
Water Allocation: *A Strategic Overview*

***PREPARED FOR
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Appendix I: Discussion Scenarios

1 INTRODUCTION

1.1 Background

Water allocation has been identified as a priority water management issue. This priority has come from the increasing demands on water, especially from the rural sector. Closing some resources to further allocation has occurred in some regions, while the reliability of water supply from some catchments is considered insufficient. These scarcities have an effect on rural productivity.

There is a perception that the current water allocation system does not encourage optimal use of water and that improvements in allocation practice could increase the value of water resources to communities. Concerns relate to both macro-allocation (the decision on when and in what quantities water can be abstracted from a resource) and micro-allocation (the decision as to who can use the water and how much).

This paper presents an overview of water allocation in New Zealand with the aims of:

- Clarifying problems in existing water allocation practice;
- Providing suggestions at the strategic level on how to improve water allocation;
- Identifying roles and responsibilities.

1.2 Approach

As an initial step we developed, in consultation with Ministry of Agriculture and Forestry (MAF) and Ministry for the Environment (MfE), six discussion scenarios that highlighted some of the perceived deficiencies in water allocation practices. The discussion scenarios are contained in the Appendix.

The topics covered by the scenarios were:

- Strategic water management – identifying need and purposes for management of water resources;
- Determining management actions – for example, setting minimum flows in rivers or water levels or pressures in groundwater systems;
- Describing the availability of a resource and supply reliability – allocation limits; cut-backs during water short times.
- Economic efficiency – initial allocation of water and reallocation, temporary and permanent transfer of water;
- Technical efficiency – how much does each individual get allocated;
- Options for more water in a fully used catchment – storage, improved technology, water sharing.

The scenarios were workshopped with the Regional Council Steering Group on Water Allocation. We then conducted a series of interviews with environmental/instream interests and abstractive users. Interviewees were sent the discussion scenarios. The aim of these interviews was to gain a perspective rather than a representative viewpoint.

Representatives interviewed were from:

- Fish and Game
- DoC (Regional conservancy and National)
- Iwi
- Fruitgrowers Federation
- Grapegrowers Council
- Vegetable and Potato Growers Federation
- Federated Farmers (Meat and Fibre)
- Federated Farmers (Arable)
- Dairy Research Institute
- Power Generation Company
- Public Water Supply Authority

The experience of all those interviewed with water allocation is summarised in Section 2 of this report. The remainder of the report contains our assessment of what constitutes “optimal” water allocation, some of the key obstacles to improving practice, recommendation for addressing the obstacles, and identification of roles and responsibilities for implementing the recommendations.

1.3 Previous Reports

In addition to the workshop and interviews, information contained in the following four reports have been used in the preparation of this document.

- Lincoln Environmental Report No 4375/1, *Information on Water Allocation in New Zealand*, prepared for MfE, April 2000.
- Lincoln Environmental Report No 4426/1, *Water Allocation – Where to From Here?*, prepared for MfE, June 2000.
- Harris, A (horizons.mw) report, *Role of Regional Plans in Addressing Water Allocation Issues*, prepared for MfE, October 2000.
- Harris, S Consulting report, *Water Policy and Legislative Review, A Strategic Thinkpiece* prepared for MAF Policy, July 2000.

1.4 Definition of Economic Efficiency

Economic efficiency is generally taken to mean the situation where society's welfare is maximised – that is the distribution of resources could not be rearranged to make society in aggregate better off¹. Society's welfare includes the whole range of monetary and non-monetary factors that individuals and society consider important. Where market failures arise through the existence of public goods, externalities or co-ordination problems, maximising economic efficiency may require intervention by central or local government.

Economic efficiency has technical, allocative and dynamic dimensions. Technical efficiency relates to maximising the level of output from a given resource, allocative efficiency is the arrangement of all resources to maximise society's welfare, and dynamic efficiency is the way in which resources are able to be rearranged over time to continually maximise allocative efficiency.

¹ This is a Kaldor-Hicks definition of efficiency. Pareto efficiency is a more stringent requirement that is achieved when it is not possible to reallocate resources without making at least someone worse off. The Kaldor-Hicks definition is more typically used because Pareto efficiency is seen as too hard to achieve. Kaldor-Hicks efficiency addresses the net effect on society and effectively means that someone may be worse off than they were under other arrangements of resources; winners are not required to compensate losers. Kaldor-Hicks is often criticised because compensation of those worse off often does not occur and perceived inequities may be generated.

