
Attitudes and Barriers to Water Transfer

*PREPARED FOR
MINISTRY FOR THE ENVIRONMENT*

Prepared by
Christina Robb
Matthew Morgan
with
Simon Harris (Harris Consulting)

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EXECUTIVE SUMMARY

This project is part of the Ministry for Environment's Water Allocation Programme. The programme is aimed at enabling sustainable development of New Zealand's water resources by removing unnecessary constraints to water availability and promoting improved efficiency of water use. A potential method to improve the economic efficiency of resource use is allowing users to transfer their allocations, thereby moving the water to those who value it most. This is not happening at present due to a number of institutional and attitudinal factors. To deal with these, we need first to understand if and when users would transfer their permits.

Approach

The project involved a programme of interviews of both water users and regional council staff to assess their issues and attitudes to water transfer. Questions covered all forms of water transfer from permanent trading of water permits, to sharing of water among users during times of water restrictions. Interviews of water users interviews included questions on prices that would be paid or accepted for water to give a general indication of market size. Water user interviews were carried out in four catchments/schemes where allocation limits have been reached. The catchments were selected to cover: surface and groundwater resources; different regions and regulatory approaches; catchments where a single land use dominates or is likely to dominate and those where there is a diverse range of potential water uses; and catchments where transfers will occur within a private scheme, under a regulatory system and within informal user groups.

Attitudes and Barriers to Water Transfer – Water Users' Perspective

There are some very deep-rooted attitudes among water users that will pose barriers to water transfer. These arise from a very strong association of water with their land and its value, and the viewpoint that water provides an ability to maximise the production from their land. The concept that water users can be compensated for reduced production is very unpopular, as is the concept of water moving to industrial uses. In addition, there is a reluctance to participate in anything that might speed up change in land and water use within a catchment. As well as attitudinal barriers, there are practical issues that will also hinder the widespread adoption of water transfer. These are small and illiquid markets, a lack of information on where there is additional water, infrastructure constraints and uncertainties in resource availability and reliability.

Users were relatively comfortable with the concept of within-season transfer because it was viewed as a practical means to help each other out if there was unused water available. The level of discomfort increased with leasing and permanent transfer partly because of a philosophical objection to money being associated with water, but predominantly because of attitudinal barriers associated with how water should be used on their own and surrounding land.

While three out of four users supported the concept of water transfer, the interview programme indicated that only 4-10% of water would actually change hands under a water transfer system.

Attitudes and Barriers to Water Transfer – Water Users' Perspective

Regional councils are generally supportive of water transfer with most water-related plans identifying the possibility of water transfer. Practice ranges from active promotion of the possibilities and opportunities through to providing for transfer if requested by users. Consent conditions can unnecessarily limit the opportunities for water transfer, and need to be kept flexible enough to allow for water transfer to occur in circumstances where any adverse environmental effects can be addressed. The following key barriers to water transfer from a regional council perspective are:

- Real time compliance;
- Consent issues associated with temporary transfers;
- Limited options for rewarding efficient use (the “use-it or lose-it” approach can be seen as penalising users for improvements in water-use efficiency);
- Difficulty in defining zones within which transfer can occur;
- Lack of a mechanism to register interest in water;
- Information on reasonable/realistic use.

Recommendations

Our key recommendations for overcoming these barriers are as follows:

- Further work on incentives for transfer (including charging for water) and the implications of approaches to “use it or lose it”.
- Extension work with users on successful implementation of water transfer.
- Work on appropriate means of facilitating market transfer.
- Further investigation of barriers to storage of water. Storage has considerable potential to overcome some practical barriers to water transfer by allowing water to be transferred across time as well as space, and providing greater certainty of water availability.
- Examination of regulatory options associated with temporary consents, and systems for registering interest in water.
- Continued regional council promotion of water transfer with a move to more active encouragement of such transfers.

Other initiatives such as increased resource investigation and technology capable of real-time monitoring of water use will help overcome some of the practical barriers for regional councils. Although not directly associated with water transfer, our results indicate considerable potential to improve the efficiency of water allocation by more accurate information on peak needs and patterns that could help better match use with allocation.

Conclusions

While we believe that water transfer has a valuable place in increasing the economic efficiency of water use, as a more widespread tool and a means to promote economic efficiency, we are dubious that it will be widely used under the current water allocation framework. Coupled with infrastructure issues, market constraints mean that, without storage, water transfer will only ever take place at the margins and over relatively long time periods. Unless it is accompanied by more fundamental changes in the regulatory framework, such as examining charging for water, it does not appear that water transfer should be a high priority issue for policy makers.

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- All the regional council staff who participated in the interviews and provided comment on the draft results.

1 INTRODUCTION

1.1 Project Rationale

This project is part of the Ministry for Environment's Water Allocation Programme. The programme is aimed at enabling sustainable development of New Zealand's water resources by removing unnecessary constraints to water availability and promoting improved efficiency of water use. The Government is looking to enhance rural, social and economic outcomes through the sustainable development of natural resources. This includes the better allocation of water resources, consistent with the provisions of the Resource Management Act (RMA). A potential method to improve the economic efficiency of resource use is allowing users to transfer their allocations, thereby moving the water to those who value it most. This is not happening at present due to a number of factors.

Regional councils claim that there is little support from users for transfer of permits and that where transfer has been allowed for, it has not been used. This is likely to be due to a mix of institutional and attitudinal factors, including the legislation, regional planning, market failure, water users' lack of familiarity with transfer of permits, and water users' risk averseness. While many of the institutional issues can be dealt with, the attitudinal issues are more problematic. To deal with these, we need first to understand if and when users would transfer their permits. This project will develop further the understanding of why transfer of water does not take place and how it may be encouraged.

1.2 Objectives

The objectives of the project were:

- To identify the circumstances where transfer of water could be successfully used;
- To identify factors influencing decisions to transfer water;
- To identify the perceptions regional councils hold about where transfer would be used and what influence it;
- To identify the barriers to transfer and how they could be overcome; and
- To provide input into the design of transferable water allocation systems in regional plans.

1.3 Scope

The project involved:

- A programme of interviews of water users to assess their attitudes to water transfer;
- A programme of interviews of regional council staff to assess their attitudes to water transfer and the issues important to regional councils;
- A workshop with water user representatives, industry groups, and staff from the ministry for agriculture and forestry and ministry for the environment; and
- This report on the project findings.

The project covered all forms of water transfer from permanent trading of water permits to sharing of water among users during times of water restrictions.

1.4 Definition

We have taken a broad view of the term “water transfer”, and see it describing both classical market transfers where money changes hands, as well as simple transfers within an irrigation scheme where scheme operators make decisions on where to divert unwanted water. In our view, any transfer which increases the economic efficiency with which water as a resource is used is worth investigation. While water transfer in conjunction with land is widespread (through the sale and purchase of irrigated blocks), this study confines itself to the transfer of water separately from the land to which it is applied.

2 WATER USERS' INTERVIEW PROGRAMME

2.1 Selected Catchments

The selection of catchments to be studied was a key decision in this project. An incorrect choice could limit the scope of issues raised in the report. We selected a suite of catchments to cover:

- Surface and groundwater resources;
- Different regions and regulatory approaches;
- Catchments where a single land use dominates or is likely to dominate, and those where there is a diverse range of potential water uses; and
- Catchments where transfers would occur within a private scheme, within informal user groups, and where they would occur under a regulatory system.

We have tried to identify catchments where irrigators are relatively familiar with the concept of water transfer.

The catchments/schemes chosen were:

- **Waimakariri Irrigation Ltd, Canterbury**

Waimakariri Irrigation Ltd is a new irrigation scheme with a consent to abstract 7 m³/s for irrigation from the Waimakariri River. Water was first delivered by the scheme in September 1999. There has been so much interest in the water that the company applied this year for more water to increase the area from its initial 11,000 ha. Applications for shares in this additional water were over-subscribed. It has a mixture of land uses, property sizes and irrigation systems. The scheme was used as the initial test of the questionnaire.

- **Shallow Pukekohe Aquifers, Auckland**

The shallow Pukekohe aquifers are predominantly used for vegetable growing, mainly for the domestic market. There are approximately 80 consents to take water. Over the last few years, a number of smaller growers have gone out of business. A feature of land use in Pukekohe is the widespread use of leased land. Land is swapped between growers frequently to maintain crop rotation and prevent disease. The cumulative take from the aquifer has been limited to 1 million m³ per year, and that limit has been reached. Growers are allocated a daily volume and a seasonal volume. The use of a seasonal allocation to determine the limit allows more water to be allocated than an approach that assumes everyone takes their daily allocation every day throughout the growing season. The total seasonal volume is 40 times the daily volume.

