of water quality in the catchment is variable. Some farmers weren't sure how good it was, others thought it was reasonable, and some perceived that water quality had deteriorated. The geographic location of farmers and length of residence influenced

farmer opinions about water quality, which tends to be based on highly localised observations, rather than a good knowledge of catchment wide water quality. Most farmers appear to assume that if the water is clear, the water quality is good, and this is misconception which needs to be addressed.

Not very many farmers visited the lagoon, and most were ambivalent or uninterested in it. They have little personal experience or knowledge about it, and this is a fundamental challenge for the Waituna Management group.

Recommendation 2: Catchment-wide information about water quality needs to be promoted consistently to farmers to counteract a tendency to draw conclusions based on highly localised observations.

4. Perceptions of influences on water quality

This section outlines research respondents perceptions of how their farm influences water quality in the Waituna catchment

When research participants were asked what they thought was causing the changes in water quality, the majority of long term non-dairy farmers identified dairy farming as having the greatest impact, and indicated that the changes became highly marked when dairy conversions started in the catchment five to ten years ago. Impacts of dairy farming on water quality included:

- dairy shed effluent, or failing to manage effluent spreaders correctly (e.g. leaving them in one place for too long)
- high rates of nutrient application and subsequent runoff
- high stocking density
- heavy cattle damaging soil structure
    - pugging soil
    - compacted soil over tile drains fail to absorb effluent and nutrients, with high concentrations filtering into tile drains
- runoff from winter crops grazed by dairy cows e.g. swede paddocks
- cows standing in waterways/grazing creek banks (no longer common for dairy farms)
- the process of converting a sheep farm to a dairy farm (siltation, litter in water ways).[13]

Sharemilkers were often singled out as being more negligent than dairy farmers who owned and managed their own properties. Sharemilkers were perceived by some as being focussed solely profit making, with no interest in caring for the environment, or the local community they live in.

> *"It is basically with sharemilkers for some reason. They get to the stage, where they only wish one thing and that is to put the milk in the tank, get their fifty percent of the cheque and stuff everything else. They are the ones that have the attitude with the environment."*

Several non-dairy farmers also observed that dairy farmers were 'easy targets' in the current political climate. They also stated that dairy farming practices had changed a lot recently, and a lot of the dairy farmers in the area were now conscientious about minimising the impact their farms had on water quality.

Sheep farmers claimed that the impacts of their farming practices would be of a lesser magnitude than dairy farming for the following reasons:

1. sheep are lighter, and did not pug or damage the soil structure like dairy cows
2. sheep do not like being wet, and stay out of water ways
3. sheep produce less dung
4. sheep farmers apply less fertiliser

The same reasons were stated by a few sheep farmers who claimed that their farming practices had minimal, or no impact on water quality.

> *"I don't feel as though I am having a huge impact. Am I being ignorant?... I can't really see any impact in what I'm doing."*

[13] Only one farmer mentioned this as an impact.

Some sheep farmers did state that their farming practices could have an impact on water quality. They identified nutrient runoff, and strip grazing combined with high stock density during winter times as potential impacts.

Dairy farmers interviewed for the project were aware and accepting of the potential impact their business could have on water quality. They identified effluent management and nutrient application as key management issues. Two were open about the fact they did not really know the extent to which their impact their farm could be having at present, particularly through nutrient runoff. Another was finding it so difficult to manage effluent he was planning to leave the industry altogether (see page 33 for further discussion about this).

Dairy farmers also pointed out that sheep farming could also have an impact on water quality, as well as cropping.

> *"...they blame the dairy farmers, but I think for a long time it has been cropping. I think it has been a problem before but they never looked for it and they only start monitoring it now. It's blown out of proportion, and it goes way back before dairy farmers arrived."*

This 'us and them' culture within the catchment needs to be addressed if an integrated catchment management approach in the Waituna catchment is to be successful, where *all* stakeholders become involved. For some suggestions on how this issue could be addressed, please see chapter 11, 'Moving forward, working with farmers on water quality issues.'

Key points

- non dairy farmers tend to assume that dairy farms are the key cause for decline in water quality in the catchment
- non dairy farmers assume that their farms have minimal impact compared to dairy farms
- dairy farmers were open to the possibility that their farms could have an impact on water quality, but have no way of quantifying that impact and adapting their management accordingly
- these perceptions tend to create a blaming 'us and them' culture within the catchment. This culture needs to be addressed if an integrated catchment management approach is to be successful, where all stakeholders in the catchment become involved.

5. Monitoring and information about water quality

This section examines farmer opinions about water quality monitoring in the catchment. All of the farmers interviewed for this project knew that the creeks and lagoon were being monitored. This knowledge was obtained by:

1. reading the local newspaper (most farmers)
2. word of mouth with members of the Waituna landcare group
3. the Waituna Landcare group newsletter.

None of these farmers (with the exception of one farmer) had been proactive about seeking information about water quality in the catchment. The principle reason given for this is that water quality in the catchment currently does not affect on-farm profitability or productivity.

> *"It's not that (information about water quality) doesn't interest me... it does interest me, but it's just not affecting me at the moment."*
>
> **
>
> *"I am not worried about (water quality) because we get our water from elsewhere; we get it out of the bore.*
>
> (Q) If your stock was relying on surface water would it be more of a concern?
> *Of course. You would probably get it tested every so often.*
>
> **
>
> Have you looked for information about water quality in the catchment?
> *"No, mainly because it is no longer my problem and I am quite sure I am not adding to it."*

Most were aware that Environment Southland and the Waituna landcare group monitored water quality, but very few were aware of the location of some of the sites.

A number of farmers were supportive of monitoring water quality in a general sense.

> *"The Waituna Landcare Group did say they would monitor the streams further away from the lagoon and stuff like that. If they want to know why the lagoon is that way, that is the only way to go, to find out where it comes from. I think it is important they do things like that".*
>
> **
>
> *"I suppose you need to know if there is a problem, and if there is a problem how to deal with it, or what the source of the problem is and then put a plan in action."*
>
> **
>
> "*They have got to keep an eye on it I suppose. It's easier to fix the problem before it gets too big".*

Others perceived that there was a lack of consistent, or highly visible information about changes in water quality in the Waituna catchment.

"It would be good if we knew that information. It is a benefit to everybody if that information is used to benefit the catchment and the people that are living within it."

One farmer was happy for members of the Waituna landcare group to monitor the quality of waterways on his farms, and talked to landcare group members about water quality if an opportunity arose.

"(Q) Have you looked for information about water quality in the area?
No.

(Q) Why is that?
It doesn't affect my profitability. I do have an interest, when Gay comes and test I will always ask her what it is like and how it is going and talk about bits and pieces in the stream that I can't see driving past in the motorbike. My kids do school projects and they talk about it. It doesn't have a major interest for me."

Just one farmer undertook to monitor water quality himself on his own property using a simple test, because he felt *'the better the information there is, the better the (catchment management) decisions will be".* He also valued a sense of control over the information he collected. This information is communicated occasionally to the Waituna Landcare group.

None of water quality data collected by landcare group members has been systematically fed back to owners who host the monitoring sites. This could be a valuable opportunity for knowledge and relationship building between the Waituna landcare group. These host farmers were genuinely interested about what is happening in waterways on their farms. Even if the information collected by the landcare group is of limited use, this information could be circulated to these farmers, with an explanation of the limits of the data.

The discussion above indicates that information about water quality needs to be proactively promoted to farmers in a way that makes the information easily accessible to farmers. Most farmers will not seek this information out themselves. Care needs to be taken when promoting this information to try and avoid exacerbating the 'us and them' culture prevalent in the catchment (Recommendation 4).

Quantifying the impact of individual farms on water quality
Quantifying the impact of individual farms on water quality was an important theme for a number of farmers. They stated they were prepared to take personal responsibility for the impacts their farming practices.

"I would like to do my part and ensure it is its best as it can be. That is my focus. I don't know if I do a good job of that..."

However most only want to do so relative to the extent to which they cause the problem, *but they have no information to gauge the extent of the impacts of their farm.*

Water quality monitoring data is currently collected from a range of points in the Waituna catchment, but these points are not specific to farm boundaries. Runoff from many farms mingle in the waterways, with no way of telling which farms or farm managers are truly responsible for the decline in water quality. The 'fault' or responsibility can readily be transferred to 'other' farmers (e.g. negligent dairy farmers). Overall, this lack of farm-specific data enable farmers to distance themselves from the issue, assume that their own practices are adequate, or assume that their farms have little or no impact.

A number of farmers stated that there was a need for robust scientific research to determine the extent to which water quality was deteriorating, and the true source of the contaminants. One farmer mentioned that he would be interested in a time-series data over a long period of time (i.e. a 'before and after dairy farming" snapshot). Whilst this data is unlikely to be available, farmers could be presented with data from a stream in Southland where there is less intensive farming.

Some of the farmers interviewed for the project were open to having monitoring take place on their farms. This information could act as a lightening rod to bring their interest to bear on water quality issues.

> *"I think the gist of it is, we can better manage balance farm productivity and the environment if we can better manage what is leaving our farm on a regular basis. We don't have that information. It has to be accurate, and there is no point in saying 'one kilometre from your boundary this is what is happening'. (The information) needs to be at the boundary of the farm. You need to know what the water quality is when it comes onto your farm and what is like when it leaves... We have got nothing to hide and everyone should be treated the same. Like I said, we have no problem with water quality. If everyone gets checked and not just the dairy farmers, everyone is treated the same. As long as that happens we don't have a problem with monitoring".*
>
> ***
>
> *"I have no problem with monitoring the water quality on my farm. If you can prove that my practices are detrimental I will definitely address them."*
>
> ***
>
> "Q)How much impact do you think your farm would have on the water quality in the lagoon?
>
> *A)Pass, I wouldn't know. It probably depends what time of year, I think that differs as well. Is the information available?"*
>
> ***
>
> "Q)How would you feel on your farm being monitored in terms of water quality?
>
> *A)Fine, it would be interesting to find out. We probably should be testing at the end of the farm, actually the beginning and the end of the farm because we don't know my neighbors bring to me. The thing is, there is a cost to that,... we have so many costs put on to us, you don't (monitor) because there is no direct benefit. What we find now, with our effluent consent, we have to monitor the water quality on this farm because the water bore is basically down in paddocks we spray effluent over. That is for safety reasons. ES come and test it every year and we get a bill for it."*
>
> ***
>
> "Q)If someone came to you and said they want to test water at top and bottom of your farm, how would you feel about that?
>
> *A)I guess I don't know. I guess they would be free to do what they liked. How would I feel? I would be a little bit uneasy but it would certainly, it might*

make me improve. I would love to have a warning bell as soon as there is a problem."

***

"Q) If someone came in and said can we monitor the top end and the bottom end of your farm, how would you feel about that?

It wouldn't worry me. Our object is not to hide anything, we want to be clean and with it."

A farm-specific monitoring programme could be a powerful tool to encourage a change in farm practices in the Waituna catchment. *It is doubtful that most farmers would change without this information.* (Recommendation 4).The programme needs to be inclusive, involving the different major land use types in the catchment so as to challenge the current 'us and them' attitude prevalent in the catchment. Farms at different stages of development could be monitored. The application of nutrients or increase in siltation is likely to be more intensive as a rough block is developed, or changed from sheep to dairy farming.

One of the farmers who indicated an interest in monitoring data was insistent that every farm in the catchment be monitored. He argued that this would be required to ensure essential levels of transparency and fairness to the process. This level of monitoring is prohibitively expensive and impracticable, but it is possible that other farmers in the catchment would demand similar levels of validity or reliability before they would accept its results.

If a farm-specific monitoring programme is put in place, scientists and the Waituna landcare group will need to enter a dialogue with farmers to negotiate a monitoring programme which is both feasible for scientists and acceptable to farmers. Participating farmers will need to be prepared to make their nutrient application program available to scientists, and ultimately to other farmers in the catchment, so they can compare the effect of their own nutrient management regimes to the monitored sites.

If farm specific, nutrient-related water quality data is made available to farmers in the catchment it needs to be followed up with good information about:

- changes in management practices required
- how to implement the change (ideally with a minimum of disruption to the farmer)
- how to cope with any flow-on effects on the farm, especially if it involves changing nutrient application regimes.

Environment Southland was identified by all farmers as a trusted, credible organisation to monitor water quality. Monitoring by the Waituna Landcare group is less likely to be trusted because some farmers perceive that the group would present the data to suit its own agenda. No science-based research agencies were mentioned, probably because of lack of awareness of these organisations.

Would monitoring data lead to a change in farming practices?

There is some question about the extent to which farmers would change their practices even if it were proved that their farm was impacting negatively on the waterways in the catchment. This is related to the lack of on-farm impacts of deteriorating water quality.

"(Monitoring) sounds like a good idea for someone in an office, but to the farmer himself unless it is affecting him a monetary way, he is just going to ignore it and say there are more important problems. For example if we are allowed to farm our creeks, and the water quality was affecting our fish we

would soon fix it then. But because it is not part of our every day life it is out of our mind.

Q) So the water quality doesn't have any affect on you?
Not at this stage. I wouldn't like to see it impacting on me in the future. But that is easy for me to say because I don't get much of anyone else's water."

Key Points

- farmers do not proactively seek information because changes in water quality at present do not effect their on farm productivity or productivity. On the whole, most farmers could be described as only mildly interested or indifferent to water quality issues in the catchment, and have currently little or no incentive to change their practices.
- some farmers perceived that there was a lack of consistent, highly visible information about changes in water quality in the Waituna catchment.
- runoff from many farms mingle in the waterways, with no way of telling which farms are truly responsible for the decline in water quality. The fault or responsibility is then transferred to 'other' farmers (e.g. negligent dairy farmers).
- overall, this lack of farm specific data enable farmers to distance themselves from the issue, assume that their own practices are adequate, or assume that their farms have little or no impact. It is doubtful that farmers would change without having more farm-specific information available to them
- quantifying the impact of individual farms on water quality was an important theme for a number of farmers. They stated they were prepared to take responsibility for their impacts, but only want to do so relative to the extent to which they cause the problem. They currently have no information to gauge this.
- a number of farmers stated that was a need for robust scientific research to determine the extent to which water quality was deteriorating, and the true source of the contaminants.
- some farmers were open to having monitoring take place on their farms.