2 EXPERIENCES WITH WATER ALLOCATION

2.1 Instream Users/Environmental Interests

Environmental sector groups are concerned that the increasing demand for water is placing greater pressure on water resources. The major concerns arise from consent based planning, the inclusion of information on instream values in the setting of minimum flows, and a number of technical issues associated with setting minimum flows.

Consent-based planning

In the face of increased pressure on water resources, environmental interests consider management of water resources via consent processes provides insufficient environmental protection. Without a catchment overview, it is difficult for consent authorities and submitters to assess cumulative effects of consents and to set a limit on the amount of water that can be abstracted. The outcomes of decisions are not tied into an ongoing monitoring/review process. Furthermore responding to all consent applications is not an effective use of their time or resources and they would prefer to concentrate their efforts on catchment and regional plans.

Inclusion of instream values

Where plans exist, there is dissatisfaction among environmental/instream interests as to the lack of rigour in collecting information on all the relevant values associated with a resource. Without adequate information, there is no guarantee that all important values will be provided for. Values that are more difficult to quantify, or for which no consistent methodology exists, often receive inadequate attention. They would prefer to see a precautionary approach where consents are either not issued or issued on a temporary basis until there is sufficient information on the resource and its response to abstraction.

In particular there is a lack of information on the effects of groundwater abstraction on values. Of note is the concern that Maori values with respect to groundwater have yet to be explored. Half of the water allocated since the enactment of the RMA has been allocated from groundwater, yet there are many groundwater resources that have no limits on abstraction. The concern is that groundwater resources could be over-allocated before the limits are understood, and as practice with surface water has shown, there is an inertia to clawing back existing takes.

Technical issues in setting minimum flows

There are some technical concerns with the ways minimum flows have been set. Many of the existing minimum flows pre-date the RMA and cannot be assumed to meet the requirements of the Act. Yet changing a minimum flow reactivates value-laden conflicts, and environmental/instream groups believe there is a definite inertia against revising these historic minimum flows. The emphasis on habitat area methods, predominantly the hydraulic habitat component of IFIM is also of concern to some groups. Other biophysical factors such as temperature, or dissolved oxygen can be overlooked. There is a tendency to base decisions on biophysical values that can be quantified, without adequate assessment of values are more difficult to describe in scientific measures, such as natural character and kaitiakitanga.

2.2 Abstractive Users

Water is becoming an increasingly important component of the rural economy. The conversion to intensive and highly controlled farming systems is accompanied by a demand for increased certainty and reliability in water supply. Abstractive users feel their uses are inadequately considered in setting minimum flows, they are concerned with the impact of water allocation processes on reliability, and that the planning process is complex, legalistic and inconsistent from region to region.

Consideration of abstractive requirement in macro-allocation decisions

Many abstractive users feel marginalised by planning processes that have concentrated on instream concerns. There is differing practice among councils concerning the extent to which abstractive users should be taken into account in macro-allocation decisions, and the extent to which councils are prepared to address economic concerns. As a result, opinion on the usefulness and relevance of regional plans varies considerably among users. At the extreme, one user commented that, beyond the setting of minimum flows, regional plans were irrelevant to abstractive users. A common theme was that there has been an over-emphasis on protecting trout and salmon habitat.

Reliability of supply

A major concern among abstractive users is the impact of water allocation decision on the reliability of supply. For example concern was expressed that subsequent consents can affect the availability and reliability of water for existing users. Users make investment decisions based on the water availability at the time their consent was issued, in the expectation that their conditions will not be substantially changed in the future. Some would prefer a precautionary approach where a lesser total volume of water was allocated in an uncertain situation, in preference to a situation where their allocation was retrospectively reduced and they were unable to realise the potential of their investment.

Users are concerned that the availability of groundwater resources is often not specified and limits are not being set, other than those to deal with localised drawdown issues. In some situations, water continues to be allocated despite affecting existing users to the extent that they are seeking alternative sources. In some less allocated resources, existing users are unaware that subsequent allocation can affect their access to reliable groundwater.

Although reliability of supply was raised as a critical issue, there is very little understanding within the productive sector on the implications of varying supply reliability. The lack of understanding means irrigation users have difficulty specifying “reasonable” or “target” reliabilities for their operations.