- **Ngaruroro River, Hawke's Bay**

The Ngaruroro River in Hawke's Bay has recently had an allocation limit set via the proposed Hawke's Bay Regional Resource Management Plan. It has a mix of land uses and property sizes, with an increasing demand for water for viticulture and dairying. There are approximately 35 irrigation consents. The minimum flow on the river was recently lowered, freeing up some water that has subsequently been allocated via consents. The consents have yet to be granted as the lowering of the minimum flow has been appealed to the Environment Court. A local district council also recently sold its stockwater right to irrigation users.

- **Waimea Plains Aquifers – Waimea West and Reservoir Zones, Tasman**

The Waimea Plains aquifers are managed in 8 zones, all of which are fully allocated. There is a mixture of land uses, including a significant and growing number of lifestyle blocks. Management zones include groundwater and surface water takes, with restrictions based on flow levels in the Waimea Rivers. We interviewed users in the Waimea-West and Reservoir zones. There are 57 users in these two zones. All irrigation consents have a consistent allocation equivalent to 35 mm per week. One of the consent holders in this zone is the Waimea East Irrigation Scheme – a piped river-fed scheme. Tasman District Council (TDC) also holds consents in these zones for public water supply. TDC has a list of those who have registered interest in more water from these zones, one of whom is the TDC public water supply. As well as interviewing 10 individual Waimea Plains irrigators, we also interviewed the Waimea East Irrigation Scheme and the TDC public water supply.

- **Ashburton-Lyndhurst Irrigation Scheme, Canterbury**

The Ashburton-Lyndhurst Scheme is a border-dyke scheme supplied by the Rangitata Diversion Race (RDR), irrigating 24,500 ha on 208 properties. The schemes on the RDR have been operating since the 1940s, with ownership transferred to user-owned co-operatives. Water users are shareholders with one share equal to an entitlement to irrigate a specified area at a specified flow rate. Allocation per hectare is approximately equivalent to 3.5 mm per day. From three years ago, the company constitution allows transfer of shares within the command area to farmers who have no water or partial contracts. To date, one major transfer has occurred and other small transfers have taken place from small areas not using their allocation.

2.2 Interview Programme Design

The topics and content of both the water user and regional council interview questionnaires were developed at a one-day workshop attended by Lincoln Environmental and Harris Consulting staff, John Fairweather (Agribusiness and Economic Research Unit, Lincoln University) and Andrew Fenemor (Tasman District Council). John Fairweather provided the social science input and Andrew Fenemor a regional council perspective.

There were two parts to the water user questionnaire – an initial section with open-ended questions to address the more qualitative objectives, followed by a series of quantitative questions aimed at addressing willingness to pay or accept compensation.

The open-ended questions included:

- A set of questions on land use, irrigation system and operation, including any long-term intentions;
- A set of questions on water allocation and use, to assess attitudes to water and resource consent and the level of information about the use of water;
- A set of questions relating to all the various types of water transfer, covering four options for the length/permanence of transfer, three transfer mechanisms (physical, within scheme or administrative), and three types of use for the transferred water (existing infrastructure, new infrastructure, speculative);

- A question relating to issues for the catchment or region as a result of water transfer.

The purpose of the qualitative questions was to identify the kinds of thoughts, ideas and perceptions water users have about water transfer. This qualitative assessment of attitudes does not rely on requiring a large sample of users and the number of users interviewed provides ample data to assess and report on these attitudes.

The quantitative questions were aimed at ascertaining whether a market in water could realistically establish. Users were questioned as to the price at which they would buy and sell water. Conditions of the transfers were varied to identify the effect of permanence of transfer and of the proportion of water transferred. The quantitative questions were framed to reduce the biases associated with contingent valuation techniques, and are shown in the questionnaire instrument (refer to Appendix I). The relatively small samples are not the basis of precise statistical analysis, but are designed to give a general indication of willingness to pay.

Prior to the interview programme, we were concerned that irrigators would not have sufficient knowledge on the value of water to accurately answer these questions. We therefore set up the questionnaire to initially ask the “willingness to pay” questions, given current knowledge, and then provided respondents with information on the value of water and asked if they would change their responses.

2.3 Administering the Interview Programme

The water user interview programme was carried out by three interviewers. Each interviewer initially undertook two interviews with water users from the Waimakariri Irrigation Scheme. Results from these interviews were discussed in order to fine-tune the questionnaire and ensure consistency of approach. Results from these initial interviews have been used in the attitudinal summary but not in the quantitative assessment.

One interviewer per catchment was used for the four main survey areas. User group representatives in each area were contacted and asked for a list of contact names, stating a preference for users from a mix of land use and sized operations. These individuals were then contacted by phone and interview times arranged. Ten interviews were carried out in each of the four areas. All user interviews were carried out in person, generally at the home or farm of the individual. Interviews were undertaken in the last two weeks of July 2001.

3 REGIONAL COUNCIL INTERVIEWS

A staff member from each of the regional council and unitary authorities (except Nelson City) were interviewed. These interviews were conducted by phone in the middle two weeks of August.

Contacts were obtained from the Resource Managers Group (RMG) and consisted of a range of consent, planning and technical staff at various levels within the councils.

The staff interviewed were asked questions on their previous analysis and experience with transfers, the roles for regional councils, and the likely future demand for transfers. They were then asked similar questions to the users as to their opinions on the time frames and mechanisms for transfer. They were also asked about the planning, consent, monitoring and investigation tools available to them for managing water transfer.

A copy of the regional council questionnaire form is given in Appendix II.

4 WATER USERS' RESULTS – BACKGROUND INFORMATION

4.1 Description of Enterprises Interviewed

- *What is the irrigated land area and land use?*
- *What is the irrigation system?*

Answers to the question on irrigated land area and land use were not straightforward. Particularly in Pukekohe, there is considerable leasing of land and moving of water between properties owned or leased by the respondents. In these cases, the land area that is “irrigated” is difficult to define. In all areas, it was very common to have two or more properties, and frequently more than one land use.

Table 1: Property sizes, land uses and irrigation systems of those interviewed

Catchment/ Scheme	Average irrigated area	Range of irrigated area	Land use (% of area)	Irrigation systems
Pukekohe	96 ha	7-203 ha	1% Kiwifruit 99% Vegetables	99% Spray 1% Drip/trickle/ micro
Ngaruroro River	114 ha	28-200 ha	4% Arable 17% Dairy 5% Fruit 28% Grapes 17% Mixed crop/stock 29% Other stock	64% Spray 36% Drip/trickle/ micro
Waimea Plains	69 ha	6-180 ha	41% Dairy 8% Fruit trees 36% Grapes 13% Other stock 2% Vegetables	57% Spray 43% Drip/trickle/ micro
Ashburton- Lyndhurst	226 ha	32-400 ha	35% Arable 39% Dairy 16% Mixed crop/stock 10% Other stock	61% Border-dyke 39% Spray
Waimakariri Schemes (6 interviews only)	184 ha	5-420 ha	38% Dairy 1% Fruit 23% Mixed crop/stock 38% Other stock	38% Border-dyke 61% Spray 1% Drip/trickle/ micro
For all areas. (figures in brackets are the number of interviewed users)	134 ha	5- 420 ha	17% Arable (4) 29% Dairy (9) 2% Fruit (5) 9% Grapes (6) 9% Mixed crop/stk (5) 18% Other stock (8) 16% Vegetables (9)	29% Border-dyke (6) 59% Spray (28) 12% Drip/trickle/ micro (12)

- **How many years have you been irrigating?**

Table 2: Number of years irrigating

	% of area	Number of respondents
Less than 5 years	20%	9
5 to 15 years	22%	10
16 to 25 years	10%	9
26 to 35 years	29%	7
Greater than 35 years	24%	11

- **What are your longer-term intentions for the property?**

Eighty-six percent of those interviewed (representing 86% of the total land area) intend to stay farming/growing in the long-term, the remainder are unsure of their long-term intentions. Eleven of those interviewed (representing 10% of the land area) have just undergone or are about to change their land use.

4.2 Existing Water Allocation and Use

- **Where does your water come from?**

- **What are your options for obtaining more water?**

Although the properties selected were either in irrigation schemes or abstracted from fully-allocated resources, it was very common for users to have another water source. In Pukekohe, there is a deeper aquifer that can be accessed, although at a much higher price than the shallow aquifers. The deep aquifer is not yet fully allocated. In the Ngaruroro River, some users have access to groundwater and others have storage opportunities on their land. In the two Canterbury irrigation schemes, some users have access to groundwater, and options for storage are being investigated. Waimea irrigators had perhaps the least access to alternative sources, although an investigation into storage options has just begun.

- **How much water do you have allocated?**

The way water users expressed their allocation of water was different in each catchment, but consistent within catchments and related to the way consents or scheme shares are expressed. In the two Canterbury irrigation schemes, a share in the company relates to a fixed flow rate per hectare. Scheme users expressed their allocation as a land area for which they have shares. Waimea users expressed their allocation in mm per week – all irrigation users have 35 mm per week. Ngaruroro users expressed their allocation in ℓ/s or in m^3 per week, both of which are described on their consent. Pukekohe users expressed their allocation in m^3/d , with only a few knowing their annual allocation.