Recommendation 3: information about changes in water quality need to be proactively distributed to farmers on a consistent basis. Care needs to be taken when promoting this information to try and avoid exacerbating the 'us and them' culture prevalent in the catchment.

Recommendation 4: implement a farm specific water quality water monitoring program, incorporating the major land use types in the catchment. If monitoring programme is implemented, scientists and the Waituna Management Group will need to enter a dialogue with farmers to negotiate a programme which is both feasible for scientists and acceptable for farmers.

6. Farm practices related to water quality

There was insufficient time over the course of the each interview to explore in depth the extent to which practices which minimise the impact on water quality were implemented by farmers. This kind of discussion would have required a second interview session with each research participant. Neither was it appropriate to examine in detail the knowledge farmers had about these practices. It was more important to avoid a process that scrutinised or 'tested' farmers so that researcher interviewers could establish trust with the research participants. This in turn should maintain a sense of openness towards, or interest in, the Waituna catchment project as a whole.

A compromise was attempted by asking farmers to fill out a simple questionnaire which listed a range of different practices which minimised the impact of farming on water quality.[14] The information collected through this questionnaire should be viewed with caution, because it was completed by only a few farmers, and gives no indication of the extent to which these measures are actually implemented according to 'best practice'. A far more accurate picture of current practices would be obtained by a series of farm visits by an experienced farm manager.

Qualitative comments about a particular practice were followed up if it arose during the interview. This chapter outlines these comments, and discusses farmer responses to the questionnaire.

All of the research participants were aware of a number of ways they could minimise the impact of their farming practices on water quality. They were asked to identify what they thought were the three most effective things that would minimise the impact of their farming on water quality. Their responses were clustered primarily around:

- Keeping stock out of water (fencing, installing culverts)
- Managing effluent properly (maintaining the effluent spreader properly, appropriate application rate, good effluent storage systems)
- Taking care when applying fertiliser (smaller amounts more often, keeping a buffer zone between applications and waterways, plus keeping an eye on the weather).

The above practices tended to focus more on the impacts of dairy farms than sheep farms, and reflects the general opinion that it is dairy farms which have the greatest impact on water quality in the catchment.

Fencing

Non dairy and dairy farmers had very different attitudes towards fencing off waterways. All of the dairy farmers interviewed were supportive of fencing off waterways in their farms, and most had already done so. On the other hand, non dairy farmers did not think it was necessary to keep their stock out of their creeks and ditches because sheep stay out of waterways and do not wreck the same damage as cattle. The same farmers argue that sheep graze right down to the waters edge, and keep creek and ditch banks 'beautifully manicured' and stable. They observed that fencing stock out of waterways create a range of problems unless the riparian margins were managed well.

> *"What happens is that gorse and weeds grow up along the ditch banks. The grass grows long, the gorse grows up, and the cow cockies don't do anything about it. Gorse is a terrible thing because it weakens the ground. It fixes nitrogen into the ground and effectively loosens it. As it grows higher and higher the grass underneath dies so what you are left with is a plant that is loosening the soil around it and eradicating its competitors on a ditch*

[14] Only 11 out of 14 research participants completed the questionnaire.

bank. Then you get a flood and a lot of grass and debris comes down and starts building up on the gorse, and the next minute the bank collapses."

Weedy riparian margins also become a source of weeds for the rest of the farm. Overall, most non dairy farmers perceived fencing and maintaining riparian strips as inconvenient and an unwanted cost. This attitude is reflected in non dairy farmers responses to the questionnaire, five non dairy farmers out of eight had half, or less than half of their waterways fenced. *Adoption of this practice by non-dairy farmers is therefore likely to be low, unless they are offered some kind of incentive to do so.*

Proportion of waterways fenced	Non dairy	Dairy
Less than a third	3	
Half	2	
Over half	2	1
Nearly all	2	2
TOTAL questionnaires completed	**8**	**3**

One sheep farmer had fenced off nearly all of his waterways, and noted the costs of cleaning his waterways had dropped slightly, and the banks of his waterways were less damaged. (Sheep walk down the same track to waterways, and this part of the bank will deteriorate more rapidly than other parts). He had also prevented some stock deaths. The farmer did not undertake any planting in the riparian margins, but was letting vegetation regenerate by spraying plant pests. His preferred vegetation in a riparian margin was long grass.

"At the end of the day with a filter system you are better off with good solid grass than you are half a dozen trees. As soon as you have a tree nothing else grows underneath it, so water can run underneath the tree. But nothing will run through grass."

Riparian management

Only two non dairy farmers had planted new vegetation in riparian margins. Proactive riparian planting is hard work, costly, and a low priority for farmers. This is reflected in farmer responses to the questionnaire. Most farmers however did undertake plant pest control in their waterways.

Riparian Management	Non dairy	Dairy
Maintain a margin of long grass at least 1 meter wide either side of a water way	2	
Existing areas of native plants, wetlands, or peat bogs are fenced off	2	2
New native or exotic plants established around major water ways	2	
Plantings provide shade or shelter over the stream	4	
Plant pest control in waterways (e.g. gorse and broom)	7	1
Animal pest control	5	
TOTAL questionnaires completed	**8**	**3**

One farmer had taken advantage of a subsidy offered by Environment Southland a few years ago, and was enjoying watching bird life return to his farm. The same farmer commented he had done the planting principally because the subsidy was available. Another farmer was keen to be more proactive about planting more trees along his waterways, and expressed an interest in receiving more advice about the best practices for riparian planting.

The plantation forest manager had planned to do some riparian planting on his block, but felt stymied by Environment Southland requirements.

"We were going to put some plantings along the creek and we contacted Environment Southland. I was going to get some of the guys to work in the weekend..., but they wouldn't let us do it because you have to put a digger down the creek to clean it out. (Environment Southland's) drainage guy

didn't want us to put the trees anywhere near the river bank. There has to be a margin between the creek itself and the bank so they can get the digger in and they have somewhere to put the spoil.... We just gave up in the end."

He also wanted to establish a wildlife reserve on his property but chose not do so for the same reason. *"We got a letter (from Environment Southland) saying you have to get a resource consent and see the iwi and all this sort of stuff. It was too much effort."*

One dairy farmer claimed that planting around waterways was not practicable for his farm because it slowed down the drainage flow, and caused flooding.

Maintaining drains and open ditches

Farmers universally perceived waterways and drains on their property as the means by which excess water is drained off their farms, allowing them to maintain the productivity of their property. Maintaining a good drainage network is therefore very important to farmers.

Open ditches

All of the farmers who completed the questionnaire had open ditches on their farms. Farmers like to keep the water flowing through the ditches quickly to prevent weed growth and build up of siltation. This is achieved primarily through mechanical cleaning and spraying by contractors.

Drain maintenance	Non dairy	Dairy
Cleaned out regularly by contractor	8	3
Low impact chemical spraying	4	3
Low impact mechanical drain clearing	6	1
Sediment traps installed in slower flowing, wider sections of drain network	1	
Total questionnaires completed	**8**	**3**

A key issue with maintaining or cleaning open ditches or streams is that tailings are dumped by the sides of the ditches or stream. These tailings create a higher ridge along the side of the ditch, and prevent runoff from a paddock flowing into a ditch, or create a habitat for gorse to become established. Farmers sometimes use these ditch tailings to level out the surface of paddocks or fill in holes.

One farmer observed that the contractor cleaning out his ditches and creek has made them too deep, and the banks are so steep and high they have started to cave in. The spoil from the collapsed bank inhibits water flow, with a subsequent accumulation of sediment and weeds on the floor of the ditch, which then requires further cleaning. This farmer preferred spraying over mechanical cleaning. Other farmers also noted that weed growth in drains made maintaining their drains difficult.

Just one farmer was experimenting with a silt trap in his (only) open ditch. He asked his drainage contractor to leave 100 meters of the main channel on his farm uncleared every 300 meters. The uncleared section of the drain will trap any silt or vegetation travelling down the channel. The next time he cleans the channel, this section will be cleaned out, but another 100 meters will be left up or downstream of the original section to operate as the next silt trap. This practice is one that he recently conceived of independently.

In 2004, social science research interviews were conducted on the West Coast of the South Island concerning farmers management of 'humps and hollows'. Wet, peaty land is contoured into large humps and hollows to improve the drainage and productivity of otherwise marginal land. Concern about increased nutrient runoff from such development initiated a Sustainable Farming Fund project, which is investigating the rate of runoff and possible solutions to this issue. Part of this project was to ask farmers opinions about creating a small wetland at the bottom of each hollow, which would then act a sediment and nutrient trap. This idea was not received favourably by farmers because they perceived that the size of the wetlands would eventually increase, defeating the purpose of the contouring in the first place.

However, farmers were more open to the idea of leaving sections of their drains uncleared to act as a nutrient trap. Further research is required to determine:

1. the extent to which silt traps are an effective solution
2. what kinds of drains are best suited for sediment traps, and how many are required to be effective?
3. likelihood of sections revert to swampy areas and how can this be prevented
4. do other waterways in a paddock have an impact, or will they be affected?
5. will there be problems with weeds?
6. impact this might have on other parts of the farm
7. does this practice have different effects in different parts of the catchment?
8. to what extent should this practice be used in different parts of the catchment?
9. benefits – e.g. reducing the cost of clearing drains
10. effects of very high rainfall or flooding
11. effects on neighbouring farms
12. best practices for drain and silt trap maintenance, e.g.:
    - length of sections of cleared/uncleared drains
    - location of sections
    - frequency of clearing silt traps

If silt traps are to be promoted in the Waituna catchment, the above issues are likely to be relevant for farmers in Waituna. The extent to which this option is acceptable to farmers could be investigated through further social science research.[15]

Tile drains

All farmers who completed the questionnaire had tile drains, but only five had mole drains on their property. Over the years of continuous drainage, the peaty Southland soils shrink and tile drains slowly rise to the surface, requiring replacement. One farmer had replaced some of the tile drains on his property three times over a lifetime of farming. Two farmers believe that soils covering tile drains on dairy farms are vulnerable to becoming compacted due to the heavier weight of dairy cows walking over the top of them. They observed that soil shrinkage combined with compaction reduces the capacity of soils to absorb effluent, which then soaks through to the tile drains in higher concentrations.

Nova Flow pipes were reported as becoming more popular in recent years, primarily because the tile drains are more difficult to source. A disadvantage of Nova Flow pipes is that the ribs in the plastic fill with sediment, which dry out and inhibits the capacity of the pipe to draw water. These pipes then become blocked more quickly. One farmer estimated that Nova Flow pipes may have a lifetime of only five years in Southland.

[15] Some farmers prefer to keep their drains clear with a fast flow of water running through them, indicating that uptake of silt traps could be low unless this option is carefully explored.

Nutrient management

Seven out of eleven farmers reported that they split their fertiliser applications. All of the dairy farmers tested their soils regularly, compared with two thirds of non dairy farmers. Just one farmer used a nutrient budgeting tool.

Nutrient Management	Non Dairy	Dairy
Split applications of fertiliser	5	2
Buffer zone of least one meter between water way and fertiliser application	5	1
Use of nutrient budgeting tools like Overseer	1	
Regular soil testing	5	3
Prevent silage leachate from reaching waterways	4	2
Total questionnaires completed	**8**	**3**

Most farmers (both non dairy and dairy farmers) reported a 25-50% increase in the amount of fertiliser applied on their farms over the last five years. The primary motivations to do this were to increase production levels, or to convert a sheep farm to a dairy farm. The process of converting a sheep farm to a dairy farm involves the application of considerable amounts of capital fertiliser. One dairy farmer reported that they were tapering off or even reducing their fertiliser application, because soils had reached an optimum nutrient profile.

Three non dairy farmers reported that they were trying to *reduce* or change the fertiliser they used. One was motivated by a concern that synthetic fertiliser was dropping the pH of his soils, and a desire to encourage more worm activity. The others were concerned about the impact on water quality in their creeks.

There is a diverse range of practices concerning soil testing in the catchment, especially amongst non dairy farmers. One farmer tested different paddocks every eight to ten years. Another farmer tested two or three paddocks every year, and these tended to be ones that were going to be planted with swedes, or paddocks that were not performing as well as he liked. Yet another tested alternate blocks every year, so he could obtain consistent data for the whole farm on a two year cycle. He was intending to do this until his new paddocks were 'brought into line' and clear patterns were emerging across the farm, then taper off soil testing.

Non dairy farmers tended to make decisions about fertiliser application by triangulating information from a wide range of sources, including:

- their own farming experience
- talking to, and observing other farmers
- reading
- soil tests
- soil company recommendations
- discussion groups (1 farmer only)
- farm consultant (2 farmers only)
- Hokanui gold farming programme (1 farmer only)

> *"I tend to get all the advice and shuffle it around and throw most of it out, but I do use some."*

Only one non dairy farmer reported following soil company recommendations closely. Other farmers tailor or limit their application according to their financial resources available for the year. Another preferred to make decisions based on the following rule of thumb;

> *"Someone told me once they never saw a farmer go broke from putting too much fertiliser on but quite a few go broke from not putting enough."*

The dairy farmers interviewed for this project differed from the sheep farmers because all of them tested their soils regularly and systematically (every year or two years) using the same paddocks or soil types. They preferred to follow the advice of their farm consultant, rather than a fertiliser company. They trusted the soil tests *results* of the conducted by the fertiliser company.