Planning processes

User groups find plan documents complex and legalistic. They find it difficult to understand the implications of plan provisions on their activities. For irrigation sectors, there is a trend towards using national groupings to make representations to plan hearings on behalf of local interests. These groups are frustrated by the differences in

how each regional council approaches a common problem, and by the variation in how the RMA is interpreted and applied.

National groupings within the productive sector expressed a desire to be more involved in the development of policies and technical tools relating to abstractive use. They would like to tie the results of their own initiatives into the tools that regional councils use. For example, combining the findings from farm or orchard-based monitoring of water use into the specification of individual allocations for irrigation.

In some instances, water users feel that they are conducting planning processes as part of applications for consents to use significant volumes of water. The potential exists with these large projects to review environmental flows, carry out community consultation and to provide for or enhance other instream and abstractive uses. In fact, the project is large enough that a process equivalent to a planning process can be undertaken as part of the consent application and hearings. However, the scope and issues included in these processes are determined by the applicant, and are limited by their ability to pay the costs, and their willingness to fund what could be considered a regional council responsibility. Current examples include the Meridian Energy proposal for the Lower Waitaki and the community water scheme proposals developed under AGMARDT funding.

2.3 Regional Council Staff

Water allocation decisions are complex and demanding. Regional council staff must deal with dynamic water resources and scientific uncertainty, in combination with strong, and often conflicting, lobby groups. Within this context, staff are required to communicate concepts, understand values, and present management choices to their politicians. Making decisions requires a certain amount of pragmatism and a political willingness to make decisions on priorities and between competing interests, and progress may require strong and sometimes controversial decisions. The key concerns with respect to regional councils are the availability of technical tools for decision-making, monitoring to ensure management objectives are met, and mechanisms to address conflict between users.

Technical tools

Regional council staff consistently raise a number of technical obstacles when asked to identify problems they face. They would like instruction or technical tools for management of abstraction from small streams, identifying issues relating to flow variability, surface-groundwater interaction, and methods for establishing sustainable abstraction levels from groundwater systems. Other concerns have been addressed by the development of technical tools under the Sustainable Management Fund, but there has not been effective demonstration of their application, and subsequently many tools have not been taken up by regional councils.

Monitoring

Scientific uncertainty means that any decision represents a best assessment given the current state of knowledge. In the face of uncertainty the outcome of decisions requires ongoing monitoring and an ability and willingness to review decisions. While recognising this principle, regional council staff acknowledge that their monitoring is often not focussed on providing feedback on the performance of their policies and methods. There has been a concentration on biophysical monitoring for state-of-environment reporting.

However, even in a situation where monitoring does suggest a change is required, the ability to review consents or water conservation orders in response to science is not well tested. This is further complicated by the expectation among existing users that their consent conditions will not be significantly changed.

Conflicting users

The increasing demand for water, particularly for irrigation, is creating situations where councils are required to choose between abstractive users. The need for allocation systems to address issues of economic efficiency and equity is becoming increasingly apparent. Examples include:

- The effect of forestry on catchment yield and availability of water for abstraction;
- The effect of hydro-electric dam operation on the availability of water downstream;
- The effect of increasing abstraction on hydro-electric generation flows;
- The effect of river gravel extraction on groundwater users subject to a declining water table;
- The effect of increasing allocation on the supply reliability of existing abstractive users;
- The effect of existing users who have an allocated volume and/or reliability in excess of their requirements on the availability of water for potential users.

The first four conflicts describe situations of competing uses whereas the later two conflicts are between existing and potential users and raise important equity issues. Regional councils are unsure as to how they can and should address these issues.

2.4 National/Regional Policy Concerns

Among senior regional council staff and government agencies there is a concern that current allocation systems are not promoting efficient allocation and use of water. Concerns arise at the strategic level, in allocating among different users, in the use of tools such as markets, in defining equity, and in the level of leadership provided at a national level.

Efficiency at the strategic level

Economic efficiency is concerned with the allocation of resources under scarcity. Opinions differ on the extent to which water scarcity exists in New Zealand. Without strategic information on the availability of water and the potential demands, it difficult to quantify scarcity and determine whether it exists. Where there has been a strategic look at increased demand for irrigation water, results indicate that many surface water resources have reached their limit for reliable run-of-river irrigation. It may well be that full development of groundwater resources in combination with water harvesting could meet foreseeable water demand while improving the level of protection given to instream values. There is a concern that while individual schemes are being promoted, there is no responsibility for addressing the concept of the best use of water at the regional level. For example, allocating water to a community scheme to the north of a river may limit the viability of potential users to the south of the river depending on the availability of other water sources. This ties in with the concept of water resources being used as a portfolio rather than being treated individually.