- **What is the reliability of supply?**

Pukekohe -- Users of the shallow Pukekohe aquifers are never put on restrictions. The allocation limit has been set to provide full reliability.

Waimea Plains -- Waimea irrigators consistently answered that they had never been off before last year, and are unsure of the future likelihood of restrictions. Cut-backs of up to 60% were experienced during the recent summer. There has been discussion about raising the minimum flow that triggers restrictions, which adds additional uncertainty to their reliability.

Ashburton-Lyndhurst -- All irrigators reported that last year was the first season they had experienced more than 25% cut-backs in flow rate; last year there were up to 50% cut-backs. There is uncertainty as to their ongoing reliability given that the allocation regime on the Rangitata River – minimum flow, allocation limit, priority – is subject to review, either through a National Water Conservation Order or Environment Canterbury’s planning process.

Ngaruroro River -- Ngaruroro River irrigators had various opinions on their reliability, ranging from very good to “ridiculous”. The perception of reliability depends on the land use and whether or not users had access to an alternative source.

Waimakariri Irrigation Ltd -- Users reported an extremely low reliability, given that the water was off for 6 weeks over the previous summer. Those without access to alternative sources of water were concerned about the reliability of their water.

- **What does your resource consent provide you with?**

There was a very consistent response to this question. All water users believe they will continue to have access to water. Very few knew the exact term of their consents, and view the consent process as an administrative renewal. They are, however, aware that conditions of their consents, including the amount of water allocated, can be changed.

From their perspective, having a consent is definitely not akin to ownership but a right to increase the productive value of their land. Many went on to say that water was a public/community resource that should be used for the good of the local economy.

- **How much water do you use?**

- **Could you use more water?**

Users in Pukekohe and Waimea are metered. At the time of the interviews, Waimea irrigators had just received a summary graph plotting their 2000/01 takes (measured fortnightly and increased to weekly during the time when restrictions were on) and a plot indicating the total use in the zone. Users, therefore, had accurate information on their water use, with pastoral farmers using their full allocation from early summer onwards, and other users occasionally using their full weekly amount. Some Pukekohe users had, on one or two occasions, exceeded their annual allocation and received letters from the regional council. Most used at or above their daily allocation at times. In other areas, information on water use was more qualitative. The Ngaruroro users have now been required by the Hawke’s Bay Regional Council to install water meters before the 2001/2002 irrigation season.

Just under half (45%) of those interviewed indicated a need for more water with about a 50/50 split between those who wanted to increase their irrigation system capacity over the same area and those who would increase the area irrigated. This split should be viewed with some caution, as it is difficult to differentiate. For example, some Ashburton-Lyndhurst irrigators do not irrigate the entire property, for which they have shares, in order to reduce the return period between irrigations. Another reason given for wanting more water was to increase reliability.

Just under one fifth (22%) of respondents indicated they have water to spare. Half of these had an allocation rate that was too much for their land use, 3 irrigators have seasonal allocation that are in excess of their requirements, and 2 others are winding down their farming operations.

5 WATER USERS' RESULTS – ATTITUDES TO WATER TRANSFER

5.1 Attitudes to the Concept and Types of Water Transfer

- ***What do you think about water or water rights being moved between properties?***

Most (74%) of those interviewed thought that water should be able to be moved between properties. The remainder were either unsure or not in favour of water transfer, giving the following reasons (the numbers of respondents giving that reason as their dominant concerns is indicated in brackets):

- Concerned philosophically about paying for a natural resource (4)
- Worried that it would increase use of the resource and reduce their reliability (2)
- Looking after their own interests and not wanting to get involved outside their property or help competitors (2)
- Unfamiliarity (2)
- Does not believe anyone would part with water (1)
- Current transfer system means price has gone too high (1)
- Believes it cannot be done fairly (1)

- ***What do you think about these specific time frames for water transfer?***

⇒ ***Transfer while on restrictions?***

Transferring while on restriction is not applicable in Pukekohe because takes from the aquifers are not restricted. Of the other 36 users, 30 were supportive of the concept of transfer during restrictions; but many noted that it is unlikely to occur since when restrictions come on everyone needs it. On the Ngaruroro River, users are never partially restricted, they are either fully on or off. In this case, transfer would only be applicable if users had storage or access to unconnected groundwater. All those who objected to the concept were concerned about fairness and everyone being equally restricted.

⇒ ***Transfer during a season?***

This type of transfer required more explanation by the interviewers than the other timeframes. It relates to transferring water at those times of the season when the full allocation is not needed. Thirty-eight users (80%) supported this concept in principle, although they noted that, similar to transfer when on restrictions, it is not likely to happen given that the peak demands for most crops coincide. However, it could be used for other purposes in the early part of the year such as filling storage. Reasons given for objecting to this type of transfer were:

- Looking after their own interests and not wanting to get involved outside their property or help competitors (5)
- Indicates to the council that they are not using their water (1)
- Increases use of the resource, and hence reduces reliability/availability (1)
- Fairness (1)

⇒ ***Transfer for a year or more – temporary?***

Seventy-eight percent of users supported the concept of temporary leasing or lending/borrowing of water. Some qualified their answer saying that the lease would have to be very long term before it was useful. Of those in support, less than a fifth had previously identified that they have water to spare, whereas almost half of those in support were people who had identified a need for more water. Of those who were not supportive of the concept, the dominant reasons were:

- Infrastructure issues – would not invest in infrastructure without a permanent transfer (5)
- Uncertainty in climate/reliability (5)
- Looking after their own interests and not wanting to get involved outside their property or help competitors (2)
- Worried about getting it back (1)

⇒ ***Permanent transfer?***

Fifty-nine percent of users supported the concept of permanent transfer of water between properties. Of the 27 respondents who were supportive, 16 wanted more water, 4 had water to spare, and the remainder considered they had enough water. The dominant reasons for objecting to permanent transfer were:

- Reduces the value of land (4)
- Land use is dependent on access to water – would therefore have to change land use or sell up (12)
- Looking after their own interests and not wanting to get involved outside their property or help competitors (1)
- Climate uncertainty (1)
- Concerned philosophically about paying for a natural resource (1)

• ***What do you think about these specific methods of water transfer?***

⇒ ***Piping water between properties?***

Only 3 respondents were not supportive of the ability to pipe or channel water between properties, 2 had had problems with neighbours before over shared water, and 1 wanted to remain self-contained. Many users noted that piping has a number of practical difficulties as a result of surrounding land uses, topography and property size that mean many users would not actually pipe water; they see transfer of consents as a more viable option.

⇒ ***Transfer within an irrigation scheme?***

The only objection from respondents within irrigation schemes was one philosophical objection to dollars being associated with a natural resource.

⇒ ***Transfer of resource consents?***

Of those respondents with individual resource consents, the only concern raised about transfer was the time taken to fill in forms and work through the process. The shorter the term of the transfer, the easier they would like the transfer process to be.

5.2 Willingness to Transfer

- **Would you transfer:**
 - ⇒ **some water (20% of existing allocation) for one season?**
 - ⇒ **all water (100% of existing allocation) for one season?**
 - ⇒ **some water (20% of existing allocation) permanently?**
 - ⇒ **all water (100% of existing allocation) permanently?**

There was a “not interested” option in the quantitative value questions. Full analysis of the quantitative questions is in the following section, but it is interesting to first look at those respondents who were supportive of the concept of water transfer to see if they would actually consider transfer themselves. Thirty-one (67%) of the respondents answered the questions on dollar values.

Of the 25 respondents who answered the dollar value questions and were supportive of the concept of short-term transfer (one or more seasons), 4 indicated they would not transfer some of their allocation, and 9 indicated they would not transfer in or out all of their allocation. A significant number of those who support short-term transfer in principle would not transfer water themselves. The dominant reasons were:

- Too risky - might not get it back or might need it within lease time frame (3)
- Water is exactly right for my needs (2)
- 100% of the allocation is too much water to lease either in or out (4)

Of the 21 respondents who answered the dollar value questions and were supportive of the concept of permanent transfer, 3 indicated they would not permanently transfer some of their allocation, and 6 indicated they would not transfer in or out all of their allocation. Similar to short-term transfers, not everyone who supports the concept of long-term transfer would participate themselves. The dominant reasons were:

- Uncertainty with land value and future land uses (1)
- Giving away even some water means the infrastructure won't work (1)
- Water is exactly right for needs (1)
- 100% of the allocation is too much water to buy in and I would not be interested in selling that much (3)

5.3 Willingness to Pay/Accept Questions

Reaction to questions

A third of respondents were unwilling to answer these questions. Most commonly, these respondents could not quantify the value of water to their enterprise, and were therefore reluctant to associate dollar values with their water. However, all recognised that water is extremely valuable to their enterprises. Although most of these respondents were in Pukekohe, there was a similar response from vegetable growers in other catchments. When asked questions as to how much dryland they would need to have in order to spend (say) \$100,000 on a bore or storage, answers ranged from \$600 to \$8,000 per hectare, which is consistent with increased values from horticulture given in the interview data.