One farmer noted he had observed a wide range of fertiliser management practices in the dairy community. Another questioned whether some dairy farmers in the catchment had an adequate knowledge of good nutrient management practices that was appropriate for the area.

> *"For instance a dairy farm up the road.. about eight years ago dumped on fifty tonne of super and twelve tonne of nitrogen one afternoon and that was followed by four inches of rain. Down through my place where the creek flooded, all the vegetation turned black. It was burnt by the amount of nitrogen coming down through the water."*

He suggested that the regional council should place a moratorium on applying fertiliser in the coldest months of the year (June and July), a time when fertiliser is least likely to be beneficial and most likely to be washed off due to high rainfall. Another farmer supported placing a regulatory cap on the amount of fertiliser to be applied on an annual basis *".. some people just chuck it on".*

Fertiliser companies most commonly mentioned were Ballance, Mainland Minerals, and Ravensdown.

The benefits of using nutrient budgeting tools such as Overseer could be more aggressively promoted, particularly to non dairy farmers. In addition, a suitable tool could be used in conjunction with the farm-specific water quality monitoring program, which would demonstrate how the tool can be used in a working farm environment (Recommendation 5).

Shelter

Dairy farmers were divided in their attitudes towards shelter on their properties. Two claimed that their stock (especially young stock) fared much better when sheltered from the prevailing seasonal wind. They also noted that pasture growth was better up to fifty meters past on leeward side of the shelter.

Other dairy farmers disliked the mess created by cows immediately next to shelter (pugging and concentration of effluent). They also claim that sheltering cows cease to graze, with a subsequent reduction in their production levels. These perceptions motivated some dairy farmers to clear as much shelter from their farms as possible. *These attitudes are likely to create significant resistance to any recommendations concerning shelter in the Waituna catchment.* Sound evidence of the benefits of shelter will be required to convince most dairy farmers in the catchment to change their practices.

Non diary farmers were generally more favourable towards shelter for the same reasons as the dairy farmers who were supportive of it. Some perceived that they did not have enough, and were working slowly to re-establish more (usually flaxes). One had spent decades clearing his farm of flaxes, and could not bear the thought of re-establishing them. A disadvantage of shelter for sheep farmers is that a lamb under shelter sometimes contracts 'watery mouth' if it fails to receive colostrum in the first few hours of its life. This problem could be worth investigating to ensure that shelter remains acceptable to sheep farmers.

Cultivating crops

Few comments were collected about cultivating crops during the course of the interviews. Most farmers indicated via the questionnaire that they left a buffer of at least one meter between a crop and a waterway, and used fenced to keep stock away from waterways when they were grazing

crops. One farmer stated he preferred to cultivate right up to the waterway in order to level out the spoil so it can be accessed for crop and then mowed.

> *"It's good to be able to drive along the bank and look into the creek to see if there is a problem with stock or drains."*

Another farmer had tried to ridge a crop of swedes across a slope instead of downhill in an attempt to minimise runoff into the creek. However after three or four weeks the runoff created its own channels which flowed downhill.

One farmer commented that he had spotted paddocks in the catchment out of sight from the road were cultivated right up to the edge of waterways. Other paddocks within sight of the road had been cultivated with a buffer zone between the crop and the waterway.

Farm infrastructure

The majority of farmers reported that they had installed a stock watering system and culverts. Only one out of three dairy farmers had built a bridge over stock crossings. It is possible that the other farmers did not have any waterways that required a bridge. Only a minority of farmers re-battered steep or slumping banks to a shallow profile. However the chief responsibility for this task may be drainage contractors. None of the farmers had cut-outs to divert runoff from tracks and races, and this is a practice which could be promoted more aggressively, especially amongst dairy farmers.

Farm Infrastructure	Non Dairy	Dairy
Reticulated stock watering system installed	5	3
Culverts installed	6	3
Bridges built over stock crossings	5	1
Steep or slumping banks are re-battered to a shallow profile	3	1
Cut-outs on tracks and races to divert runoff through pasture	0	0
Total questionnaires completed	**8**	**3**

How much control do farmers have over their impacts on water quality?

Farmers were asked how much they perceived they could control the impacts of farming practices on water quality. Gauging this sense of control is worthwhile because it could influence the extent to which farmers were willing to adopt any recommended 'interventions' or changes in farming practices. Nearly all of them said that farmers had a lot of control.

> *"We control our inputs, when we put fertiliser on, effluent stocking rates... whatever pollution is created by people, we can control it."*

Southland weather could often make managing the impacts a challenge, due to cold temperatures and heavy rainfalls. Two dairy farmers mentioned that it was not easy to manage a dairy herd on the soils in the catchment.

Bottom lines

Farmers were asked if there was anything they were *not* prepared to do to maintain water quality. As indicated on page 23, some non dairy farmers said that they would not be prepared to fence their waterways, because they felt that sheep did not have any impact on the water quality. Some farmers were also worried about having to fence off minor waterways.

Other farmers said that they would insist on their right to apply fertiliser – their farms would cease to be viable if they could not do so. This point is not necessarily the same as resisting a cap on

the amount of fertiliser applied. One farmer voiced support for such regulation, which he perceived would moderate farmers who *"just chuck fertiliser on".*

The issue of placing a moratorium on development was a sore point for a few research participants, primarily those who still had plans to develop their properties. This kind of restriction is viewed as unfair, given that most other farmers have benefited from development in the past.

> *"Say there were two sections in town, one had a house on it and there was a the section next door for 10 or 20 years but there wasn't a house on it yet. Suddenly, the council brings in a law saying we are not letting anyone build any more houses. When that person bought that (empty) section, they may well have paid as much as the person who built a house on it but the other person built his house before the new law came in so he's sweet. So the other person has no compensation and the council says tough luck. That is going to devalue that land significantly because there is no productive potential."*

Increasing development-related regulations and compliances could have a counter effect for farmers who genuinely believe they are doing their best to minimise their impacts on water quality.

> *"I could say I want to develop this country and the (council) could say no. I'll say fine and I will pull all my fences down and ruin the creek that way. I believe I am responsible and therefore I am not going to stuff up a development job. But they might say I need resource consent, and then I need to go to a hearing and all the other hassles and expense. As soon as you have to go to full resource consent it becomes uneconomic and I get real upset about it because it is something I don't want to do."*

Are farmers doing enough to minimise the impact on water quality?

A number of farmers believe that they are taking adequate measures to minimise the impact of the farms on water quality. With no reliable, farm-specific information about such effects, this belief may be reasonable for some. For others it may also be symptomatic of denial, and a reluctance to take responsibility for their actions.

> *"I am not a greenie, but I like to think that I practice good attitude. The environment we live in is only here as long as we look after it"* (Dairy farmer)
>
> **
>
> *"We all have a line in the sand where we don't want to have a negative impact on our environment. We don't believe we are, that's important."(Dairy farmer)*
>
> **
>
> *"I make an effort to take any stock out of the creek and changed the fertiliser practices. I think at this stage I am doing my bit." (Mixed stock farmer)*
>
> **
>
> "Q)How much do you think your farm influences the water quality in the river?

A very small amount. I am only a small area in a large catchment. I also have some practices that I would like to think reduce the impact on that environment and water quality." (Mixed stock farmer)

**

"We are doing what generations have done before us and it has seemed to have worked. We don't think we are having any impact. It has been drained for 100 years and will still be drained for 100 years." (Mixed stock farmer)

Key Points

Farmers were not questioned closely about the measures they take to mitigate the impact of their farm on water quality. It was more important to build trust and avoid a process which scrutinised or tested farmers. Data collected about farm practices is therefore very general, and a more accurate picture would be obtain through farm visits by an experienced manager.

All of the research participants were aware of a number of ways they could minimise they could minimise the impact of their farming on water quality. These tended to cluster around keeping stock out of waterways, managing effluent properly, and taking care when applying fertiliser.

- Non dairy farmers are unwilling to fence their waterways. Dairy farmers reported good progress towards fencing off all their major water ways.
- Other than spraying plant pests in riparian margins, most farmers were not proactively managing or planting riparian margins.
- Problems with maintaining open drains and creeks include steep banks collapsing into the waterway, growth of weeds, and ditch cleanings preventing runoff into waterways. Only one farmer was experimenting with a silt trap.
- Most farmers reported a 25-50% increase in the amount of fertiliser applied on their farms over the last five years. Some are now tailing off now that their soils had reached an optimum nutrient profile.
- There is a diverse range of nutrient management practices amongst non dairy farmers. Most make a decision by triangulating information from a range of different sources.
- Dairy farmers tested their soils regularly and used the advice of farm management consultants when making decisions about nutrient application.
- Dairy farmers were divided about shelter. Some were in favour, and others prefer to remove as much shelter as possible, citing problems with pugging and a preference to keep stock feeding all the time throughout all times of weather.
- Only a minority of farmers (or contractors) were re-contouring steep or slumping banks to a shallow profile. None of the farmers had cut-outs to divert runoff from tracks and races.

The above points reveal that some farm practices (e.g. fencing on non-dairy farms or planting riparian margins) are unlikely to be adopted without clear incentives such as subsidies for fencing or plantings. Farmers also make choices about practices that are usually based on a sound logic that is focussed on maintaining or increasing production. Encouraging change (e.g. establishing more shelter on dairy farms) could be very difficult to achieve.

Farmers perceived that on the whole they could control the impacts of farming practices on water quality, but were challenged by the Southland climate and soil types. Many farmers assumed that their practices were not affecting the water quality, or that their mitigating practices were adequate.

Recommendation 5: Nutrient budgeting tools such as Overseer could be more aggressively promoted, particularly to non dairy farmers. A suitable tool could be used in conjunction with the farm-specific water quality monitoring program, which would demonstrate how the tool can be used in a working farm environment.

7. Dairy issues

> "(Q) The finger is being pointed at dairy farmers up and down the country for deteriorating water quality ..., how do you feel about that?
>
> *(A) It is not nice to be a dairy farmer for that reason and a lot of it is justified. How do I feel about it? I feel disappointed, I feel disappointed about my management while I have been on this farm regarding those issues."*

This section outlines some of the challenges dairy farmers face in the Waituna catchment. It is worth exploring these issues because it might help to identify areas where dairy farmers can be supported, or the problems a change strategy could address. Of the four dairy farmers interviewed for this project, there were three owner-managers, and one sharemilker. One owner of a sharemilking property was also interviewed.

Labour and employment conditions

Two owner-managers reported that it was very difficult to source reliable workers with initiative, a good work ethic, and an ability to learn. The outcome for one farmer was a constant battle to meet his consent conditions for managing effluent.

> "(Q) What is it like trying to find staff?
> *It is a nightmare. We are looking overseas simply because we can't get staff. We are permanently short on labour. That has a big effect, it is probably why there are a lot of errors being made, the stress level and work level is so high.... We spend a lot of time educating workers and trying to prevent accidents from happening because once there is an accident or neglect we have a huge issue very quickly....We pretty well follow what our consent conditions and they are very detailed. It is a simple task but not always carried out like it should be."*

Conversely, the sharemilkers interviewed for the project observed that some owner-managers they had encountered in the past were not always good employers, and did not train or support their workers.

Farm infrastructure

Managing effluent properly can be difficult if the infrastructure inherited through the purchase of, or leasing a farm is not properly maintained, or inadequate for the soil types on the farm.

Climate and best practices

One dairy farmer questioned whether the Southland climate was suitable for dairy farming. He also doubted whether the best practices recommended by Fonterra were sufficient to mitigate the impacts of dairy farming in the Waituna catchment.

> "(Q)Fonterra promotes best practice methods to reduce the impact of effluent on waterways - is that not enough?
>
> *It is not. (Fonterra's best practices) are enough in an ideal situation but we are not in an ideal situation. Maybe it is worse here in Southland with the more extreme climate, a lot wetter climate and the farm is probably a greater area of the catchment than other areas of New Zealand."*

A landowner relatively new to dairy farming admitted he was on a rapid learning curve about how to manage dairy effluent in a Southland climate. He had only recently learned that it was inadvisable to spread effluent once the soil on his farm had become saturated from heavy rain.

"(Q) What happens if it has been heavy rain for a week in Southland and all your effluent storage capacities are completely full?

> *You are in the shit. Then you have to pick your best paddocks that are not going to run off in a hurry to the creek, all those sorts of things."*

Stress

One farmer is intending to leave the industry and the area. He found the combination of labour issues, inadequate farm infrastructure, and Southland climate too much to cope with.

> *"I want to get out, I want to sell. I think it is too big, too big an operation, too hard to handle. Environmental issues are a constant worry especially in the catchment we are in. They are a far bigger problem as the scale (of the farm) increases."*

Two other farmers reported that they did not want to increase the size of the operations because of the impact an increased workload would have on their life. They would also become more dependent on additional labour.

> *"Your life is so consumed by it... It is too much sometimes."*

The stress levels dairy farmers cope with have been observed by other people living in the catchment.

> *"Dairy farmers are busy, some are running from A to B, but they also get to a burnout point. You see them losing weight, stressing out bad."*

Two of the owner-managers interviewed for this project did not volunteer that they were currently experiencing high levels of stress. One farmer appears to have completed most of the development on the property, and believed in keeping farming systems as simple as possible so staff are able to comply with those systems.

Sharemilking vs. land ownership

Dairy farm owners and sharemilkers can be located along a spectrum of good practices like any group of land managers. The sharemilkers and an owner of a leased dairy farm commented on this spectrum, and gave examples of practices at each end of the spectrum.