While s7(b) of the RMA requires “particular regard to” the efficient use and development of natural and physical resources, there has been very little exploration as to the application of this section to water allocation issues.

Allocating among users

The “first-in first-served” allocation regime appears the only option available under the RMA for assessing resource consent applications, and it is receiving increasing criticism. First-in first served gives preference to current rather than potential users, and avoids having to address the most economic allocation of the water. Councils are unsure as to the legality of options for addressing the “gold rush” situation that occurs when a block of water becomes available or for operating “waiting lists” in fully allocated resources.

Water markets and pricing

Water markets have not been very successful and very little transfer of water is occurring. It may be that water is not yet scarce enough in most catchments to encourage water transfer. Water transfer is occurring in some fully-allocated catchments and the use of water transfers is likely to increase as demand for water increases. There is a consensus that water transfers and water markets deserve more exploration, particularly clarifying obstacles to water markets and determining the situations where they will work. There was considerable discussion during the interviews on the issue of resource rentals for water allocation and water ownership. Virtually, all who raised it agreed that this concept is politically untenable for a variety of reasons.

Treaty of Waitangi

Implementation of market options for water allocation, including resource rentals, will raise the issue of water ownership. The exercise of the Treaty of Waitangi rights with respect to water has not yet been widely debated. The appropriate exercise of kaitiakitanga in macro and micro-allocation decisions is not resolved.

Equity

Equity between existing and potential users is also considered important. Equity issues also arise when an allocation regime is changed by changing a minimum flow, altering priorities or changing the total amount of water that can be allocated from a resource. Input to planning processes by user groups is nearly always related to protecting the rights of existing users rather than ensuring access for subsequent users. Single entities such as irrigation schemes, hydro-generation companies or public water supply agencies can assess their potential demand. However, for industries that are groupings of individuals it is more difficult to represent future interest, and address equity issues within the planning process. It is even more difficult to ensure these issues are addressed within consent processes.

National direction

A number of leaders of stakeholder groups commented on a concern that there was little leadership at a national level. Section 6 of the RMA identifies “matters of national importance” yet there has been very little national guidance as to the outcomes sought at the national level with respect to the matters identified in relation to water resources management. There is considerable confusion on how National Water

Conservation Orders and National Policy Statements can be used. Neither instrument has yet been fully exercised in relation to a water resource under the RMA. However there is currently an application for a National Water Conservation Order (Rangitata River) and work has begun on a National Policy Statement on Freshwater Biodiversity. Both of these events have initiated debate on the scope and use of these instruments.

The RMA is an enabling piece of legislation, but in some ways it is seen as too enabling – that almost everything is up for consideration in every decision. While the hierarchy of planning documents is meant to ease this somewhat, there remains a great deal for each region to resolve. Those spoken to considered that there was a place for national leadership to clarify and resolve many issues at a level which meant that regions did not have to consider them individually. In some cases this expression of a need for national leadership was a statement of discontent with the planning process, but in others it was a genuine concern with the complexity and uncertainty which arises as a result of the RMA as a rather pure enabling piece of legislation.

Climate change

The potential for climate change to alter the flows in water resources and the demand for water is of concern to many environmental groups, instream and abstractive users. Concerns relate to the flexibility of allocation systems to adjust to the changing environment while continuing to protect instream and economic values and address equity issues.

3 A VISION FOR “OPTIMAL” WATER ALLOCATION

An overarching theme from all stakeholder interviews was a concern with RMA processes. Discussions moved quickly to how the groups have been and would like to be involved in regional and national processes. Those who have been closely involved in advisory roles to regional planning processes were complimentary of existing practice. Criticisms relate to how the RMA has been applied, but not to the legislation itself. From a stakeholder viewpoint, resolution of the issues raised in the discussion scenarios (see Appendix I) will follow if there is an adequate process in which they are actively involved.