Other reasons given for not answering the willingness-to-pay/accept questions were:

- Suspicions that results might be used to set charges for water
- Climatic variations means that a value cannot be put on water
- Inability to put a dollar value on something that is not paid for

Information used to set values

The types of information respondents used to estimate the value of water were:

- Feed prices or availability of feed on own run-off land – buying in feed can be a better option than buying water since it is definitely there, and can be used all over farm to suit and not limited by irrigation infrastructure.
- Difference between production on dryland and irrigated land
- Difference between profit on dryland and irrigated land
- Information from valuers on the relative value of land with and without water
- Annual resource consent fees
- Cost charged to householders for domestic water supply
- Power costs, pump maintenance, and some contribution towards capital cost of pump/bore.
- Price paid for shares in scheme
- Cost of alternative supplies or of upgrading system

The reaction to the information provided to respondents on the value of water was consistent. Nobody disputed the figures, and most respondents already knew the values for their land use. No one reviewed their answers as a result of seeing the information.

Market analysis

A supply and demand curve was constructed to analyse markets for water for permanent and temporary transfer in each area. The intersection of the two curves gives price and volume likely to be traded in each area. The information on price has not been released due to concerns regarding its influence on developing markets. However, the congruence between our assessed price and recent trades gives some confidence in the robustness of the analysis. Our assessment of the volume of water likely to be traded is shown in Table 3.

Table 3: Volume of water likely to be traded in surveyed areas

	Area likely to be traded on LEASE market, as a percentage of total area surveyed	Area likely to be traded on PERMANENT market, as a percentage of total area surveyed
Ngaruroro	2%	3%
Waimea	10%	4%
Ashburton-Lyndhurst	3%	12%

Results are not available for the Pukekohe area due to a general unwillingness to answer this set of questions. The results indicate that there will be a small market for water in most of the areas surveyed, and that, in these cases, water rights will trade at realistic prices from the point of view of buyer and seller. However, this market will be limited and confined only to the margins of available supplies (typically less than 10%).

It should be noted that we have not included questions on timing here, and we have assumed that respondents were basing their answers on a reasonably immediate willingness to buy or sell. It may be that over time, as attitudes change or as the farmer's life cycle changes requirements, the willingness to sell will increase. However, in some places, it may be that the willingness to trade is driven by availability of alternate sources of water (such as groundwater substituting for surface water). Once these are used up, transfer may decrease. For this reason, some circumspection should be attached to the figures provided. They do, however, indicate that the total market for water is not likely to be large.

5.4 Wider Implications

- ***Do you have concerns or see benefits for the catchment or region as a result of water transfer?***

Concerns

Loss to other uses -- A major concern with water transfer was who the water would end up with. Some users raised concern that water would go out of agriculture to industry, large processors, or urban uses, or that it would go out of the catchment/aquifer.

Speculative buying/selling -- There was a strong reaction against speculative buying/selling or water banking. It was seen as very important to keep the water for productive uses. However, there was a belief that speculative interests could be avoided by requiring proof that the person receiving the water had land to put water on.

Monopolising the resource -- A more dominant concern was where water might go within the productive sector. Users were concerned that water would go to larger and corporate enterprises making it difficult for smaller businesses to compete. Or water might be bought up and used to the benefit of corporate companies such as seed suppliers or vegetable processors to the detriment of growers. There was concern that water transfer would encourage a faster growth in land uses that were doing well at the time, and hasten the loss of traditional farming sectors, reduce the number of economic family units and lead to the loss of long term farming families. Some respondents indicated they would be selective as to the land uses they would sell or give water to, or choose to transfer to locals rather than outsiders new to the area.

Increased use -- Another concern with water transfer is that it would increase use of the resource if currently unused consents were transferred and exercised. Increased use could increase the frequency of restrictions to existing users.

Reduced productivity -- Some users stated that the best land in the area was currently irrigated and that any system that moved water to other land would reduce the productive benefit gained from the water.

Benefits

Increased efficiency of water use and benefits to the local economy were frequently given as the benefits of water transfer. Specific benefits noted were:

- The ability to transfer water would compensate those not using water, or not making a profit from their water for giving up water.
- Transfer would provide a means to allow new development by freeing up water that is currently not being used.
- Transfer allows better use of resources so that those who have access to an alternative source can be compensated for the cost of switching sources, thus freeing up water from the original source.

The benefits that water users see in transfer relates to mechanisms that enable the use of water that is currently excess to requirements, ie they are interested in selling only excess water. In general, they do not consider the potential regional economic benefits achievable by moving water between land uses.

Ambivalent to water transfer

Not all users who were relatively comfortable with water transfer considered that it would achieve any benefits locally. This was most common in Pukekohe where there is significant uncertainty in the market and the margins payable to growers. Most growers felt that water transfer would not actually increase the amount of product grown because it is the size of the produce market that is limiting, not the availability of water. In Waimea, some users commented that there is not much unirrigated land left, and that there is land with water for sale. In this case, demand for more water is not high, and it can be obtained through land purchase.

5.5 Other Issues

Water users raised a number of other issues predominantly relating to the existing regulatory regimes.

Use it or lose it

Users raised concerns with strict enforcement of “use it or lose it” for resource consents. While they would like to see unused consents cancelled, they believe “use it or lose it” encourages people to waste water or artificially “clock up” their water meters. If there is a general measure for how much water should be applied, then someone who is efficient and uses less water could stand to have their take reduced under a “use it or lose it” policy. This provides a disincentive for efficiency as the loss of water is seen as reducing land value or at least limiting future options for the land.

Uncertainty in limits

Uncertainties in the regulatory regime means water users are unsure of their reliability and security of consents, and therefore unlikely to transfer water. Uncertainties include:

- Increases/decreases in minimum flows or allocation limits
- Mechanisms by which increasing urban demand will be catered for

Relationship between water transfer and existing regulatory system

Water transfer organised between users could circumvent existing arrangements such as informal waiting lists. Users who have indicated to the regional council an interest in more water would not like to see someone else get water ahead of them.

Dual sources

There was some concern as to how regional councils were addressing allocation where users had access to more than one resource. For example, users within a surface water or piped scheme who are using groundwater to increase their irrigation system capacity or as a backup source to improve their reliability.

6 REGIONAL COUNCIL RESULTS

Regional council reaction to water transfer was reasonably consistent. The major variation was the extent to which councils have explored the issue. Unsurprisingly, those who have catchments or aquifers that are closed to new consents have done the most assessment of water transfer. Seven councils already have fully-allocated resources. Some councils who have not yet set or reached allocation limits stated that they were expecting to learn from the experience in other councils.

- ***Have you carried out any analysis assessments of the potential for water transfer?***

Five of the 15 councils interviewed had undertaken analysis of the potential for use of transferable water permits within their region. The only council that expressed concern with water transfer in principle was Otago Regional Council. Mining privileges in Otago prevent the Council from implementing minimum flows until 2021, unless they compensate consent holders. Given this situation, any mechanism that could increase the use of water will place increased pressure on the values that would otherwise be protected by a minimum flow, and therefore is undesirable.

- ***Have any water transfers occurred?***

Eleven regions have transferred water permits for reasons other than ownership changes. However, the number of permits transferred was less than 10 in each region. Most transfers have been permanent, but temporary transfers for a season or less have occurred in Auckland, Waikato and Manawatu-Wanganui.

- ***Can you see water transfers playing a role in water allocation in your region in the future?***

Five of the regional council staff interviewed believed water transfer would become an increasingly important mechanism in their region as the demand for water increased and allocation limits were set and reached. Six other councils expect water transfer could become an issue in a few catchments/areas. One of the limiting factors is that many resources have less than 10 users.

- ***Do you see a role for regional councils in encouraging water transfer?***

Staff from seven councils stated that regional councils should have a role in promoting water transfer. A further three thought their council would not actively promote transfer but definitely cater for any user requests for water transfer.

- ***What are the practicalities for water transfer in the following areas?***

⇒ ***Planning?***

Five councils have no specific reference to water transfer in their water plans. Eight have reference to transfer as either a controlled or discretionary activity. Transfer between users in user groups when on restrictions is also used as a method. Environment Bay of Plenty have identified transfer of water between irrigated properties as a possible permitted activity, provided the point of take remains unchanged. There are no cases identified where permanent transfer is a permitted activity.

A common theme from the councils was the difficulty in defining zones within which water transfers can occur. There was also concern that water transfer could lead to an increase in use of the resource.

Common expiry dates on consents in an aquifer or catchment was mentioned as a good way to address changes in the allocation regime. Issues such as reasonable use can also then be applied consistently among all users.