The landowner described sharemilkers as having similar attitudes to tenants of a rented house. Sharemilkers enjoy no capital gain if they undertook development activities on freehold land. Therefore they minimise spending money and time on the leased farm, and do not take as good care of the property as if they owned it. Because a sharemilkers goal is to stair-case into larger herd sizes and ultimately their own property they move around a lot, and have little attachment to the local community or concern about the environmental impacts of their farming practices. When the land owner took over the farm he currently owns (leased by sharemilkers in the past), he was shocked to discover that some of his paddocks had Olsson P levels of 69, due to a badly maintained and poorly used effluent spreader.

Whilst the sharemilkers interviewed for the project admitted that owning their own farm would 'change the picture dramatically', they also reported a recent experience where they had improved production by nearly thirty percent on a property, which was then sold on for a similar increase in capital value. That their contribution to improving the value of property was not recognised by the previous or current owners *'was heartbreaking.'*

The tensions described above illustrate how the financial structures shaping sharemilking do not create an environment within which the good practices are rewarded or encouraged for a

sharemilker. They tend to act as a disincentive more than anything else. Despite this, the sharemilkers interviewed for the project stated that they had a 'moral obligation' to minimise the impact of their farming practices on water quality.

Relationships between sharemilkers and landowners

The relationship between sharemilkers and farm owners can be difficult due to disagreements over the most appropriate ways to manage a farm. This could have a significant impact on the extent to which good farming practices are implemented. A sharemilker may fail to implement some practices (e.g. good effluent management), regardless of clear stipulations from the landowner. Alternatively, a land owner could refuse to provide adequate resources to maintain farm infrastructure, or invest in making environmental best practices possible (e.g. riparian planting) despite the best intentions of a sharemilker.

Any communications or engagement strategy need to be sensitive to these dynamics between a sharemilker and a property owner to determine the best way to move forward with sharemilkers.

Responsibility for ensuring good practices on sharemilking properties

The researcher spent some time talking with the landowner of a sharemilking property to tease out who he thought should be responsible for making sure that farm practices have minimal impact on water quality. Whilst he felt that both parties were accountable, the ultimate responsibility remained with the landowner.

> *"I think your landowner is responsible at end of the day because he owns the land, he must be responsible for the land. But the share milker is responsible for something, he is actually opening the gate, it is not the owner because he is not here. But somehow or other you must make (the land owner) responsible for that wanker that isn't doing the job. It is a tricky one. It has to work somehow."*

He was considering shifting to a more litigious approach to make sure that the sharemilkers on his property were following best practices concerning effluent spreading. This was going to be implemented by writing into the lease contract:

1. a compulsory maintenance regime for the effluent spreader
2. a requirement that lessees keep a record of when and how they maintained the effluent spreader
3. a requirement that sharemilkers keep a record of the rates and location of effluent application.

He intended that these processes and records were to act as a back up for him to demonstrate that he was a responsible land owner, should he be taken to court, or require sound evidence to terminate a sharemilker lease if their practices fell short of the above conditions. He was also planning a rigorous interview process for future sharemilking candidates for his farm.

It is the beyond of the scope of this research to explore to what extent these sorts of conditions are commonly used in a contract between a landowner and a share milker. However there could be some merit to promoting this as an option to ensure best practices on dairy farms with a lease arrangement, especially those with an absentee owner.

Absentee owners

Some of the long term residents of the Waituna catchment expressed the view that absentee land owners (i.e. land owners who live outside of Southland) had the same attitudes as sharemilkers. Their primary goal is to make a profit, and have little concern about the environmental impacts of the farming practices on their property.

Absentee owners are unable to monitor what is happening on their farms unless they appoint an agent to do so. Agents themselves may or may not be prepared to address water quality issues on a leased farm due to:

1. their own lack of knowledge or interest in the issue
2. lack of support from an absentee owner
3. difficult lessees.

It is possible that the priorities of agents are more likely to reflect land owner priorities and interests. Agents acting as a go between absentee owners and sharemilkers could be a key link within the dairy industry that could merit further investigation.

The issue of who is responsible for the application of nutrients on a leased dairy farm is unclear. In theory the landowner is responsible for this part of farm management. The owner of the farm leased to sharemilkers made all of these decisions, but he was able to do so relatively easily because he is also a local resident. It is not clear who makes these decisions for absentee landowners. Some landowners may rely solely on advice from fertiliser companies and make their own decisions, or depend on their agents if they have one. It is possible that the sharemilkers make these decisions for landowners in some cases. The responsibility is likely to be different on a case by case basis, and this is an issue which could merit further investigation. A communications or engagement strategy needs to be sensitive to the variability of who has ultimate power over the application of nutrients on a sharemilker property.

Absentee owners of dairy farms (i.e. land owners who live outside the Waituna catchment) remain a 'dark horse' in this report. No such owners were interviewed, and the project could benefit from exploring in greater depth with absentee owners some of the issues raised above (e.g. how to ensure good farm management practices from a distance). This could be achieved by searching for, and reviewing any social science research conducted by other agencies on this issue, or implementing further primary social science research in the catchment itself. In the first instance dairy agencies such as Dexcel or Dairy Insight should be contacted first to determine if this research has been undertaken already. If this information is not available, there could be some merit to conducting a focus group discussion with owners of dairy farms to explore how they manage their sharemilker farm practices, and some of the difficulties they face. A similar process could be undertaken with sharemilkers.

Finally, it could be worth while to explore ways in which the Waituna Management Group could contact and work with absentee owners of properties, especially if a particular property is causing a problem. However, it may be more appropriate that Environment Southland deals with this kind of issue, given that contact with a regulatory authority may have more impact for an absentee landowner than a landcare group.

Key points

- Some of the difficulties dairy farmers in the catchment face include Southland soil types and climate, finding reliable workers who have initiative and willing to learn, plus high stress levels and work load.
- Relationships between sharemilkers and land owners can be complicated, with each different party having different attitudes to implementing good practices and willingness to resource them
- The financial structures underlying a sharemilking arrangement tend to act as a disincentive for sharemilkers to take an interest in, and care for a property or its infrastructure like it is their own.
- Absentee owners of dairy farms are sometimes viewed by longer term residents as opportunists, who fail to take an interest in the impacts of their farming practices that are implemented on their properties. Agents acting as a go-between absentee landowners and sharemilkers are likely to be a key link within the dairy industry.

Recommendation 5: The project could benefit from further investigation into the relationship between sharemilkers and absentee owners. This could be achieved by searching for, and reviewing any social science research conducted by other agencies on this issue, or implementing further primary social science research in the catchment itself.

8. Knowledge gaps, sources of information and networks

This section outlines some knowledge gaps identified by farmers, where they obtain information about good practices, and their preferred style of learning.

Knowledge gaps

On page 23, it is argued that it was not appropriate to examine the 'accuracy' of the knowledge farmers had about these practices, or the extent to which the practices are undertaken. This research therefore cannot report in great detail about knowledge gaps associated with these best practices. Research respondents rarely self-identified any knowledge gaps, either because they assumed their mitigating practices were sufficient, or they were more focussed on the more global question of what impacts, (if any) their farm had on water quality.

Knowledge gaps that can be identified with some confidence are:

1. farmer understanding of the concept of environmental sustainability
2. knowledge of how fertiliser leaches through soils
3. the relationship between water clarity and nutrient loading
4. strategies for sustainable and appropriate land development.

Understanding of 'environmental sustainability'
Farmers' understanding of the concept 'environmental sustainability' is likely to influence the way they interpret and implement their own farming practices, plus their perceptions of the impact that these practices have on water quality in the catchment. Farmers were asked what they understood by the phrase "environmental sustainability" to try and gauge their comprehension of the concept.

One farmer was unable to provide a response to this question; "*I need to think about that.*" Another commented that the concept was a recent development, and he was still learning about it.

> *"Sustainability has been just been invented... We have got to start looking at the long term to see what happens....*
>
> Q) What kinds of things do you think we need to look after for the long term?
>
> *I don't know, I don't have the necessary information to make these calls. I am a farmer, I like to see nice flat paddocks, sheltered areas, and a pleasant environment to work in."*

One research participant flatly stated that it *"...doesn't mean much to me."*

Other responses focussed on ensuring the cross-generational viability of a farm, which is based in an anthropocentric world view and focuses on human needs, rather than one that prioritises ecological systems for their intrinsic value.

> *"We are here in one hundred years time and still be able to farm"*
>
> **
>
> *"If I don't look after the place my production will drop."*
>
> **

"I suppose its as much as you can take off the land without affecting the environment."

**

"God only knows what it means. To me it means that if we can farm for the next 40 or 50 years here and maintain the lake in its present condition or improve it, then it is sustainable."

One farmer recognised the systemic or closed cycle nature of ecosystems:

Q) What does the phrase environmental sustainability mean to you?

(A) "Managing a resource in a way that it replenishes itself in an environmentally friendly way."

Farmers were also asked if there was a link between environmental sustainability and productivity. The majority of them identified that an increase in productivity usually resulted in a negative impact on the environment. Some farmers assumed that they would be able to keep farming even if the environment is negatively affected.

"All they are doing is wrecking the creek but it won't stop their farming"

**

Q) If your farm isn't environmentally sustainable do you think you could keep producing milk?

"Definitely, because a lot of the effects are going to be downstream. We could infect the lagoon with algal bloom but this farm would still be pumping milk."

Farmers appear to have a very low awareness of the environmental services that the lagoon provides for the catchment as a whole. Just one farmer noted that the lagoon could have an effect on the extent to which his farm is drained.

"It stops the water getting into the sea. It controls the water levels when it's open and closed. I believe it controls the rate that my water gets away in storms and that sort of thing. I just found out we are only 49 meters above sea level.

Q) What do you think would happen to your farm if the lagoon tipped over?
People would stay away from it and the weed aspect would kill my drains. My drainage out fill is what I am interested in. We are very flat."

These responses suggest that farmer understanding of environmental sustainability and environmental services is hazy, and conceptualised in very general terms. It tends to focus on the need to maintain the productivity of their farms, rather than prioritising the intrinsic value of ecological systems themselves. It is unlikely that any of the farmers have a detailed understanding of how ecological services maintain the productivity of their farm. There is a need to improve farmer knowledge and understanding of the concept of environmental sustainability, including how ecological services maintain the productivity of their farm, and how catchment-wide systems work (Recommendation 6).

Impact of nutrients
Some farmers felt that they do not have enough knowledge about how fertiliser leaches through soils, the speed at which this happens, and corresponding best practices related to fertiliser application.

"I don't think there is enough knowledge, and what sort of rates (of fertiliser) we are spreading to know that we are actually putting it in the water rather than it stays on the soil."

**

"I don't know... if you put fertiliser on the whole paddock, it's on the whole paddock. But if you only put it on half the paddock I suspect it ends up on the other half. I don't know, I don't know of any testing, I don't know how fertility moves around."

**

"I think rather than pointing the finger, if we had information... For example if we knew if there was a spike in the waterway at the certain time of the year after a phosphate application... Perhaps we would be better to split it than put on one application or do it at a different time of year."

A communications strategy should seek to find ways improve farmer knowledge and understanding of how fertiliser leaches through soils (Recommendation 7).

The relationship between water clarity and nutrient loading
Only one farmer observed that the water clarity could be high, yet still contain a high nutrient loading. Some farmers in the catchment may not be aware that clear water could also carry a high nutrient loading. This is a knowledge gap which must be addressed.

"We go down and look in the water, it looks clear so it is clean"

Bala Tikkisetti from Environment Southland suggested the following phrase "clear water is not clean water" as a key message to be promoted in a communications strategy (Recommendation 8).

Appropriate development
One farmer observed that people new to the area had inappropriate expectations of the best way to develop rough land in the Waituna catchment, and how quickly it could be made productive. He argued that it was necessary to find a "middle ground" by which rough land can be developed in a way that has a minimal impact.

"I think we have to be responsible. We have to accept that the country doesn't develop very quickly and you can't go and put a whole lot of inputs in and expect it to grow grass. We have some new farmers in the new land that expect that if you put drains in peat land and a whole lot of fertiliser, then it will grow a whole lot of grass. It doesn't happen like that in tussock country. If you put a plane over top of tussock country you can double its capacity tomorrow within twelve months. Peatland doesn't do that. Some people need to accept that, but you will never convince them of that because they see land and they see potential. As long as we do it responsibly and over a period of time, (the impact of development should be acceptable).

A focus group of farmers and scientists could be convened to gather ideas about the most appropriate ways to develop a farm or paddock sustainably, and the rate at which it could happen.

Sources of information about mitigating practices

In general, farmers are not proactive about looking for information about mitigating practices. This does not necessarily indicate a complete lack of interest in, or resistance to, the issue. A possible reason for this lack of proactive searching for information is outlined below in a comment about printed information.

> *"To be honest our first priority is just keeping the farm going. It's quite a demanding occupation. The first thing is basically maintaining healthy stock and maintaining the quality of what we are sending off the farm to the factory. (Looking for information about water quality and minimising farm practices) comes after that..."*

Seeking information about mitigating practices is therefore not a priority, and there are no incentives for farmers to do so. Even if farmers receive this information, this knowledge does not necessarily translate into substantial changes in farm practices.

Print

For many of the farmers interviewed, knowledge about mitigating practices appears to have been gleaned from a raft of farming magazines and farming newspapers. Farmers have incidentally 'come across' information about water quality when seeking information about other issues, such as how to improve farm productivity. The deluge of information over the last ten years through the print (and broadcast media) has slowly seeped through to farmers in the form of the general practices listed above. This process has been so subtle farmers could not be specific about the titles of the magazines and newspapers they obtained this information from, with the exception of "New Zealand Farmer" and the Southland Times. It is not clear to what extent this information was specific to the farming conditions in Southland.

The key advantage of print information is that farmers can read it at home, at a time that suits them best. However farmers often commented that they received so much information through the mail they tended to be very selective about what they read, and often chose not to read anything at all if their backlog became too large.