The discussion scenarios suggested approaches to water allocation decisions that differ from common practice. These include the reservation of water for strategic purposes, taking account of future instream and abstractive values within planning processes, a portfolio approach to managing a region’s water resources, the use of water transfer, policies for addressing over-allocated resources, and users allocated water at various reliabilities. All of these are currently happening to some extent in at least one region. Some regional councils are prepared to adopt new approaches without being restricted to measures that have been legally tested. These councils are confident that the measures can be justified with respect to the purpose of the RMA. Stakeholder representatives are generally supportive of these initiatives despite the untested status.

Defining of “optimal” water allocation at the strategic level is problematic. Looking at a given situation and determining what is optimal requires an evaluation against stated objectives. A common answer to the scenario which asked whether water be allocated to users who can make the most profit or to users who create the most jobs was “it depends”. In our opinion, optimal water allocation is about good process – understanding a resource and all the associated existing and future environmental and economic values, setting clear objectives, and selecting management options that optimise outcomes across the suite of objectives. The process should allow all stakeholders to understand the implications, provide opportunity for debate and be explicit about the political trade-offs made.

The table on the following page presents a vision for how the tools provided under the RMA could be applied to water allocation and contrasts this with examples of deficiencies in current practice. We pose the “ideal allocation process” not as a solution, but as a starting point for discussion and analysis of how the available RMA tools can be used in an integrated manner.

<i>Ideal water allocation process</i>		<i>Sub-optimal aspects of existing processes</i>	
<p>National Policy Statements, National Environmental Standards and Water Conservation Orders</p> <ul style="list-style-type: none"> • Identification of important national values. • Specification of environmental and economic outcomes necessary to protect national interests. <p>Regional Policy Statements</p> <ul style="list-style-type: none"> • Identification of important regional values. • Identification of conflicts. • A statement as to the priority issues that will be focussed on over the next 10 years. • A vision of how the suite of water resources within a region will be managed to provide for the ranges of present and future values and uses. <p>Regional Plans & supporting documents</p> <ul style="list-style-type: none"> • Clear objectives that specify the environmental and economic outcomes sought. • Obvious links between objectives, policies and methods. • Demonstrate how ongoing monitoring will be used to measure performance against the objectives. • Identifies scientific uncertainties and indicates how monitoring results could alter consent conditions. • Specify issues that can be addressed at the catchment scale. <p>Catchment Plans (including informal)</p> <ul style="list-style-type: none"> • Used for the resolution of catchment issues within limits set in regional plans. • Provision of quantitative numbers on the availability of water for abstraction. • Provide detail on implementation. <p>Resource Consents</p> <ul style="list-style-type: none"> • Used to assess site-specific concerns within the limits set in regional and catchment plans. 	<p>Strategic Input</p> <ul style="list-style-type: none"> • Identification by environmental, instream and user groups of their existing and potential values. • Identification of priorities. <p>Community Input</p> <ul style="list-style-type: none"> • Early and ongoing involvement by all stakeholders in the process. • All feel they have been given an opportunity to identify their values, and that they have been considered. • All understand the rationale for specific decisions. • All understand the implications of objectives and policies on their activities. 	<p>National Policy Statements, National Environmental Standards and Water Conservation Orders</p> <ul style="list-style-type: none"> • Not used to date under the RMA. • Confusion as to the use and limits of these tools. <p>Regional Policy Statements</p> <ul style="list-style-type: none"> • Provide little more guidance than the RMA. <p>Regional Plans & supporting documents</p> <ul style="list-style-type: none"> • Do not exist in all regions. • Vary considerably in their form and scope between regions. • Are unclear as to the values being managed, and contain vague objectives. • Do not demonstrate linkages between objectives, policies and methods. • Monitoring is often not addressed. • Focus has been on a regulatory document for guiding resource consents. • Do not adequately address efficiency issues. <p>Catchment Plans (including informal)</p> <ul style="list-style-type: none"> • Although similar shortcomings to regional plans are generally well received. • Formal plans have proved too time consuming to carry out for each catchment. <p>Resource Consents</p> <ul style="list-style-type: none"> • Have received the majority of effort. • Unable to assess cumulative effects or take account taken of potential values and uses. 	<p>Strategic Input</p> <ul style="list-style-type: none"> • Very little strategic input by stakeholder and user groups to regional councils. • Input has concentrated on consent processes. <p>Community Input</p> <ul style="list-style-type: none"> • Formal processes not particularly effective as a method of gaining information or communicating the implications of plan provisions.