⇒ **Consents?**

The staff interviewed identified two aspects that would be assessed with a consent to transfer water:

- Any environmental effects that will alter due to changing the point of take. This is considered particularly important in small catchments where takes are of significant size, and also in aquifers where there is potential for significant interference effects on neighbouring bores.
- Assessing whether the recipient of the transfer complied with reasonable/realistic use guidelines.

⇒ **Monitoring?**

Monitoring compliance with resource consents to take water creates problems even without water transfer. Without water meters, the only aspect of a take that can be monitored is spot checks of the instantaneous rate. For those councils with water meters, there are issues with collecting returns from water users; one of which is lack of returns by water users. There is often a mismatch between the allocation timeframe (e.g. m³/d) and the timeframe used to collect and collate water meter records. For the most part, water meter returns are collated annually, even if they are returned to council on a more regular basis. Ensuring compliance with transfers that are for a shorter timeframe than the period for which use is monitored will create issues with those councils intending to closely monitor use.

• ***What do you see as the usefulness, practicalities and obstacles relating to the following types of water transfers?***

⇒ ***Short-term transfers when on restrictions?***

Council staff were supportive of transfer when on restrictions, although it is not relevant in a few regions that have an “either-on-or-off” restriction regime. In 6 regions, user groups are specifically used to address transfer when on restrictions with some including mention of user groups in plans and consent conditions. Staff have generally found that user groups can, more efficiently, manage the specific restriction rostering than the council.

⇒ ***Temporary within-season transfers?***

There was also support for the concept of within-season transfer, although the staff noted that there has been no or very little demand for this type of transfer from water users. A few staff raised the issue of the timeframes specified in consents; for example, irrigation takes that allow water to be taken year round not just in the growing season. They are looking at other options that would enable the water to be used at other times.

The major concerns with the within-season transfer are generic issues associated with temporary transfers. These are discussed below.

⇒ **Temporary transfers for one or more season?**

While supportive of the concept in principle, regional council staff raised the following concerns about temporary transfers:

- Questions the ability to temporarily transfer a resource consent under the RMA. Most believed they would have to transfer the consent as if it were a permanent transfer, and then transfer it back again at the end of the agreed time; although it was mentioned that authorising the transfer as a 'change of conditions' of the original consent might make this issue easier. Under this system it is difficult to provide the assurance to the original consent holder that the water will be returned. Issues relating to the term of the consent also complicate matters.
- Compliance monitoring systems would have to keep track of all transfers.
- The transfer would still need to be assessed for realistic/reasonable use, and the person receiving the water may not be entitled to use the full transferred amount if their actual and reasonable use of the water is less than the transferred amount.

As for within-season transfer, there has been very little demand for this type of transfer from water users.

⇒ **Permanent transfer?**

Staff were more comfortable and familiar with permanent transfers than with temporary transfers. Nearly all have no concern in principle with such transfers, provided the effects on the resource of moving the point of take can be addressed, and that the person receiving the water does not breach reasonable/realistic use values for the intended end use. The main concern is where there is a big difference between allocation and use, and where water transfer has the potential to increase use. Hence, it may affect the reliability to users and/or the frequency with which environmental bottom lines are reached.

• **What do you see as to the usefulness, practicalities and obstacles to transfer via pipe/channel or within an irrigation scheme?**

The staff members interviewed had similar reactions to water transfer by pipe and water transfer within a scheme. Most were comfortable with these types of transfer because they did not involve transferring the point of take, and therefore did not require a change in resource consent. Along the same lines as what water users had said, council staff identified that piping will only be practical in a few situations. Concerns raised about this type of transfer were as follows:

- The potential for inter-catchment transfer and potential conflict with tangata whenua values.
- No formal recording of who receives the water, raising issues with compliance and contacting water users.
- The inability to keep track of which land is irrigated, except through continuing 'changes of conditions' which describe what land is irrigated.

- ***What are the differences in water transfer from surface water sources compared to groundwater sources?***

The heterogeneity of groundwater systems means that any new take point or an increased take from an existing point has to be assessed for localised effects.

Some surface water sources are small streams that often have one dominant take. Allowing this take to transfer to another point on the stream may have significant environmental effects.

Groundwater resources can be suited to the use of longer expression of consent such as weekly, monthly or seasonally, which can allow more water to be allocated than if assessed on an instantaneous basis.

- ***What is your response to issues raised by water users?***
⇒ ***Whether “use it or lose it” is enforced?***

Councils react differently to unused consents compared with under-used consents. Although “use-it-or-lose-it” is not often actively enforced, many councils are currently looking into more active enforcement. If councils have looked at the issue, they have generally done so at the consent renewal stage and focussed on the unused consents. Many councils are working with industries to address reasonable/realistic use.

There were some uncertainties expressed in implementing “use it or lose it”. The process needs to be flexible to cater for year to year differences in water demand, and for changes in crops or land use.

Questions were raised as to whether councils could or should dispense with “use it or lose it” under a water transfer regime, as the market should ensure water is used to the highest value. However, it was stated that a “use it”, “sell it”, “lease it” or “lose it” approach may still be required.

- ⇒ ***Establishment of user groups and their involvement in allocation?***

Ten councils are actively promoting user groups.

- ⇒ ***Annual consent charges?***

Four councils use a consent charging system that charges more for those takes with higher allocations. It could be argued that this provides a benefit to those who use less, but on a per unit allocated basis, the smaller users can actually be charged more. Also, the gradations are usually such that it takes a large change in allocation to move into the next band and, therefore, generally makes little difference. This benefit was not the intention of these charges under the RMA. In fact, charges cannot be levied for the water itself, but only for the administration, supervision, monitoring and s35 costs. However, comments were made that councils would like a mechanism to reward for efficient use.

⇒ ***Systems for applying for more water in fully-allocated zones (e.g. waiting lists)?***

Some councils questioned the legality of using waiting lists and the mechanism for putting people on them. Two councils use waiting lists. The remaining councils do not have a mechanism and use the “first-in first-served” approach following any water becoming available, which does raise some equity issues of who came first. Some councils have directed those who have asked for water to existing users.

⇒ ***Action taken if someone uses more than they are consented to take?***

There was a variety of responses to this question, ranging from doing very little to coming down hard on the user even in the first instance. Action would depend on the level of the offence. Taking slightly more water than their instantaneous or seasonal allocation would generally be treated differently than someone taking water when a ban is in place. Most councils generally explore the softer options first; maybe tolerating it the first time, or providing a warning to the user. Education was also given as an initial option. Enforcement/prosecution was more often seen as a later option for repeat offenders.

7 KEY BARRIERS

7.1 What is Not a Barrier?

This study has found that the following issues that have previously been perceived to be barriers to water transfer, are not in fact barriers:

Understanding the potential for water transfer as a tool for increasing economic efficiency

Both water users and regional councils understand the role water transfer could play in promoting the economic efficiency of water use.

Improved information on the value of water

The basic information of value with and without water for generic enterprises provided with the water users' questionnaire did not appear to influence decisions on whether to transfer water, or on the dollar value assigned to water. Respondents either knew the exact figures for their enterprise (based their assessment on the replacement value of water – feed prices, or cost to get from another source), preferred to use land value as a measure of the value of water, or were reluctant to associate dollar values with their water. More detailed information on the value of water to their own enterprises, including the marginal values, could more accurately help place a value on water, but is likely to be needed on an individual basis. The complexities and differences between enterprises mean that generic or case study data on the value of water is unlikely to influence transfer.

Regional council willingness to use water transfer

Seven council staff stated that regional councils should have a role in promoting water transfer. A further three thought their council would not actively promote transfer, but would definitely cater for any user requests for water transfer.

7.2 Barriers to Transfer – Water Users

While 3 out of 4 users supported the concept of water transfer, the interview programme indicated that only 4-10% of water would actually change hands under a water transfer system. Users were relatively comfortable with the concept of within-season transfer because it was viewed as a practical means to help each other out if there was unused water available. The level of discomfort increased with leasing and permanent transfer partly because of a philosophical objection to money being associated with water, but predominantly because of attitudinal barriers associated with how water should be used on their own and surrounding land. In addition to attitudinal barriers, there are practical infrastructure and market issues that will also hinder the widespread adoption of water transfer.

It is worth noting at this point that all the 5 catchments/schemes interviewed had investigated or were investigating the potential for an alternative source of water. While not all users could access this alternative source, it is questionable if the areas could be considered “fully-allocated” in the full sense of the term. Water transfer is

more likely to occur in a mature water economy (Jones *et al.*, 1992¹) – that is, where all affordable storage options have been already built.

The key barriers we have identified are as follows:

Water and land considered as one

From a water user's perspective, the water is tied to the land and directly related to the land value. Users were very reluctant to permanently transfer water even if they could not use it with their existing infrastructure and/or crop, because they believe that the access to a viable volume of water influences the land value. For most, selling water is akin to selling the land, even for those who could operate as a viable dryland farm. For example, dryland farming of pasture is viewed as a different land use than irrigated pasture.