The Waituna Landcare group newsletter was mentioned by a quarter of the research participants.

Field days

Some farmers commented that they picked up some ideas about minimising the impact of the farms on water quality at field days. The process by which this happens is similar to that of print information – farmers 'encounter' the information as they seek out ways to improve the productivity of their farms.

> *"...if production issues are included I would be more likely to go. If you trip over these things by accident it is a lot more fun. If you are going to something (that focuses only on environmental issues) then you are disappointed because it didn't cover what you thought. It is the other stuff that you trip over by accident that you really enjoy."*

**

> *"A limited number of farmers attend field days. If you have priorities... you will go and listen to someone who will directly affect your bottom line. At the bottom (of your priorities) is an environmental field day. There are the ones in between. You only get a small number to the ones that are going to affect your profit and you get very very few at the other end. It is just a fact of life.*

Nobody pays us to go to the field days. We have to take time off work... Probably the only way you can get farmers to field days is to show them something else and then show them what you can do (about environmental issues). Show them something where you can get a reasonable turnout and at the same time something else that they didn't actually come for."

Field days mentioned by farmers included:

- a field day at the local community centre hosted by the Waituna Landcare Group which featured a range of speakers on different topics, including information about a James Aerator
- Southern Field days at Waimumu.

Farming families with children are less likely to attend a field day held on a Saturday because they are attending sporting events with their kids. Field days during a week day are easier for them to attend than the weekend. March, April, and winter time is a quieter time of the year for local farmers, and afternoons are the best time for a field day because the most pressing tasks are completed in the morning.

Waituna Landcare Group

Discussions with Waituna landcare group members have been a useful way for some of the research participants to find out about water quality issues in the catchment. It is not clear to what extent they learnt about good management practices through these discussions, but they did also mention the occasional newsletter from the landcare group as a source of information. An interesting point is that the people who identified the landcare group as a source of information tended to be those who were longer term residents, and have been part of the social networks for a long time.

'Best practices'

Non-dairy farmer awareness and practice of industry guidelines for best practices tended to be focussed principally of animal health and food safety, rather than environmental best practices. It is not clear to what extent the phrase 'environmental best practices' have any meaning or relevance to farmers. Given the attitudes prevalent in the catchment, this phrase may have little potency, or even cause farmers to 'switch off' from key messages.

Dairy farmers were mostly focussed on these issues as well, but also referred to the Fonterra Clean Streams Accord. They reported completion of, or good progress towards excluding stock from waterways. All dairy farmers who filled out the questionnaire reported that they

1. avoided applying effluent to land where conditions are too wet
2. applied effluent onto short pasture but not sooner than 3-4 days after the paddock was grazed
3. maintained an effluent management plan and kept effluent systems well maintained
4. trained their staff in use and maintenance of effluent systems

It is likely that the lack of *farm-specific* information tends to break or disrupt an important feedback loop for farmers. They have no way of judging whether or not their practices are indeed 'best practices', or have a 'good enough' effect, other than their own location-specific assessments of waterways on their own farms.

Other sources of information

Dairy farming has had a considerable ripple effect on sheep farming practices in the area. Two research participants noted that they had learnt a lot from dairy farmers, and had changed some of their management techniques. However, the overall result has been to intensify their farming.

"There are lots of new lines of thought in dairying. We sheep farmers have to watch them so we can learn from them."

Whilst most of the learning up until now from dairy farming is likely to be production oriented, the same ripple effect could occur concerning water quality-related farming practices. This will only happen if sheep farmers perceive that their own practices are having a significant impact on water quality.

One farmer mentioned that he enjoyed listening to Hokanui Gold radio show. This avenue for disseminating information could well be worth utilising.

Problems with contradictory information

Some farmers reported receiving different information from different stakeholders.

"What I find is funny, is the greenies want us to keep the all the grass on the banks. But if you talk to the drains contractor, they want you to spray it and keep it clean. We are getting different feedback on what we should do. That makes it hard. For us it is better if we spray it so the water keeps running and the creek keeps clean."

This is an issue that has been prevalent on a nationwide basis for some time.

Another farmer noted that it was important to provide very clear messages to farmers about how to manage riparian margins well. Whilst many farmers have fenced off their waterways, they had neglected to manage the gorse and weeds that had grown in the margins between the fence and the waterways.

What next?

Farmers show a clear preference for obtaining information about how to improve the productivity of their farm over information about sustainable land management practices. An information strategy may be more effective in the earlier stages of the project by coupling information about sustainable land management strategies with production-related information. This can be achieved through attending events (e.g. Waimumu field days), developing partnerships with production related stakeholders (e.g. Meat and Wool New Zealand or Fonterra), or hosting events that include a mix of the different types of information (Recommendation 9).

Networks

New sustainable land management tools are more likely to be adopted if they utilise networks within rural communities to create a shift in attitudes which is more accepting of sustainable farming practices. This is a core principle which underpins the praxis of landcare. Such networks can include place-based community networks (e.g. informal social connections within neighbourhoods), and networks within different production industry sectors.

Discussion groups

Four farmers reported that they belonged to (or were a past member of) farm discussion groups. It is unlikely that farmers have learnt anything of substance about best practices related to water quality through discussion groups, because most discussion groups are focussed on improving production. The advantages of a discussion group is that the information received from other members is usually trusted, and farmers can see the different practices operating on a farm.

> *"I am in a farm discussion group and we go and see other farms and there are other farmers around that have done similar work before so you have a look, and think 'that would work' and maybe try it and see what happens."*
>
> **
>
> "Q) Who do you think would provide the most reliable information about those practices?
> *'Farmers are the best person to learn something off. We tend to trust them."*

Some farmers are less enthusiastic about farm discussion groups, or don't see any value in attending them.

> "Q) Do you belong to a farm discussion group?
> *No, too many bloody wankers. One thing they do that I don't like, all I heard was everyone else's problems. I don't think that is my business for a start and if you are in a discussion group like that keep your mouth shut."*
>
> **
>
> *"I just find them quite boring. Personally I'm better off staying at home doing some work."*
>
> **
>
> *"I find they go round in circles."*

Contractors and consultants

Farmers were invited to supply the names of the contractors they used for different farm-based services via the 'farm practices' questionnaire. Unfortunately not many research participants were willing to give this information. One farmer explained that he did not want to create a situation whereby unsolicited approaches are made to his contractor(s) to become involved in water quality issues in the catchment. This list is therefore only indicative of some of the contractors who are working in the area:

The following farmers employed consultants to enhance and support their farm management decisions:

- All of the dairy farmers
- One sheep farmer
- One sheep and beef farmer

Other farmers cited unnecessary cost and lack of credibility as key reasons for choosing not to employ consultants.

Given that all of the dairy farmers interviewed for this project employed an agent or consultant, these people may be a good entry point to communicate with dairy farmers. A communications strategy could also specifically target consultants or agents themselves to build their knowledge and awareness of water quality issues in the catchment.

Sharemilker networks

A communications or change strategy should take into account that most sharemilkers or dairy farmers will not have the time to socialise or attend meetings. It also needs to address the turbulent nature of the sharemilker community, which appears to have a very high rate of turnover. Landcare groups have traditionally relied on stable community networks to encourage change. Other than school-related associations, these kinds of networks generally do not appear be strong around sharemilkers, especially those new to the catchment. Instead, the networks that do tend to cluster around sharemilkers are *industry related.*

> *"When you are flat out busy you don't have time to socialise. We have found that a lot of people we have become friends with is through work, like contractors and carriers and vets. It is all work related."*[16]

Dairy farm agents or consultants may be a good entry point to communicate with dairy farmers. A communications strategy could also specifically target consultants or agents themselves to build knowledge and awareness of water quality issues in the catchment (e.g. through a workshop) (Recommendation 10).

Key Points

- most farmers had a patchy understanding of the concept of environmental sustainability. This understanding tends to be focussed on maintaining ecosystems for human needs, rather than intrinsic ecological values.
- some farmers felt that they did not have enough knowledge about how fertiliser leaches through soils, the speed at which this happens, and corresponding best practices related to fertiliser application.
- other farmers assumed that if water quality is clear, then the water quality is good. They did not realise that clear water could also carry a high nutrient loading.
- knowledge about mitigating practices appear have been gleaned primarily from print information. This has been a subtle process by which the information has been absorbed 'by accident' when farmers are seeking other kinds of information.
- only longer term residents reported obtaining information from a landcare group member.
- farmers tended to be focussed primarily on best practices concerning animal health and food safety. It is not clear to what extent the phrase 'environmental best practices' have any meaning or relevance to them.
- information received by farmers can be contradictory or incomplete.
- dairy farmers do not have the time to socialise or attend meetings. The sharemilker community has a very high rate of turnover. Other than school-related associations, community-based networks generally do not appear be strong around sharemilkers, especially those new to the catchment. Instead, the networks that do tend to cluster around sharemilkers are *industry related.* All dairy farmers interviewed for the project employed an agent or a consultant.
- getting meaningful information to farmers is not easy!! Farmers contradict themselves and say that they prefer to go to field days or see examples of good practices, but also state that they

[16] These sharemilkers talked about a local neighbour who welcomed them to the neighbourhood, and that they appreciated this effort. However the same neighbour mentioned that it was wearying for her to keep making contact with a new set of sharemilkers every year.

are unlikely to attend a field day that focuses solely on environmental issues. They have gained most of their knowledge from print sources, but only selectively skim read. Some farmers value discussion groups, but these tend to focus on production issues.

Recommendation 6: There is a need to improve farmer knowledge and understanding of the concept of environmental sustainability, including how ecological services maintain the productivity of their farm, and how catchment-wide systems work.

Recommendation 7: A communications strategy should seek to improve farmer knowledge and understanding of how fertiliser leaches through soils.

Recommendation 8: A number of farmers assume that if water was clear, quality was high. This is a knowledge gap which must be addressed. Bala Tikkisetti from Environment Southland suggested the following phrase "clear water is not clean water" as a key message to be promoted in a communications strategy.

Recommendation 9: An information strategy may be more effective in the earlier stages of the project by coupling information about sustainable land management strategies with production-related information. This can be achieved through attending events (e.g. Waimumu field days), developing partnerships with production related stakeholders (e.g. Meat and Wool New Zealand or Fonterra), or hosting events that include a mix of the different types of information.

Recommendation 10: Dairy farm agents or consultants may be a good entry point to communicate with dairy farmers. A communications strategy could also specifically target consultants or agents themselves to build knowledge and awareness of water quality issues in the catchment (e.g. through a workshop).

9. Perceptions of the Waituna Landcare Group

This chapter examines farmer perceptions about the Waituna landcare group, what it is trying to achieve, and the means it has used to influence farming practices in the past.

All of the farmers associated the group with water quality in the lagoon. Fewer farmers mentioned preserving the ecological values of the lagoon or a whole-of-catchment approach. One farmer wasn't clear *why* the lagoon was important to the group.

> *"I am not sure; I thought it might have been some people with their own set of ideas of how they want the lagoon looked after. That was my perception. Maybe they wanted to go duck shooting or something. Maybe that is why they want to look after the lagoon. I don't know."*

A communications strategy should therefore emphasise a whole of catchment approach so as to counter farmers tendency to associate the group with the lagoon only (Recommendation 10).

All of the farmers thought there was a legitimate role for a community group in catchment management issues. The Waituna landcare group has a valuable function as a ginger group, pushing stakeholders to take a greater role and interest in the lagoon.

> *"I used to observe it and not do much about it, think that's a shame, shit happens, this is the price we pay for farming. But the landcare group raises these issues."*

It is also a source of information for farmers who are concerned about the issue

> *"Any start is a good start... before that there was nothing... it gives us somewhere to start to looking for answers to questions."*

The Waituna Landcare group should take heart in the knowledge that they have had an influence on a number of farmers in the catchment, and some have changed the ways they managed their farms.

> *"The (Waituna Landcare Group) highlight the things that can improve the quality of the water. You can take them on board. It gets through to most of us slowly over time. Most people in the area including myself were reluctant when they started. If you had asked me the same questions ten years ago, I would have said fencing off waterways was impractical. I have done it and it is not one hundred percent. It does have a relatively high cost associated with it but I have found it better than I thought and probably less costly."*

**

> *"Through the help of the Landcare group it's just been wonderful. We haven't had the big algae bloom like there was when there was no control.*
>
> *(Q)* So you think the group has made a difference?
> *A huge, huge difference because I know for a fact people were pulling the plug and flushing the ponds into the creek. I never witnessed this personally but I know who they were. Since the set up of Landcare all that has stopped."*

**

"It does make us aware of what is happening downstream, that is important."

**

"The landcare group makes you aware. Quite often you are not aware. We have lived on (the stream) all our lives, some of it is getting a bit weedy but you don't think why. Then someone else says something, and you think 'oh yeah, it is a problem, we might have to get more serious'."

**

"I guess probably with the influence with the local land care group has with their local newsletter, I have thought a lot about the fertiliser issues and if anything I have dropped the solid fertiliser a bit. I don't believe in nitrogen use at all and I have probably gone more the fine particle way."

**

"I tend to feel I am the villain because of the problems we have here. I wouldn't have any animosity. I have a huge amount of respect for them and what they are trying to achieve, and I would like to achieve my part in that as well with the way I manage this farm."

Two farmers noted that a landcare group model is likely to be more constructive than a regulatory approach.

"They seem to be more flexible. If the council gets involved it gets too neurotic and nothing seems to happen. All that will happen is new laws come out and they will have levies. They are probably a better way of doing it."

Three research participants warned that the majority of farmers in the Waituna catchment do not care about the impacts their farm is having on water quality, and that the Waituna landcare group has little or no credibility with those farmers.