4 KEY ISSUES

4.1 Planning Processes

We make the statement in the previous section that optimal water allocation is about good practice including understanding a resource and all associated environmental and economic values, clear objectives, consultation, transparency, and explicitness in decision making. Resource consent processes rarely provide for these components of good practice, yet a majority of water allocation decisions have been made via resource consent decisions. Cumulative environmental effects and equity issues are time-consuming to address on a case-by-case basis. Concentration on resource consents and case-by-case decisions has not allowed the appropriate public debate on these broader issues. The regional councils who are advancing the most innovative water allocation options have been through extensive public consultation on a catchment or regional basis.

The need to look at the broader picture is recognised by councils, with almost all councils having completed or in the process of preparing regional plans covering water allocation issues. However, it is wrong to conclude that regional plans are the sole answer to optimal water allocation. The RMA provides other tools, for example Regional Policy Statements, that are untested in their application to water allocation issues. It appears an opportune time to look at best practice with respect to integrating all the RMA tools into an overall planning process.

The RMA established an elaborate structure of planning documents – national/regional policy statements and regional/district plans. The Act also provides a suite of tools such as s32 analyses, monitoring, objectives, policies, methods and rules. These formal tools are supplemented by issues and options papers, investigations, strategies, public communication and education, and annual plan processes. A council starting on a water allocation planning process has little more guidance than that given in the RMA as to how to use and apply all these tools in a coherent package. Looking at existing plans only highlights that there are many options. There has not been a systematic evaluation of existing planning processes and their use of available tools or of the scope and form of existing plans. As a result, the way that the documents and tools have been applied to water allocation issues differs considerably among regions.

Planning processes have tended to concentrate on the preparation of regional plans as regulatory documents for guiding resource consent decisions. Such regulatory documents are not necessarily the best way to promote public input and effectively engage the community. Nor do they promote a strategic approach to water allocation issues. By concentrating on the preparation of a regulatory document, insufficient attention has been given to the process of identifying values, defining existing and potential issues and determining a vision for a region's water resources (or strategic purpose for management). There is considerable potential to make better use of regional policy statements and developing methods for communicating the rationale and political decisions that can be difficult to distil from regulatory documents.

4.2 Planning Scale

Water allocation practice is evolving to a nested hierarchy of regional plans, (sometimes informal) catchment plans and resource consents. Councils have started in a variety of places, some developing regional plans by combining catchment plans, and others considering regional plans as an umbrella document under which catchment plans will be developed. There is an issue with establishing the appropriate scale at which to apply various planning tools and resolve issues.

Catchment-scale planning is generally well received by environmental and user groups alike. It allows the local community to understand the implications of management options on their activities, and allows debate between conflicting local interests. However there tends to be a precedent set by the first catchment plan in a region, and subsequent plans follow a similar format and contain similar measures. The implications of the first plan are therefore wider-reaching than the specific catchment, yet public input and consultation is often limited to the specific catchment. Catchment plans can also be expensive and time-consuming, and most councils are opting for a region-wide plan.

Region-wide plans can adopt a more strategic approach to meeting the existing and potential values and uses for water. A regional plan could theoretically treat the resources of a region as a portfolio that provides for all the various instream values and ensures that abstractive demand is concentrated on those resources most able to sustain abstraction and/or where greatest benefit can be derived. They would enable the definition and management of water scarcity at a regional level. However, at the regional level it is more difficult to engage the public, and define values and issues requiring management. There is also a tension between management objectives set at the regional level and aspirations of people for use of their local resource.

4.3 Macro-allocation Decisions

The setting of a minimum flow or an aquifer level or pressure is analogous to the setting of a standard for (say) water quality or air quality. There are national and international standards or guidelines for water and air quality, predominantly human-health related, that provide defensible thresholds for councils to use as management objectives. However, no such uniform standards are available for ground or surface water resources. The dynamic and heterogeneous nature of New Zealand's water resources means it would be inappropriate to use a single standard. Councils are therefore required to go through the equivalent of a standard-setting exercise for each resource. This is an extremely technical, complex and expensive process.

The perception that there is an environmental bottom line (river flow or aquifer level/pressure) above which the instream values will be protected is a simplistic representation of reality. As abstraction increases there is increasing risk to instream values. But, even if there is no abstraction there is still a risk of ecosystem decline in dry years. Conversely, many of our river ecosystems are adapted to periods of no flow. Given this continuum, science alone cannot provide a recommended "safe" level, making the setting of a minimum flow or aquifer flow/level extremely difficult.