Maximising production

Water users who would transfer water are only referring to water they do not need or water that can be replaced from another source or by purchasing feed. The concept that they would produce less than full potential and be compensated for reduced profit raised very strong objections². In the catchments/schemes studied, there were very few users who could forgo irrigation for a year, with no effect on productive levels, into the next season. For tree, vine and pasture crops, not watering in one season has implications for production into subsequent years. Even for annual or short-term crops, lower production in one year could result in loss of contracts, quality or reputation.

Resistance to change

There is a resistance to change in land and water use within a catchment, even when the change is occurring between land uses within the productive sector. There is some concern that water transfer would encourage a faster growth in land uses that were doing well at the time, or increase the number of larger and corporate enterprises. Some respondents indicated that they would be selective as to the land uses they would sell or give water to, or choose to transfer to locals rather than outsiders new to the area. In some part, this attitude could be considered conservatism, but there are genuine concerns as to the social implications of such change and the potential for water transfer to increase the rate of change.

Irrigation infrastructure

When water is transferred to previously unirrigated land, an investment in infrastructure is required. While some irrigation systems and methods for abstracting water from a source are transportable, there will usually be some non-recoverable investment in infrastructure. For water markets to work, the willingness to pay for water must cover the cost of infrastructure, as well as any loss of production or substitution by the seller. We believe that infrastructure costs are one of the reasons that the size of water markets will always be limited.

¹ Jones, R; Musgrave, W; Bryant, M (1992): Water allocation and supply reliability in the Murrumbidgee Valley. *Review of Marketing & Agricultural Economics* **60(2)**155-172.

² This is perhaps one of the reasons that there is a strong objection to industrial or urban uses being able to buy water from the productive sector.

Infrastructure issues are likely to limit temporary transfers to new irrigation development. Most temporary exchange of water is likely to be for supplemental purposes between existing irrigators only, since leases would have to be very long-term to warrant investment in infrastructure. Respondents indicated that a 5- to 10-year lease would be required to invest in pasture irrigation, and at least a 10-year lease to invest in fruit crops.

Lack of information on where there is additional water

In addition to those barriers raised specifically in the questionnaire, we suspect a barrier regarding availability of information on water transfer. We are not convinced that the possibility of transfer is widely appreciated by potential users, particularly small business. Nor is there widespread appreciation among existing users of how water requirements vary between crops.

Small, illiquid markets

If a market in water transfer were to develop in any of the four catchments studied, there are a limited number of buyers and sellers; of these, only a percentage would transfer water. Only a small number of transfers would occur each year. Current holders of water rights are unlikely to give up their current allocations as there is a significant risk that there will be no water available for purchase should they need it in the future. The lack of liquidity in water markets means that considerable value is attached to the retention of the option to use the water in the future. This is exacerbated by the view that water is getting scarcer and is likely to be more expensive in the future. Their current right, therefore, represents both an option for the future and an appreciating asset.

Uncertainties

Uncertainties in markets, climate, reliability, environmental requirements, future land use options and land values all cause water users to hang on to water. There is also less certainty in the ownership of water as there is with ownership of other property, such as land. This discourages payment of full value for any water rights.

Objection to paying for water

From some users, there was a strong philosophical objection to water being paid for. In a few cases, this arose from a fear of water being charged for, but was more commonly a belief that water is a public good and should not be tradeable.

Administratively time consuming

Users would be more likely to adopt temporary transfers, if they do not have to go through extensive form-filling in order to transfer water. Users often mentioned the time and effort required to apply for a resource consent, and would not like to see a similar process for water transfers.

7.3 Barriers to Transfers – Regional Councils

The following have been identified as key barriers to water transfer from a regional council perspective. The last two are specific to regulatory regimes and could be overcome with water markets.

Real time compliance

Councils need to ensure that environmental effects are minimised in accordance with the relevant consent conditions. This is both related to localised effects (mainly involving monitoring amounts taken and their local impacts) and the cumulative effect of all takes (involving monitoring compliance with environmental bottom lines, such as aquifer levels or river minimum flows). Council staff felt that monitoring for localised effects would be more difficult with water transfer occurring.

Consent issues associated with temporary transfers

Detailing a transfer system within a plan (e.g. MWDC, 1995³) or treating a temporary transfer as a permanent transfer appear to be the only regulatory options for temporary transfers. The legality of other more immediate and flexible options is unclear. Council staff also see additional administrative difficulties maintaining information on the location and use of water, particularly with short term lease or temporary transfer arrangements.

Difficulty in defining zones within which transfer can occur

Until certain that the resource has been adequately defined and both localised and cumulative environmental effects can be addressed, councils are likely to treat each transfer on a case by case basis.

Lack of a mechanism to register interest in water

A waiting list that was widely known of may encourage more potential users to explore transfer, and a suitable mechanism needs to be found which would demonstrate to prospective water users how water could be obtained.

Information on reasonable/realistic use

One of the key components of the existing regulatory regimes that promotes efficient use of water is only allocating as much as people realistically need for their intended use. More accurate information on peak needs and patterns could help better match use with allocation, and possibly allow more allocation.

³ MWDC (1995): *Oroua catchment water allocation and river flows regional plan*. Manawatu-Wanganui District Council

7.4 Which Barriers Affect Which Types of Transfers?

The relevance of barriers depends on the type of transfer. Table 4 divides the types of transfers into three categories – within-season, temporary (more than one season), permanent – and identifies which barriers are relevant in each case. A “U” is a barrier to water users, a “C” is a barrier to regional councils. Some barriers are relevant only to market transfer, and some to only regulatory transfer regimes.

Table 4: Categories of transfers

Barriers	Within-season transfers	Temporary (more than one season) transfers	Permanent transfers
<i>General</i>			
Water and land considered as one			U
Maximising production		U	U
Resistance to change		U	U
Irrigation infrastructure	U	U	U
Lack of info on where there is additional water	U	U	U
Small, illiquid markets		U	U
Uncertainties			U
Objection to paying for water		U	U
Real time compliance	C	C	
Consent issues associated with temp transfers	C	C	
Difficulty in defining zones	C	C	C
<i>Specific to regulatory regimes</i>			
Administratively time consuming	U	U	
Lack of a mechanism to register interest in water	U	U/C	U/C
Info on realistic use	C	C	C

8 OVERCOMING THE BARRIERS TO WATER TRANSFER

8.1 How have Barriers been Overcome in Existing Transfers?

Irrigation schemes – within-season transfer

All three irrigation schemes interviewed as part of this project have within-season transfer. Water delivery is on a rostered or ordered basis, and if someone does not want water on their scheduled day, scheme operators re-distribute the water to other properties. Waimea East Irrigation Scheme used this approach during the latest drought and were able to prevent anyone suffering a shortfall. Such arrangements work because:

- Having a single point of take avoids the barriers of real time compliance and temporary consents;
- Transfers do not involve the regional council and are therefore administratively simpler;
- Additional water is not paid for, thereby avoiding attitudinal barriers to markets;
- Racemen or scheme engineers provide information on who has and needs water; and
- Transfers are kept between existing scheme members and avoid issues associated with new users and land uses.

User groups on rivers – within-season transfer

A similar arrangement to an irrigation scheme can be achieved by a group of water users on a river if river flow can be, or is measured, at a point downstream of all takes. Users can establish a system to share water around during restrictions, and ensure that their combined takes do not breach minimum flows with a single measurement. It avoids the barriers in the same way as an irrigation scheme, except user groups, rather than racemen/engineers, provide the mechanism for information on who has and needs water

Piping of water/leasing of land – within-season transfer

Particularly in Pukekohe, a considerable amount of water was used on different properties or by different growers than those specified on the consent because of leased land or piping water between properties. This type of transfer is generally associated with land uses that do not require water throughout the whole season, and use readily transportable irrigation equipment. This system overcomes the barriers by:

- Avoiding consent/compliance issues by not moving the point of take;
- Using land agents or communication between users to provide information on who has and who needs water or land; and
- Tending to stay within existing users.

Ashburton-Lyndhurst Irrigation Scheme – permanent transfer

The Ashburton-Lyndhurst Scheme allows transfers of shares to non-irrigated land within the scheme boundaries. Farms that already have a full allocation of shares are not permitted to buy more shares in order to increase their irrigation system capacity. Despite having a system that overcomes many of the barriers to water transfer, it has taken time and demonstration of the system to overcome reluctance by shareholders to accept transfer. This system has been successful in promoting some transfer because:

- Transfers are happening where there is an alternative source of water, or from land where water cannot be used due to physical limitations (shape and topography). Therefore, the attitudinal barriers associated with loss of land value or ability to use land to full productive potential are avoided;
- Whilst remaining neutral, the corporate body of the Ashburton-Lyndhurst Scheme effectively facilitates the transfers;
- The price received for water can be used to compensate the seller for the cost of new infrastructure;
- The system maintains a limit to the flow rate per hectare so that no one is seen to be able to get higher application rates; and
- The tradeable commodity is expressed as shares on a land basis – not as water.