"Some people would think that it would end up costing me money somehow so they don't want to know. The average person would think the landcare group are 'tree-hugging idealists, they've possibly got a point but it will end up costing me money.' It eventually would come back to that and aggravation."

**

"I guess some of the people in it are people that are probably better off staying at home doing a bit of work rather than poking their nose in other people's business. But it's a good thing, it is a good thing. It is good they are caring about something."

Other farmers claimed that the some of the ideas suggested by the landcare group were 'not practicable', or 'cranky'.

"Their heart is in the right place but their bloody brain is somewhere else."

Details about exactly which ideas were lacking credibility were difficult to draw out from research participants. However a controversial meeting in 2003 about development in the catchment is likely in part to be a cause of this attitude.

"Some people thought they could influence things a bit more but I think they got the message 'back off'. I think from that they learnt their lesson and I don't think they will go down that track again."

Activities considered by farmers as unacceptable for the Waituna landcare group to pursue were to pass laws or regulations (strictly the domain of Environment Southland), and (apart from some extreme cases of malpractice) "pointing the finger" at individuals.

Key Points

- All of the farmers associated the group with water quality in the lagoon. Fewer mentioned preserving the ecological values of the lagoon, or a whole of catchment approach
- Most farmers thought there was a legitimate role for a community group in catchment management issues. Such roles included acting as a ginger group, providing information, and raising farmer awareness about water quality issues. The landcare group was also perceived as having more flexibility than a regulatory body.
- A small number of farmers reported changing their management practices as a direct result of Waituna landcare group activity.
- Overall most of the farmers interviewed for the project had a grudging respect for the Waituna landcare group, but some claimed that some of the solutions proposed by the group were not practicable and lacking in common sense.
- Some farmers reported that others in the catchment perceived the group as having little or no credibility. Building credibility can take some time, but can be achieved by using defensible science/monitoring strategies, communicating data appropriately, incorporating farmer knowledge and expertise into the project, and establishing partnerships with other credible organisations.

Recommendation 11: A communications strategy needs to emphasise a whole of catchment approach so as to counter farmers tendency to associate the group with the lagoon only.

10. Other Stakeholders

Farmers were not systematically interviewed about other stakeholders in the Waituna catchment. However, some comments were made about their role, principally Environment Southland. These are outlined below.

Environment Southland's regulatory powers were seen by some as an important mechanism by which the worse excesses of poor management can be addressed.

> *"Some of these guys I know wouldn't give a stuff if they just let it run into the creek. The only reason why they don't is the fear of Environment Southland knocking on their door."*

**

> *"I think the real power in the end is in Environment Southland. They can tell us what it is you have to do. I think a community based group can encourage us to do it but I think the ultimate power is Environment Southland".*

Farmers appear to trust Environment Southland's water quality monitoring capacity and data. However, for reasons outlined on pages 18-19 they had not personally undertaken to seek out this data. Recommendations provided by Environment Southland about how to mitigate the impact of farming on water quality also appear to be trusted by the farmers who had noted the information. This does not necessarily mean that farmers had been motivated to implement these practices.

Two research participants expressed frustration based on a perception that Environment Southland had failed to take action over evidence of blatant malpractice.

None of the farmers interviewed knew the extent to which the lagoon had significance for local runanga (Awarua) or iwi (Ngai Tahu).

Apart from the exception of one farmer, the Department of Conservation was not mentioned by any of the research participants (see comment below). This farmer stated that the two Crown agencies (Environment Southland and Department of Conservation) had failed to support the Waituna landcare group.

> *"They are a small group whose heart and soul is in the right place. They don't have the resources or if one is to be honest, they don't have the support they should have from (the Department of Conservation and Environment Southland). They need someone to step in beside them and say they will help. A lot of what they say and are doing is just dismissed by farmers - 'It's only a Landcare group, just bunch of no hopers.' "*

11. Moving forward - working with farmers on water quality issues

Sustainable land management practices often carry a stigma within many farming communities, and a lot of farmers are reluctant to be associated with this cultural marker. New sustainable land management practices are more likely to be adopted if they are part of a wider strategy which engages whole communities and utilise social and industry networks to create a shift in attitudes which is more accepting of sustainable farming practices, and unsustainable farming practices less acceptable. Engaging communities to create a shift in attitudes requires a holistic approach, involving a range of stakeholders and different tools. There is no 'one' simple recipe or prescription applicable to all situations. Engaging communities can take time, involve a number of stages, and must be planned strategically.[17]

The first two sections of this chapter outlines a range of barriers and incentives which create a strong contextual influence on farmers willingness to change. These need to be taken into account when planning a change strategy for the Waituna Catchment. The third section outlines in brief farmers preferred ways of learning, which need to be incorporated into any communications strategy developed by the Waituna Management Group.

The fourth section suggests a of range of possible actions which could be incorporated into a future strategic direction if considered appropriate. These suggestions or recommendations have been made in the spirit of a 'brainstorm,' and are not 'compulsory' in any sense. They may also be implemented at different stages of a project.

The recommendations in this chapter are based on a mixture of:

1. key issues indicated by the research conducted for this report
2. suggestions made by Waituna farmers themselves
3. strategies used by other agencies or recommended by other researchers
4. strategies currently being used or developed by the NZ Landcare Trust

Barriers to implementing sustainable land management practices

This section outlines some of barriers which influence farmers ability or willingness to change. These include barriers:

- identified by Waituna farmers themselves, which both confirm and reinforce past research conducted other agencies and researchers
- identified by other agencies and researchers, but not by Waituna farmers

Attitudinal Barriers

An individualistic culture

Most farmers waking moments are absorbed by the (often high) pressures of farming. They are accustomed to deciding what happens on their farm, how it happens, and when it happens without input from other people.[18] External pressure to change is commonly viewed with frustration and defensiveness, and farmers in the Waituna catchment are no exception.

[17] Aslin, H & Brown, V (2004) Towards of Whole of Community Engagement: A practical toolkit. Canberra ACT. Murray Darling Basin Commission.

[18] Robertson, G (2005) Engaging farmers in sustainable management. Dunedin. TAIERI Trust, NZ Landcare Trust, Sustainable Management Fund

"Farming by its nature is a very individualistic game. My philosophy in life is that our strengths and weaknesses are the same. The dealings I have had with farmers, most of the times I come away feeling very frustrated and I just want to hit them over the head with a bat. In order to survive the farming game you just have to be focused. That is what I see is the crux of the problems .... It has probably just taken an age thing for me to open my ears and eyes a bit because I can see when I was younger I would have said "get stuffed", I wouldn't even think about it. I was that focused on what I was doing that any outside interference I would have said no to, 'I don't want to know.' "

**

"The hardest thing to do is tell somebody what to do with their farm."

**

"I know what my issues are and it is up to me to address them and improve them. I don't think the landcare group have a part in advising me. Maybe they do if I have a continuing problem... and it is pretty much what I am having. I deal with Environment Southland, they are on my back when there is a problem and that is fair enough."

This individualism and need for control acts as a fundamental barrier to change. Sustainability and water quality issues cut across what farmers consider to be inviolable private rights. In some cases, progress or change may not be possible until a property changes ownership.

Other attitudinal barriers identified in prior sections of this report include:

1. Lack of acceptance of the need to change (outlined in depth in chapters 3,4,5 and 6).
2. A favourable attitude towards development and generating wealth (Chapter 1).
3. Attitudes towards drains. A farmers key priority is to drain his or her property of excess water so that they can maintain the productivity of their farm. Any recommended practices which contradict this function is likely to be resisted (Chapter 3).
4. Lack of knowledge about 'environmental sustainability' (Chapter 8).
5. Attitude towards the Waituna Landcare Group (Chapter 9).

Behavioural barriers to sustainable land management

Some of the behaviours which act as barriers to a shift towards more sustainable land management practices include:

1. busy work schedules (Chapter 7)
2. a preference for practices and information which enhance or maintain production, e.g. removing shelter from dairy farms (Chapters 6 and 8)
3. a reluctance to adopt complex or time consuming practices (see comments below under 'characteristics of new practices).

Economic barriers

Pro-environmental stewardship values and attitudes have a relatively minor influence of the adoption of sustainable farming practices. This means that even if land managers are sympathetic towards ameliorating environmental problems on their property, their actual farming practices are more likely to be influenced by their economic status. Landholders who feel secure in their financial future are more likely to invest resources in adopting farm management practices (Cary et al, 2003: iii-ix).[19]

[19]Cary, Webb and Barr (2003) *Understanding Landholders' Capacity to Change to Sustainable Practices. Insights about Practice Adoption and Social Capacity for Change.* Canberra: Bureau of Rural Sciences.

"At the end of the day the only time we can afford to do it when we have profits because all of these measures cost money. Fencing is effectively the only way to stop animals getting in and out of water and you have to fence. It costs money, and the only time we can afford to do it is when we have profits. I am not going to do it when I have to borrow money from the bank to do it. As long as we make profits, farmers will do as much as they can financially."

The economics of a long time frame.
The benefits of sustainable land management practices are difficult to quantify and rarely offer financial advantages to farmers in an immediate sense. There is often a long time lag between a change in farm practices and demonstrable positive effects, which makes farmers reluctant to invest in, or change to, different farm practices. [20]

'Macro' barriers
Other barriers to change listed by the Parliamentary Commissioner for the Environment but not identified by Waituna farmers include: [21]

- Lack of industry-wide strategic focus across or between different production related sectors.
- Lack of (regulatory) incentives and disincentives to change
- Lack of capacity to change due to insufficient skills and knowledge
- Technology necessary to implement change is not readily available.

These barriers tend to operate at a 'macro' level, which farmers have little control over.

Incentives for implementing sustainable land management practices

This section outlines some of incentives that can encourage farmers to change their farming practices.

Saving money, making money
Farmers on the whole are quick to adopt sustainable land management practices that either sustain or increase the production values of their properties.[22] This is achieved by either reducing costs of production or increasing production output. Wherever appropriate, the benefits of increased production or reduced cost of a sustainable land management practice should be promoted (Recommendation 12).

Characteristics of new practices
Farmers are also more likely to adopt sustainable land management practices which have the following characteristics:

1. observable (farmers can see the effects of the practice have relatively immediate positive consequences for their farm).
2. can be trialled (where practices can be implemented on a small or pilot scale, decisions can be more easily made about the value of a new practice without the risks associated with full implementation).
3. less complex, or convenient to implement
4. can fit easily into existing systems of social or cultural practice.

(Cary et al, 2002: viii).

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[20] Parliamentary Commissioner for the Environment (2004), *Growing for Good: Intensive farming, sustainability and New Zealand's environment.* Wellington. Pp 172.
[21] Ibid
[22] Ibid

The quotes from Waituna farmers below encapsulate these priorities.

> *"I don't want to change the way I am doing things now, unless it will make it easy for me or financially profitable."*
>
> **
>
> *"I am not saying farmers are stupid... but whatever system they put in place to try and improve the water quality on the Waituna stream, it has to be easy. It has to be steps one, two, three. Otherwise it becomes too hard."*

When the Waituna Management group is working with scientists to identify alternative land management practices, it should insist that any technical solutions should include at least two of the following characteristics – observable, can be trialled, less complex, or fit into existing systems of social or cultural practice (Recommendation 13).

Minimising risk

Recent research conducted by GroundWorks Associates (2004) with Balance Farm Award Winners identified that forward thinking farmers implement sustainable land management practices as a way to manage or minimise risk.[23] Risk-related motivations to undertake sustainable farming practices include:

- reducing environmental risk (e.g. maintaining soil health) is likely to provide more financial security and ensure the long term economic profitability of a farm.
- investors may be less likely to support farmers with unsustainable farming practices in the future.
- recognising the marketing implications of quality assurance and animal welfare issues in overseas markets (pg 7).

Managing risk is a day-to-day activity for farmers, whether it is assessing which kind of stock to farm, or anticipating unfavourable changes in the weather. Risk management is a concept that is familiar to them, and the concepts of environmental farm plans and sustainable land management practices could be marketed to farmers as means by which longer term risk can be effectively managed.

Consistent, low key messages about the benefits of sustainable land management as a form risk management could be communicated throughout the life of the project (Recommendation 14).

Align key messages with core values: 'Leave the land in better shape'

One means by which people can be encouraged to change is to align messages with their core value set in some way. Most people's values tend to be human centred, and appeals to 'care for the environment' will touch only a small minority of people.[24]

A comment commonly made by the farmers all over New Zealand is that it their duty to 'leave the land in better shape' than when they first started to farm it. This phrase is often used to defend the farming sector from accusations of being a poor steward of the land. It tends to be equated to creating a farm that has high production values, is easy to farm, and looks tidy. 'Leaving the land in a better shape' is also often referred to as a cross-generational issue, whereby the children of the incumbent farmer inherits a farm which is easier to manage and more profitable than the parents inherited or purchased. It may be worthwhile to consider how a communications strategy

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[23] Ritchie, H., & Perkins, A (2004) *Ideas gathered through the Hamilton sustainability showcase 2004.* Groundworks Associates, Hamilton

[24] Robinson, L., Glanzing, A., (2003) *Enabling ecoaction: A handbook for anyone working with the public on conservation.* Human Society International, WWF Australia, World Conservation Union, Sydney. Pp 19-21

could align sustainable land management practices with the phrase 'leaving the land in a better shape' for future generations (Recommendation 15).

It is important that this kind of strategy focuses on the concept of environmental services. Farmers tend to associate the word 'environment' with native plants and animals, or pristine pre-agricultural ecosystems. This association could have the effect of preventing farmers from recognising the value of environmental services or issues at the paddock level of a whole-farm system. Without consistent messages about these services, voluntary changes in farmer behaviour and attitudes could therefore be limited to 'keeping an eye on' fenced off bush remnants, or planting riparian strips.

This is a new concept currently being explored by the NZ Landcare Trust.