Determining the appropriate level of risk is a socio-political decision that requires a judgement call between instream and abstractive demands on the water.

Although the matters in s6 of the RMA are described as “Matters of National Importance” there has been very little direction to councils as to appropriate targets or standards for protecting these values. The Technical Drafting Group for the proposed National Policy Statement on Biodiversity has recommended that the scope be expanded to include freshwater biodiversity. This is a potential vehicle for the provision of “bottom line” guidance for the protection of native flora and fauna if it is considered necessary to protect national interests.

4.4 Providing for Economic Efficiency

The ability of the RMA to address issues of economic efficiency remains untested. As a result, council staff and politicians are reluctant to address efficiency issues beyond the technical efficiency of individual takes.

Opinions as to what a regional plan can achieve range from a plan that deals solely with in-resource values and how they will be provided for, to a plan that regulates how and where water will be used. The latter option requires picking winners with respect to resource allocation, an option that is universally unpopular among councils and user groups. However, the option of only addressing in-resource values relies on functioning markets to prevent the creation of a common access problem where the resource is allocated beyond a level at which regional benefits are maximised. Where on the spectrum between these two options water allocation plans can and should lie has yet to be legally tested or publicly debated.

Much of the debate and legal decisions on plan provisions with respect to economic efficiency have been based on district plans and the management of land-use. But there is a fundamental difference between land and water resource management in that land is allocated through a market mechanism, whereas for water, the absence of effective markets leaves regional plans as the only available mechanism for allocating water. Case law on the role of regional plans as an allocation mechanism is very scarce.

In some instances, reducing the allocation or priority of existing abstractive users will improve the regional benefits either by increasing instream flows or providing more abstractive users with access to water, in other words increasing the economic efficiency of resource use. Existing users react very strongly against such changes having made infrastructure investment based on existing consented allocations. They consider their right to take water extends beyond the term of the consents and expect their consents to be renewed with no or very little change in conditions. The expectation is not unrealistic, given that almost all consents to take water have been reissued upon expiry with very little change in allocation other than adjusting rates of take to reflect actual use. Water transfer is another mechanism for moving water to potential users, but one where existing users have control over how much water they keep. Addressing these equity issues will require considerable consultation with existing users, and ensuring potential users and communities who will benefit from the changes are represented in planning processes.

Addressing issues of economic efficiency and equity will require information on the relationship between management options and economic outcomes. There is a lack of data relating water availability to economic measures. In the absence of a price signal for water, users do not consider water use when optimising their outputs. Lack of water meters exacerbates the lack of data on the value of water. There are a number of research projects aimed at relating water use to farm outputs, but these tend to concentrate on site specific issues such as the technical efficiency of irrigation (e.g. the production per unit of irrigation water applied). Standard and agreed methods for taking this information and extending it to broader economic outcomes do not exist.

4.5 Pool of Experienced People

Water allocation issues are complex requiring technical expertise in biophysical, social and economic aspects, communication expertise in public and political arenas, regulatory expertise and most importantly an ability to integrate across this range of skills. The pool of people with the experience and ability to effectively address the complexity of the issues is small, and lies with some regional councils. It is therefore critical that any national initiatives use the combined expertise held by councils, and that there is a mechanism for the sharing of ideas among councils.

4.6 National Direction

There has been a lack of consistent national direction on implementation of the RMA and its application to water allocation issues. National submissions to regional plans and Environment Court decisions tend to evaluate plan provisions with respect to objectives and not address the form and scope of plans. Waiting until draft or proposed plans are released has not been effective. Such documents create an expectation in the community as to what will be in subsequent versions, making it more problematic and less politically acceptable to make substantial changes.

There has been a lack of recognition by central government agencies of the value-laden and difficult decisions associated with addressing issues of economic efficiency. There has been a mixed message given to councils, on one hand the strong suggestion that they should not be backing winners, and on the other the message that they should be addressing efficiency. Regional councils, with their traditional expertise in science and resource planning, can struggle with economic efficiency concepts. Making progress towards addressing issues of economic efficiency and equity within regional planning processes will require strong national leadership.