8.2 Recommendations for Overcoming Barriers

Water transfer is not desirable in itself, but is a means to increase the economic efficiency of water use. Ideally, this will occur when there is an alternate use to which the water could be put which produces higher value. Water transfer is already widespread where irrigated blocks are bought and sold, but we are specifically concerned with situations where water is transferred separately from the land. This may be required because there is unirrigated land that could produce more than the irrigated land, using all or part of its current allocation. Furthermore, the very act of assigning value through a trading system will increase efficiency by highlighting for users the opportunity costs of the resources they employ.

Nevertheless, despite this theory, intervention to encourage water transfer is not a priori a “good thing”. The government does not become involved in land transfer for the purposes of encouraging economic efficiency despite many of the same issues being involved. While with water there are other issues involved which create greater public interest, such as the use of a free public good and interests in the environmental effects of water abstraction, interventions in water transfer need to be approached with some care. The list of possible initiatives below has been formulated with this in mind, but further work will be required on many of the areas before widespread adoption is indicated.

The recommendations are divided according to attitudinal barriers, pricing and market barriers, and regulatory barriers.

Attitudinal barriers

Many of the attitudes that prevent the transfer of water are not easily overcome. Perceptions such as the link between land value and water, and concern about social change as a result of water transfer, may have legitimate and rational bases. However, the general prejudice against water transfer appears less well based, and may simply relate to fear of change.

Attitudinal change may occur slowly, over decades or even generations but the mechanism for transfer needs to exist in order for transfers to start occurring albeit at a slow rate. Without it, no transfer will occur and therefore attitudes are unlikely to change. For example, within the Ashburton-Lyndhurst Scheme there was initially widespread opposition to water transfer but now, with a few years trading, there is virtually no opposition. Examples such as these indicate that demonstration of water transfer systems may be a key feature in overcoming concerns.

There are three sets of actions recommended in response to the attitudinal barriers:

- **Regional council encouragement** -- Regional councils should highlight opportunities for and encourage water transfer. Most regulatory plans include reference to water transfer and methods including water user groups are encouraged. In addition to plans, councils must ensure that resource consent provisions do not pose unnecessary barriers to water transfer. Where consents are issued to schemes, the consent conditions should ensure that trading and transfer, within the limits of the infrastructural capabilities of the scheme, is allowed and encouraged. We recommend plan references to water transfer continue, despite low uptake of transfer by users, with increasing emphasis on a language of encouragement rather than permissiveness. This is a subtle change that we believe will have two benefits:
 - It will provide leadership to the community in terms of general understanding of the benefits of water transfer; and
 - It will provide reassurance to users contemplating water transfer as to the way in which the council is likely to approach the issue. This has particular implications in light of the “use it or lose it” issue.
- **Extension** -- We believe that extension of the concepts of water transfer is worthwhile. Specific demonstrations of water transfer in appropriate locations may be valuable, although, in general, our impression is that locally driven initiatives are more likely to be successful.
- **Publicity** -- Successful demonstrations of water transfer is likely to be a successful initiative, particularly at the national level. This would involve the development of material which reflects the experience and outcomes for those who have been involved in water transfer and in schemes where water transfer has taken place, and extension of these concepts in conjunction with users and councils where it may be of use.

Pricing and other market barriers

Pricing barriers arise because the buyer's and seller's price do not meet. This study has shown that, in general, information about the value of water is not a barrier to appropriate pricing. It is our opinion that some pricing barriers, such as the sunk cost associated with infrastructure and restrictions on transfer through take and delivery constraints, are not likely to be overcome under any scenario. However, others, such as the assignment of a high value to the options for future use, may be affected by various incentive structures. Other market barriers can also arise through high transaction costs for individuals, and through poor liquidity in the market. The following recommendations are made in respect of pricing and other market barriers:

- ***Investigation of incentive structures*** – Currently, there is a very low or minimal apparent cost associated with having a water right and not using or under-utilising it. The low perceived cost to holding the resource reduces incentives to holders to transfer. We recommend that means of creating incentives for use or transfer of water be investigated. These include:
 - *Investigation of charging regimes for water.* This may include charging for both the right and use of the resource. Charging or tendering for water has the potential to increase the incentive for users to transfer water that is surplus to requirements. Whilst charging as a solution has obvious political problems, the issues surrounding both this and more radical options (such as re-tendering of the resource at set intervals) should be explored by MfE, with a view to understanding constraints and potential outcomes.
 - *More sophisticated use of the “use it or lose it” approach.* By explicitly excluding transferred water (temporarily or permanently) from the “use it or lose it” philosophy, those with surplus water will be encouraged to transfer water to other users. Care would need to be taken that the “use it or lose it” approach does not result in over use of water with users taking more water than they need simply to ensure that the right to its use is not lost.
- ***Investing in reducing uncertainties*** – The development of any properly functioning market requires secure property rights. Regional councils need to act swiftly to define their water resources and the available allocation limits in a way that is secure for a defined period. Some of the uncertainties related to the capacity of resources, and delineating zones can be overcome by investment in investigations. This will allow buyers and sellers to understand properly the resource they are trading. As mentioned above, the “use it or lose it” provision needs to be carefully prescribed to ensure that water transfer is encouraged, rather than discouraged through increased uncertainty.
- ***Assess options for addressing transactional barriers*** -- The costs for an individual to locate a buyer or seller of water are high. In many other resources, these costs are reduced by the actions of middlemen (brokers, agents, etc.) or by the creation of a market. It is clear from this study that water transfer works best when it is facilitated through some means. Given that water transfer is unlikely to result in a large market and will, therefore, not be very attractive to the commercial sector, some form of initiative into facilitating transfer is likely to be worthwhile. Traditional forums such as user groups could be specifically tasked with transfer for

non-restriction periods as well as restricted periods, and novel approaches such as web trading could be investigated.

- ***Explore storage initiatives*** -- Storage has the benefit of both increasing liquidity and increasing certainty. It increases liquidity by enabling the transfer across time as well as from place to place, greatly increasing the number of potential traders. It increases certainty by identifying with greater precision the amount of water likely to be available to each user. The issue of storage, therefore, has the potential to improve economic efficiency overall, as well as water transfer specifically; initiatives to identify and reduce barriers to storage schemes will be worthwhile.

Treating groundwater as a storage mechanism through allocation of seasonal as well as daily takes may potentially have similar benefits in terms of allowing transfer and greater economic efficiency.

Regulatory barriers

Compliance issues could be overcome by technology capable of real-time monitoring of water use, or by establishing downstream monitoring sites for the purpose of compliance with environmental bottom lines. However, regional councils are unlikely to invest in additional monitoring, and it is more likely that user groups will be required to design systems to the satisfaction of councils.

The following would assist councils in overcoming some of the regulatory barriers to water transfer:

- A mechanism for registering interest in water from fully-allocated zones.
- An assessment of regulatory options for temporary transfers. Rather than have to think through all likelihoods in a regional plan to make transfers permitted/controlled activities, options for a more immediate system of temporary consent transfer could be investigated. For example, the possibility of consenting a transfer system itself rather than individual transfers would allow the effects to be assessed but not require a consent every time water changed hands. Such mechanisms would allow councils to respond to local requests for transfer system without going through a plan change.

Councils are currently unsure as to the legality of these approaches under the RMA. Clarification of the legality, followed by any adjustments to the RMA, would be required.

9 CONCLUSIONS

There are a number of significant attitudinal and practical barriers to water transfer. While water users are relatively comfortable with short-term transfer of excess water, there is significant unease with permanent transfer and transfer to other land uses. Attitudinal barriers appear to be broken down by association with successful water transfer systems, but many of the practical barriers cannot be removed. Regional councils are generally supportive of water transfer with most water-related plans making reference to the possibility of water transfer. However, council staff identified a number of practical difficulties most of which relate to the management of temporary transfers.

Although users and regional councils generally support the concept of water transfer, the work undertaken here has shown that only 4-10% of water is likely to change hands; even then, this will be further limited by infrastructural constraints. However, water transfer is occurring in specific instances and does not appear to have been significantly hampered by the regulatory barriers. Facilitation of transfer through a variety of modes appears to be a key ingredient in success where transfer has occurred.

Storage of water has considerable potential to overcome some of the practical barriers to water transfer. It allows water to be transferred across time as well as space, and provides greater certainty of the amounts of water available. Storage schemes will provide opportunities for water users to develop and test transfer systems, and potentially novel allocation options. Treating groundwater as a storage mechanism through allocation of seasonal volumes may potentially have similar benefits.