Farmers preferred way of learning

Decades of research on farmers' preferred learning styles and sources of information has consistently identified the following characteristics of farmers preferred learning environment(s).

- 'kicking clods', i.e. visiting other farms, and seeing how different practices work on other farms
- information and recommendations relevant to **local** farming conditions and constraints
- recommendations based on proven facts, incorporating farmer experience and knowledge and backed up with concise print material.
- talking to other farmers.

Some Waituna-based farmers indicated similar preferences, primarily through expressing an interest in farm-specific monitoring data (relevance to local farming conditions), and trusting other farmers knowledge.

> *"In farming if you want to know something, ask a farmer. Ask a good farmer."*
>
> **
>
> *"The best way of learning is getting out in the field... I would sooner be out on the farm and seeing, it is the only way. Having field days is twenty times better than having a meeting."*
>
> **
>
> *"I think they all learn from each other. If there are farmers that are doing things right, they tend to rub off onto other and it sort of follows on."*
>
> **
>
> *"Farmers are the best person to learn something off. We tend to trust them, but the only problem with farmers is that most of us have no scientific background to back up what we say."*

The latter comment is worth noting, because it indicates that a farmer is aware that he does not have sufficient defensible evidence to support his ideas about farm management practices. Some farmers could be receptive to work with scientists to explore and implement farmer-based solutions to water quality issues in the catchment.

Change in the Waituna catchment

This part of this chapter outlines some ideas specific to the Waituna catchment itself. One farmer said that the group urgently needed to find ways of engaging people outside of the immediate group members.

> *"They talk amongst themselves, preaching to the converted... and it just keeps going round and round in circles."*

It suggests of range of possible actions which could be incorporated into a future strategic direction if considered appropriate. These suggestions or recommendations have been made in the spirit of a 'brainstorm,' and are not 'compulsory' in any sense. They may also be implemented at different stages of a project. These recommendations are based on a mixture of:

1. key issues indicated by the research conducted for this report
2. suggestions made by Waituna farmers themselves
3. strategies used by other agencies or recommended by other researchers
4. strategies currently being used or developed by the NZ Landcare Trust

Public meetings

Only a minority of farmers mentioned attending a public meeting hosted by the Waituna Landcare Group (other than one meeting about land development in the catchment). Unfortunately these meetings failed to establish ongoing commitment to attend similar meetings with most of these farmers.

> *"There's always thousands of ideas at public meetings and nothing comes out of it. And big committees, but nothing comes out of those because no-one want to take on the decision or burden of doing it."*

**

> *"It was just the way they had meetings... didn't get much out of them, too many paid people there.. and the farmers got nothing out of it. There were probably only three to four farmers there."*

**

> *"We have had a couple of landcare meetings at the old school house and it has been a waste of time because all they do is end up arguing with each other... DoC, Fish and Game, ES... they get them all in one room and they end up talking. I would sooner be out on the farm and seeing, it is the only way."*

A public meeting is currently a form of engagement which is likely to have little impact if it focuses solely on water quality issues.

Other reasons given for not attending a meeting by other farmers were lack of time and interest. Dairy farmers are especially pushed for time to attend public meetings.

> *"So many times I have thought I would love to go to (meetings) but never get there. Priorities again. You do the most urgent and if you are lucky you can fit in something in your day that you want to do."*

One of the advantages of farming in Southland is the long hours of daylight in the growing season. Farmers are likely to take full advantage of the evening light to keep up with their chores,

unlike in other parts of New Zealand where the days are shorter and farmers may have more time in the evenings to attend meetings.

It may be more appropriate to use other forms of engagement and communication until a meaningful issue arises which can be constructively addressed through a public meeting. A powerful example of how farmers can be involved in a public forum is to invite a panel of farmers to review a series of recommendations developed by scientists in just one evening. This approach was successfully used by the TAIERI Trust (Recommendation 16).

Print information

The Waituna Landcare group has circulated information about water quality in the catchment via the Gorge Road Community newsletter, plus distributed a newsletter called *'Our Water, Our Responsibility'* in winter 2003.

Publicity concerning land management or water quality issues need to be consistent to be effective, and it was suggested by two farmers that the Waituna landcare group should send out newsletters more regularly, with up to date information about water quality monitoring.

> *"Why can't every farmer be given that information? Something needs to be done about it."*

Whilst information about water quality in the catchment is readily available via the Environment Southland website and annual environmental report, *farmers do not proactively seek out this information.* Regular print information (e.g. newsletters twice a year) focussing solely on the Waituna catchment delivered to farmers homes may have more impact.

This recommendation was made in Chapter Five (Recommendation 3).

Be open to ideas

Two farmers described encounters with landcare group members where they had suggested some ways in which the landcare group could improve its relationship with the local community. The landcare group members then suggested that the farmers themselves take responsibility for their ideas, and the tasks involved for making them happen. This is a sensible tactic for a number of reasons, including encouraging farmers to become involved and to take ownership of the issues. Unfortunately it will be a rare individual who will be prepared to step up to the mark and do so. In current farming culture, most farmers prefer to be a 'closeted' greenie. It is too much for them to take a public role, but the Waituna landcare group might benefit from developing a range of options that involve farmers in a low key manner and allow them to pursue their own interests. The group may also need to be more open to appreciating and taking the lead on other people's ideas.

(Recommendation 17): Involve farmers in a low key manner, be open to their ideas, and allow them to pursue their own interests.

Market segmentation

Community members' motivations are diverse, and it is difficult to reach different audiences with specific localised messages, especially the farming community. Farmers with little disposable time must perceive messages to have clear relevance, and this raises the issue of 'market segmentation' within the Waituna community of land managers.[25] This research indicates that there are some clear differences between dairy and non dairy farmers, and that different engagement strategies may be required to encourage changes in their land management practices. The key differences are:

[25] Tyson, B (2004) The TAIERI Trust Project: Year Three Evaluation. Ministry for the Environment. Sustainable Management Fund.

Non dairy Farmers	Dairy Farmers
Non dairy farmers interviewed for the project were longer term residents of the catchment. They were more likely to mention having personal contact with Waituna landcare group members.	Dairy farmer community (especially sharemilkers) tend to be more turbulent, and networks are industry-based.
Non dairy farmers tended to believe that their farms had little or no impact on water quality compared to dairy farms.	Dairy farmers were more open to the possibility that their farm is likely to be affecting water quality.

It is unlikely that a single 'blanket' communications strategy will be effective for both dairy and non dairy farmers, given the significant differences between their management strategies and farming impacts.[26] A communications strategy needs to consider how a communications strategy could address the differences between non dairy farmers and dairy farmers (Recommendation 18). The Waituna Management group will have to think carefully about what practices they recommend to whom, otherwise scarce resources could be wasted. The group may also need to prioritise what kinds of farm types they wish to target (e.g. dairy or non dairy).

A communications or change strategy will need to accommodate and work with tensions between:

1. the need to provide specific messages for different farm types
2. the need to avoid escalating tensions between dairy and non dairy farmers
3. the need to promote and encourage a catchment-wide sense of responsibility.

Below is a précis of the different messages or information that non dairy and dairy farmers could be targeted with. Regardless of the type of farm, farmers who make a commitment to changing their practices will require information about the magnitude they need to change their practices by, and how to address any flow-on changes to the rest of the farming system.

Non dairy farmers
Non dairy farmers in the Waituna catchment need sound, scientific evidence that explains if and how their farming practices affect water quality in the catchment. Some non dairy farmers in the catchment assume their impact is minimal compared to dairy, and are likely to default back to a 'change nothing' or 'do nothing' stance until dairy farmers in the catchment are demonstrating consistent good practices.[27] This strategy may indeed be valid, because non dairy farmers currently have no reliable information about the extent to which their practices do impact on water quality. It is unlikely that they will change their practices unless there is solid evidence there is a need to do so.

Dairy farmers and sharemilkers
A communications or change strategy should take into account that most sharemilkers or dairy farmers will not have the time to socialise or attend meetings. It also needs to address the turbulent nature of the sharemilker community, which appears to have a very high rate of turnover. Landcare groups have traditionally relied on stable place-based, community networks to encourage change, or make certain practices unacceptable. Other than school-related associations, these kinds of networks generally do not exist around dairy farmers, especially those new to the catchment. Instead, the networks that do tend to cluster around dairy farmers are *industry related.* For example, all of the dairy farmers interviewed for this project employed consultants to enhance their farm management decisions.

This suggests that developing partnerships within the dairy industry itself could be more productive than relying solely on place-based community networks. If this is not a viable option,

[26] Solutions to the impacts of dairy and sheep farming are also likely to vary.
[27] This comment is not intended to discount the non dairy farmers who do acknowledge their farm may be affecting water quality, and have made efforts to minimise those impacts.

then resources and energy may need to be put into meeting individual dairy farmers on their own farms, at a time that suits them.

A communications strategy could include a systematic means by which it can identify, contact and engage with new dairy farmers (sharemilkers and manager-owners). Otherwise any hard-won gains associated with specific properties could be lost with the arrival of a new farmer. Conversely, a new farmer may be more open to the messages about good practices, providing a valuable opportunity for change and to cement new practices on a property. It is possible that a change in farm practices will take place *only* when there is a change in land ownership or lessees.

A farmer new to the community could be issued with a 'welcome' package, which includes a range of information which includes:

- A description of the lagoon and why it is important to the community
- An introduction to the Waituna landcare group, and who to contact for any queries
- Recent information about landcare group activities
- A précis of the history of water quality in the catchment
- A list of social/community based services available in the area (e.g. kindergarten, recreational groups)
- A list of contractors or agents

Such a package would send a very clear message to the new resident of the expectations of the local community about land management practices and water quality, plus raise their awareness of a range of community and industry based networks (Recommendation 19).

Finally, any communications or engagement strategy concerning dairy farmers need to be carefully considered and well timed, due to their busy work schedules.

> *"You can get a lot of dairy farmers that won't want to talk to you, because they are so busy. They have to get out of bed in morning and then they put the cows out and then get them ready to milk again. The gap between two milkings is not big. If they have things to do between milkings they get wound up and you find they are hard to talk to. You have to talk to dairy farmers in the winter. But nowadays winter is pretty full on too. Wintering cows is a big job depending how they do it, most of it is off their property so they charge off the land to feed them. It is not an easy job."*

Monitoring the impact of farm practices and developing solutions – use credible science

If the Waituna Landcare group choose to seek funding for, and implement a research program, the following issues need to be considered when developing the program.

It is now widely accepted that research programmes which include land manager communities from the outset of the research and in appropriate roles during the course of the research are more likely to achieve positive, lasting changes in the way communities themselves manage their land.[28]

It is critical that researchers and land managers come to an agreement on the issue to be addressed, plus the overall focus and goals of the research (Recommendation 20). Land managers need to be given the opportunity to express their needs at a paddock level scale. Researchers must respect and accommodate those needs as well as address wider sustainability

[28] Pretty, J. (1995). Regenerating agriculture: Policies and practice for sustainability and self reliance, Joseph Henry Press.

issues. Farmers also need to give feedback on the practicality or feasibility of solutions suggested by researchers.

> *"Farmers need scientists to work with them to develop appropriate practices in sustainable land management. Farmers are part of the solution as they can contribute valuable local knowledge. If they are included in the solution they will have ownership of the problem and be better informed for the decision making processes that need to take place for change to occur."* [29]

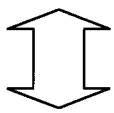
Building trust and relationships between scientists and the communities takes time, which can be difficult under funding constraints and wider institutional pressures. However failing to do so can expose a research programme to a degree of risk as it could fail to encourage uptake of the research findings.

The extent to which scientists and communities work together on a research problem can be placed along a spectrum. Collaboration between scientists and communities can involve any or a few of the following roles:

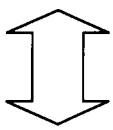
- Problem identification
- Methodology design
- Data collection
- Data interpretation
- Ongoing review or improvement of research cycle
- Developing recommendations, solutions, and management tools
- Knowledge transfer

Figure 1 Communities and Research Spectrum

Research Conducted By Communities and Research Scientists
Communities are involved in *all* stages of the research process except some aspects of methodology design and interpretation of certain kinds of data sets.
Examples: "Citizen Research" projects in Australia[30]



Research Conducted By Researchers 'For and With' Communities
Communities are involved in problem identification, ongoing review of research cycle, developing recommendations and knowledge transfer. Researchers are primarily responsible for methodology design, data collection, and data interpretation
Examples: TAEIRI Trust, MAF Sustainable Farming Fund projects



Research Conducted by Researchers Only, Communities 'Receive' Information
All stages of research are conducted by research scientists.
Communities are 'delivered' research findings after the research is completed.

This spectrum is very simplistic, and there are documented advantages and disadvantages to all of these models.[31] A research strategy for the Waituna catchment would benefit from being

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[29] National Landcare Facilitator.(2005). Landcare - linking science to paddocks, Geelong, Victoria,
[30] See Coastal CRC website for examples: http://www.coastal.crc.org.au/aboutus.html
[31] Black, A. W (2000) *Extension Theory and Practice: A Review.* In Australian Journal of Experimental Agriculture, V 40, 4493-502

placed intentionally somewhere along this spectrum, so it can be supported by efficient, appropriate engagement strategies.

Science which is credible to farmers has the following additional characteristics:[32]

1. the results are well presented by a credible person
2. messages are clear, short and simple
3. farmers must be able to measure the results
4. the science must fit into the whole farm package, e.g. economics, pay back time, and information how the practice will work within a commercial setting
5. seeing is believing e.g. use demonstration sites
6. computers, email, websites, videos, DVDs work well for young dairy farmers located in regions with good network access. These may not work for other farmers or those in more remote regions.

In addition, any future recommended practices which run counter to the prevailing norms need to be promoted with information that acknowledge and address the reasons why farmers have chosen not to adopt that practice in the past.

An Example of Scientists and Communities Working Together
Farmers and scientists could work together to investigate the effectiveness of silt traps in the Waituna catchment, exploring the following questions.

1. what kinds of drains are best suited for sediment traps, and how many are required to be effective?
2. likelihood of sections revert to swampy areas and how can this be prevented
3. impact on other waterways
4. likelihood of problems with weeds
5. impact on other parts of the farm
6. does this practice have different effects in different parts of the catchment?
7. should this practice be used in different parts of the catchment?
8. benefits – e.g. reducing the cost of clearing drains
9. effects of very high rainfall or flooding
10. effects on neighbouring farmers
11. best practices for drain and silt trap maintenance, e.g.:
    - length of sections of cleared/uncleared drains
    - location of sections
    - frequency of clearing silt traps

Any funding application for further research in the Waituna catchment needs to be carefully framed to ensure success. The Parliamentary Commissioner for the Environment argues that the cumulative impacts of intensification of farming and subsequent degradation of natural capital place the future of farming in New Zealand at risk. New ways of farming must be found that address these problems. Redesigning farming systems can encompass a spectrum which include:

1. Remedy and mitigation: aimed at reducing the adverse impacts on the environment of various outputs from farming systems. The status quo in terms of the functioning of the overall farming system (i.e., focus on increased production is maintained)
2. Farming systems redesign involves adapting farming systems to avoid adverse environmental outcomes
3. Whole system redesign expands the focus to include what is happening beyond the farm (e.g. integrated catchment management).[33]

[32]Sustainable Farming Fund Quarterly Newsletter September 2005 Issue 6. http://www.maf.govt.nz/sff/newsletter/sff-news-0905.htm. Accessed 19/12/2005

The vision of the Waituna Management group (*"Lifting economic and environmental outcomes by improving land management practices in the Waituna catchment"*) has the potential to encompass all three elements of redesign through a science and monitoring strategy. Any further applications for funding could benefit from being based on an explicit framework which identifies each of these levels and how the project will incorporate these elements.

Monitoring water quality

Quantifying the impact of individual farms on water quality was an important theme for a number of farmers. Some of the farmers interviewed for the project were open to having monitoring take place on their farms, and this information could act as a lightening rod to bring their interest to bear on water quality issues. A farm-specific monitoring programme could be a powerful tool to encourage a change in farm practices in the Waituna catchment. *It is doubtful that farmers would change without this information.*

This point was discussed in greater depth in Chapter Six. See Recommendation 4.

Working with Gorge Road school

One or two farmers identified the Gorge Road as an important means by which to engage with the local community.

> *"The school is a big part of it. If I was strategising and in your position I would be thinking your school and Board Of Trustees is the heart. It is quite simple, rural dairying community and kids; you are going right to the heart of the human condition."*

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> *"Get the school involved, the kids are starting to learn a bit more, starting to respect it a bit more. They are the ones that you should be targeting, as well as the farmers."*

It is possible that the school is the only community-based connection that some dairy farmers or sharemilkers have within the Waituna community, and the value of this connection should not be discounted. However it is not clear to what extent working through the school will change actual *farming practices at a paddock level.* The pressures of day to day farming could push aside or minimise farmer contact with a school programme. In addition, not all farmers have children at the school.[34] It may be sensible use of resources to use a school programme to raise farmer awareness of the lagoon and the ecological values associated with it, and use other, more direct strategies to promote good farm practices to farmers themselves (Recommendation 21) Careful thought should be put into the key messages promoted through the school, and the amount of resources dedicated to those messages.

Working one on one with farmers – environmental farm plans

One or two farmers commented that a farm-plan approach might be effective for some land managers in the catchment, given that they are less likely to attend meetings or a field day.

> *"I'm probably more of a one on one person... I wouldn't go to one of those meetings; well possibly I would if I had nothing else on. I don't read much. I can't ever see me being a member of the landcare group... If they come along and didn't say what I was doing wrong and just said would you be*

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[33] Parliamentary Commissioner for the Environment (2004), *Growing for Good: Intensive farming, sustainability and New Zealand's environment.* Wellington. pp. 175-176

[34] In the 2001 census, 35.8% of families in the Waituna mesh block were couples without children. Source: http:www2.stats.govt.nz. Waituna Community Profile. Accessed 28/11/2005.

interested in improving this and improving that, perhaps I would be interested."

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"I think probably you've got to visit every farm, have to talk to everybody, you have actually got to get some common sense.... The guy doing the farm visits have to know what they are looking for, they have to have been round farms all their life. This is not a job that you are going to get someone out of university and do it."

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"I think if they want to influence farmers, you go through a simple management plan (for each farm) but it has to be relatively simple and relatively low cost and obviously it needs to be monitored."

Environmental farm plans are an effective method of documenting environmental issues and management approaches to those issues in a simple but integrated way. Successful plans have to be integrated with financial planning and production management. Landcare groups can undertake some types of environmental farm planning, with benefits of collective ownership of catchment-wide projects.[35]

Unfortunately dairy farmers are less likely to adopt environmental farm plans. The reasons for lack of uptake by dairy farmers are complex, but probably relate to the physical nature of dairy farms, the structural relationship of sharemilking and dairy farm ownership, the strong production-led orientation of the dairy sector, and the historical regulation-driven relationship between dairy farmers and regional councils.[36] Further research may be required to assess the acceptability of environmental farm plans to dairy farmers living in the Waituna catchment. However, a farm planning process could be integrated into, and modelled by, the science and monitoring strategy (Recommendation 22).

Conduct further social science research

A good understanding of human dimension issues is essential to ensure that technical solutions to sustainable land management issues are appropriate for, and adopted by, farmers. Quantitative and qualitative social science research can be used in an action research framework to inform and energise a sustainable land management change program over its lifetime (Recommendation 23) Some of the different ways social science research can be used in a sustainable land management program are listed below:

Tracking change
Quantitative, catchment-wide social science research could be used to track changes in farm management practices and attitudes towards water quality issues.

Exploring new issues and problem solving
This report highlights a need for more information about the relationship between sharemilkers and dairy farm owners, and absentee dairy farm owners.

Investigate the acceptability and practicability of technical solutions
Once a suite of possible best practices have been identified by scientists, further social science research should be conducted to determine the acceptability of those practices to other farmers in the catchment – e.g. acceptability of silt traps or environmental farm plans.

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[35] Blaschke, P, Ngapo. N (2003) *Review of New Zealand Environmental Farm Plans.* Ministry of Environment, Wellington. Pp 38-39.
[36] Ibid

Ongoing evaluation of workshops and field days
Simple questionnaires and evaluation sheets help to assess the value of workshops and field days, identify ongoing information needs, and plan future field days.

Lighten the focus

Two farmers commented that it could be useful to shift the focus away from an antagonistic approach to one that invited people to engage with catchment issues in a more indirect, light hearted way; *"Have a party."* (Recommendation 24). One farmer suggested organising a debate, with the Mayor of Invercargill Tim Shadbolt as a guest debater. A topic could be set which allows issues about water quality to be discussed in a humorous way.

A 'party' could also include:

- an exhibition of children's artwork featuring the lagoon and the wildlife living in it
- a photo exhibition, including photos of wildlife in the lagoon, the socio-cultural history of the lagoon, and the history of the drainage scheme.

Secondary school students from the area could be invited take part in a competition and submit photos, art, or a short video which could be used at a later stage for stalls.

This function could be run in conjunction with the school to raise funds.

Mapping drains

All but one farmers stated that they would take advantage of funding if it were made available for mapping drains. However it is not clear the extent to which such an exercise would contribute to improving water quality in the catchment, and two farmers raised this point during their interviews. Drainage maps will:

1. enable farmers to find drains quickly and efficiently, thereby reducing the time taken to locate drains. There is some water-quality related benefit to this if a farmer has to locate a drain quickly in order to fix a problem with effluent runoff.
2. provide good information to 'sell on' to future buyers.
3. provide good information for absentee owners and new farmers, especially sharemilkers.
4. provide a means by which maintenance, replacement and upgrade history of a drainage network can be recorded.
5. enable farmers to make good decisions about where to put more drains in
6. help dairy farmers to make good decisions about where to irrigate effluent.
7. enable Environment Southland to make good decisions when considering resource consent applications for new development or changes to dairy farm infrastructure.

The Waituna Management group will need to assess if seeking funds for mapping drains will provide sufficient environmental or public good benefits to make such an investment worth while (Recommendation 25).

Field days and farm visits

This research indicates that only a small minority of farmers are likely to attend a field day which focuses principally on how to mitigate the impacts of farming on water quality. It may be more effective to:

- develop partnerships with production-related groups or agencies to identify ways in which information about good farming practices can be promoted through these agencies (e.g. production-related field days or local discussion groups).
- run field days that encompass both production issues and water quality issues.
- arrange a tour of farm visits which promote and celebrate good practices concerning production and water quality.

"We can always do more, but we also need to be shown examples of what can be done. We tend to learn by seeing a good example rather that someone coming and telling us it is a good thing for us."

This strategy is suggested in Recommendation 9.

Further outputs from this report

This report contains information that is useful to a range of other stakeholders, and has the potential to be used throughout the life of a project. However this type of report is also notorious for being shelved once completed, and failing to have any ongoing influence on future decision making. There is considerable potential to disseminate the key points in this report in a range of different ways, and to revisit it regularly (Recommendation 26). These include:

1. presenting key findings to a stakeholder workshop (Feb 2006)
2. distributing an executive summary to all research participants
3. publishing a précis in the next Waituna Landcare group newsletter
4. Waituna Management Group revisiting the report every 6-12 months to check for new ideas or opportunities as the project progresses.

Make connections with other groups

The Waituna Landcare group could benefit from keeping in touch with other groups who are addressing similar issues. These include

The Avon-Heathcote Ihutai Trust: http://www.estuary.org.nz/

The Guardians of Pauatahanui Inlet: http://www.gopi.wellington.net.nz/.

The Waihora-Ellesmere Trust: http://www.wet.org.nz/

Extend the economic value of the lagoon

The Waituna lagoon is a habitat for a some rare endemic bird species, and a range of migratory birds. Bird watching is a niche tourism market, and avid 'twitchers' are accustomed to visiting destinations which other tourists may not be interested in, or appreciate. The same tourists may be interested in some of the unique plant life in the wetlands. A small business could be set up to capitalise on this opportunity. This would signal to other people in the catchment that there is an economic value to the lagoon. For examples of bird-watching tourism packages in New Zealand, see the following links.

http://www.kiwi-wildlife.co.nz/newzealand_islands.php

http://www.limosaholidays.co.uk/tourDetail.cfm?tourID=292

Capital expenditure on such a business need not be extensive. Chris Dahlburg runs a modest operation on the Daintree river (Australia), the success of which is due to his in-depth ornithological knowledge, and his business being listed as a quality, but affordable experience in past editions of "Lonely Planet."

http://www.daintree.info/daintreebirdwatching.htm.

Key points
Engaging farming communities to create a shift in attitudes requires a holistic approach, involving a range of stakeholders and different tools. There is no 'one' simple recipe or prescription applicable to all situations. Engaging communities can take time, involve a number of stages, and must be planned strategically.

Barriers and Incentives for changing to sustainable land management practices

- Attitudinal barriers which influence farmers ability or willingness to change include a strong culture of individualism, lack of acceptance that there is a need to change, a favourable attitudes towards development and generating wealth, and a lack of understanding about the environmental sustainability of farm systems.
- Behavioural barriers include busy work schedules, a preference for practices and information which enhance or maintain production, and a reluctance to adopt complex or time consuming practices
- Economic barriers include lack of finances, and lack of any visible or short term benefits of sustainable land management practices.
- Institutional barriers to change include lack of regulatory incentives or disincentives to change, lack of industry-wide skills and knowledge, and lack of technology necessary for change.
- farmers are quick to adopt sustainable land management practices that either sustain or increase the production values of properties. New practices more readily adopted are ones that are observable, can be trialled on a pilot scale, and less complex to implement

Recommendations for Moving forward
Recommendation 12: wherever appropriate, promote the benefits of increased production or reduced cost of a sustainable land management practice.

Recommendation 13: Insist that any technical solutions developed by scientists include at least two of the following characteristics – observable, can be trialled, less complex, or fit into existing systems of social or cultural practice.

Recommendation 14: send consistent, low key messages about risk management throughout the life of the project.

Recommendation 15: consider using 'leaving the land in better shape as part of a communications strategy.

Recommendation 16: use other forms of engagement and communication until a meaningful issue arises which can be constructively addressed through a public meeting.

Recommendation 17: involve farmers in a low key manner, embrace or follow through on their ideas, and allow them to pursue their own interests.

Recommendation 18: consider how a communications strategy could address the differences between non dairy farmers and dairy farmers

Recommendation 19: Find ways to track change in community membership, and to send a clear, consistent message to new members of the expectations and values of the local community about farm practices and water quality.

Recommendation 20: It is essential that scientists work with farmers to agree on the problems to be addressed, and to identify acceptable and practicable solutions

Recommendation 21: The Gorge Road school may best be used to raise awareness about the ecological values of the lagoon, rather than promote changes in farm practices.

Recommendation 22: Integrate a farm planning process into the science and monitoring strategy.

Recommendation 23: Integrate further social science research into the project, but only where it offers best value.

Recommendation 24: Try to shift an engagement strategy from one that is antagonistic to a more indirect, light hearted way.

Recommendation 25: The Waituna Management group will need to assess if seeking funds for mapping drains will provide sufficient environmental or public good benefits to make such an investment worth while.

Recommendation 26: Disseminate the findings of this report to a wide range of stakeholders in appropriate format, and revisit it regularly,