While we believe that water transfer has a valuable place in increasing the economic efficiency of water use, as a more widespread tool and a means to promote economic efficiency, we are dubious that it will be widely used under the current water allocation framework. The reality in most New Zealand catchments is a small number of water users of which only a percentage will consider buying or selling water in a given year. Even without attitudinal barriers, these conditions result in a small and illiquid market. Coupled with infrastructure issues, market constraints mean that, without storage, water transfer will only ever take place at the margins and over relatively long time periods. Unless it is accompanied by more fundamental changes in the regulatory framework, such as examining charging for water, it does not appear that water transfer should be a high priority issue for policy makers. There are, however, some areas which are worthwhile, particularly those which would improve efficiency through a number of routes.

Our key recommendations for further work in the area of water transfer are as follows:

- Further work on incentives for transfer (including charging for water) and the implications of approaches to “use it or lose it”.
- Extension work with users on successful implementation of water transfer.
- Work on appropriate means of facilitating market transfer.
- Further investigation of barriers to storage of water.
- Examination of regulatory options associated with temporary consents, and systems for registering interest in water.

- Continued regional council promotion of water transfer with a move to more active encouragement of such transfers and ensuring that consent conditions do not hinder transfer.

Although not directly associated with water transfer, our results indicate considerable potential to improve the efficiency of water allocation by more accurate specification of water needs for a given end use, including specifying the times when water is needed. More accurate information on peak needs and patterns could help better match use with allocation, and possibly allow more allocation.

APPENDIX I:

Questionnaire Form – *Water Users*

Water Transfer Questionnaire

1 BACKGROUND INFORMATION

What is the land area and land use?

- Crops
- % irrigated
- Non-irrigated land used?
- Markets if not obvious

What is the irrigation system?

- System Type
- System Capacity

How many years have you been irrigating?

What are your longer-term intentions for the property?

- Stay here/leave
- Change land-use
- Increase irrigated area
- Do increases/changes depend on more water

2 EXISTING WATER ALLOCATION AND USE

Where does your water come from?

How much water do you have allocated?

*What is the reliability of supply
(the likely restrictions)?*

- Years when OK
- Length of restrictions
- Frequency of restrictions
- Could you be completely off?
- If never off, what is worst cut-back
- Constant reliability in the catchment?

What does your resource consent provide you with?

- Length of consents
- What happens when it expires?
- Can new users change your reliability?
- Can conditions be changed?
- Equivalent to ownership?

How much water do you use?

- Method of measuring water use
- Peak rate of use vs peak allocation
- Adjust use if it rains or ET low?
- Wet vs dry seasons
- Spring and autumn use
- When do you need peak rate 24 hours a day

Could you use more water?

- In times of peak ET
- Over a season
- Altered infrastructure needed?
- To irrigate more area or better do existing

What are your options for obtaining more water?

3 ATTITUDE TO WATER TRANSFER

What do you think about water or water rights being moved between properties?

After this question show them the four options for the length/permanence of transfer and discuss using checklist below, then explain types of transfer – physical, within scheme or administrative, then three type of uses – existing infrastructure, new infrastructure, speculative.

TIME OF TRANSFER

Are there any other options?	
What are your options?	
Which options would you like to have?	
What would it take for you to consider other options?	
How would you evaluate whether to transfer?	

When on restrictions

Within a season

Lease for a fixed number of years

Permanent transfer (buy/sell)

TYPE OF TRANSFER

Are there any other options?	
What are your options?	
Which options would you like to have?	
What would it take for you to consider other options?	
How would you evaluate whether to transfer?	

Physical - Pipe/channel from/to neighbour

Transfer within a scheme

Administrative Transfer of water permit

END-USE OF WATER

For use with existing irrigation systems

For use with new or extended irrigation

Speculative

4 QUANTITATIVE QUESTIONS

As part of the survey we have been asked to talk to people about the price at which they would transfer water. We have a number of questions about the price at which you would buy or sell all or part of your current allocation. Each one presents a different situation – transferring 20% or 100% of your current allocation, and doing so as a short term lease for the following season or permanent sale. The questions are based on an exchange in which you are allowed to simply transfer water rights without having to go through any part of the resource consent process. The other party is an irrigator within your [catchment, scheme, aquifer]. The price is only for the water, and all other costs of getting the water to the property and applying it will be met by the purchaser. No other compensation for infrastructure costs or loss of production will apply. Payment would be by bank cheque on the date of settlement.

Give them the card of quantitative questions

Follow up for each question once card completed – *would you like to choose a value in between any of the values we have supplied?*

Give them sheet with value of irrigation water on it (they can keep this)

Notes

- | | |
|--------------------------|--|
| <input type="checkbox"/> | How do you set values? |
| <input type="checkbox"/> | Explain differences between buy and sell \$ |
| <input type="checkbox"/> | Factors other than productive values of water considered in the price? |
| <input type="checkbox"/> | How realistic is the situation? |
| <input type="checkbox"/> | Would you like to review any prices you gave? |
| <input type="checkbox"/> | Was information on value useful? |

SHORT TERM TRANSFER – ONE SEASON ONLY

Some of your allocation

Amount: 20% of current allocation

I would lease IN this water for
\$0/ha
\$25/ha
\$50/ha
\$75/ha
\$100/ha
\$150/ha
\$200/ha
\$300/ha
\$500/ha
\$1000+/ha
Not interested

I would lease OUT this water for
\$0/ha
\$25/ha
\$50/ha
\$75/ha
\$100/ha
\$150/ha
\$200/ha
\$300/ha
\$500/ha
\$1000+/ha
Not interested

All of your allocation

Amount: 100% of current allocation

I would lease IN this water for
\$0/ha
\$25/ha
\$50/ha
\$75/ha
\$100/ha
\$150/ha
\$200/ha
\$300/ha
\$500/ha
\$1000+/ha
Not interested

I would Lease OUT this water for
\$0/ha
\$25/ha
\$50/ha
\$75/ha
\$100/ha
\$150/ha
\$200/ha
\$300/ha
\$500/ha
\$1000+/ha
Not interested

PERMANENT TRANSFER

Some of your allocation

Amount: 20% of current allocation

I would BUY this water for
\$0/ha
\$50/ha
\$100/ha
\$200/ha
\$300/ha
\$500/ha
\$1000/ha
\$2000/ha
\$5000+/ha
Not interested

I would SELL this water for
\$0/ha
\$50/ha
\$100/ha
\$200/ha
\$300/ha
\$500/ha
\$1000/ha
\$2000/ha
\$5000+/ha
Not interested

All of your allocation

Amount: 100% of current allocation

I would BUY this water for
\$0/ha
\$50/ha
\$100/ha
\$200/ha
\$300/ha
\$500/ha
\$1000/ha
\$2000/ha
\$5000+/ha
Not interested

I would SELL this water for
\$0/ha
\$50/ha
\$100/ha
\$200/ha
\$300/ha
\$500/ha
\$1000/ha
\$2000/ha
\$5000+/ha
Not interested

5 WIDER IMPLICATIONS

Do you have concerns or see benefits for the catchment or region as a result of water transfer?

At the end of the interview, ask if they would mind being contacted if there is anything you want to clarify or test.

THANKS

Estimates of the value that irrigation adds to a land use.

This information is derived from a range of sources and locations. If these amounts are reasonably accurate, would they affect the amount at which you are willing to buy and sell water?

Check your previous answers to see which, if any, you would change.

Land use	Increase in Annual Profit from irrigation
Dairy	\$600 - \$1700/ha
Sheep and Beef	\$200 – 600/ha
Cropping/Livestock	\$200 - \$700/ha
Horticulture	\$1,000 - \$9,000/ha

APPENDIX II:

Questionnaire Form – *Regional Councils*

REGIONAL COUNCIL QUESTIONNAIRE

For the purposes of interviews with water users, we have defined “water transfer” as the swapping of water between properties on a short-term, long-term or permanent basis.

Have you carried out any analysis, assessments of the potential for water transfer?

Have any water transfers occurred?

What do you see as the usefulness, practicalities and obstacles relating to the following types of water transfers?

Types of Transfer

- Piping between properties

- Transfer of resource consents

- Transfers within a scheme

Length of transfer

- Short-term transfers when on restrictions

- Temporary transfers within a season (e.g later in season when water demand declines)

- Temporary transfer for a year or more (leasing arrangements with or without payment)

- Permanent transfer of resource consents

- Others?

What are the practicalities for water transfer in the following areas?

- Planning

- Consents

- Monitoring

What are the differences in water transfer from surface water sources compared to groundwater sources?

Can you see water transfers playing a role in water allocation in your region in the future?

Do you see a role for regional councils in encouraging water transfer?

What is your policy or thoughts on the following aspects of allocation regimes?

In our interviews with water users the following aspects of water allocation systems were identified as important in influencing how they react to water transfer.

- Whether “Use it or lose it” is enforced
- Establishment of user groups and their involvement in allocation
- Annual consent charges
- Systems for applying for more water in fully-allocated zones (e.g. waiting lists)
- The use of annual water allocations
- Action taken if someone uses more than they are consented to take

Any other comments are welcome.