We note the difficulty inherent in situations where national agencies provide advice on their preferred course of action, but local agencies are required to be accountable for the outcomes from following that lead. This report recommends that where national leadership is given to clarify or promote particular options, it be done so in a manner which removes uncertainty for those implementing the advice and appropriately shares the risks associated with implementing untested measures.

5 RECOMMENDATIONS FOR IMPROVING WATER ALLOCATION

The problems arising in water allocation are complex and varied. The key issues relate to three broad topics - macro-allocation decisions, planning processes and economic efficiency considerations. We have made four broad categories of recommendations to address these issues:

- Provide national leadership
- Improve planning processes
- Provide, demonstrate and disseminate technical tools
- Other policy initiatives

Details of these recommendations and a suggested process by which they can be achieved are outlined below. Roles or responsibilities are assigned in the following section.

5.1 Provide National Leadership

Purpose:

To provide clarity in the interpretation and use of the RMA

Recommendation:

Provide national direction on:

Macro-allocation decisions

- *The ability to make trade-offs, set priority uses and employ a regional portfolio approach to water resources management.*
- *Any “bottom line” or standards for instream values that are necessary to protect national interests.*
- *The extent to which abstractive benefits can be taken into account in macro-allocation decisions.*

Economic efficiency

- *The ability to allocate water using approaches other than first-in first-served.*
- *The ability to grant a resource consent for less water and/or at a lower reliability than an applicant ideally requires to either:*
 - *increase the economic benefits gained from the resource including reduced risk to instream values; or*
 - *ensure equity between existing and potential interests in the water.*
- *The ability to reserve allocations as a means to recognise the strategic direction of stakeholder and users groups, including those representing potential interests.*

Recommended approach:

- Assessment of the RMA and its ability to address the questions raised above.
- Seek declarations and pursue legislative change where appropriate.
- Determine a mechanism for providing national direction on RMA implementation with respect to the questions raised above.

Discussion:

Although there is widespread opinion that it is practice rather than the RMA that requires improvement, there is insufficient clarity on the extent to which regional councils can address the questions raised above. A suggested starting point is an assessment of the RMA, case law and legal opinions as to the limitations of the Act. The process will differentiate areas where the Act is deficient from areas where existing practice is not using the Act to its full potential. There are likely to be some areas of uncertainty that can be addressed by declarations of the Environment Court. For example, the ability to allocate using other than first-in first-served. The resulting document should then go through a public process that allows for debate on what the RMA can and should deliver with respect to water allocation.

Educating all stakeholders as to what they can expect from the RMA will promote improved and consistent RMA practice on water allocation. However, we believe that a statement on the capabilities under the RMA cannot be guaranteed to improve regional council practice, and that some national leadership on RMA practice will be required. Having defined where practice could improve, there are a number of existing options to assess for providing national direction on practice. These are national policy statements, support to regional councils for setting case law precedents, and best practice guidelines. The approaches used however must perform in the following manner:

- They are intended to be ***permissive*** – that is allowing regional councils scope to use particular approaches rather than requiring them to do so.
- They should provide ***clarity*** to regional councils, removing uncertainty in methods.
- They should be ***national*** in scope, providing a degree of consistency across plans.
- Any ***risk associated with testing new approaches that could apply in other regions should be borne at the national level*** rather than at the regional level.

None of the existing possible approaches – national policy statements, case law or guidelines – provides an ideal mechanism for national leadership with respect to the questions raised in the recommendation. Of the three, the national policy statement or its equivalent is preferred, despite its unproven nature. Although the Board of Inquiry process reduces the ability of central government to determine the final policy, it is our understanding that National Policy Statements are the mechanism provided by the RMA for this level of input. As an alternative, case law precedents developed with leading regional councils may be appropriate in some circumstances, but there is no guarantee that the nuances relevant in the broader national context will be considered. Best practice guidelines are least preferred because of their lack of status, and therefore poor performance in providing clarity and certainty. The exception to this would be if there were a mechanism to clarify the legal status of such guidelines under the RMA.

5.2 Improve Planning Processes

Purpose:

To improve the planning processes used by regional councils in water allocation.

Recommendation:

Promote best practice with respect to:

- *Better integration among all tools provided under the RMA.*
- *Effective input to planning processes by stakeholder, public interest and user groups.*
- *A strategic approach to water resources management.*
- *Clear frameworks for values, objectives, policies, and methods in regional plans.*
- *Monitoring related to the objectives in the plan.*
- *Consistent interpretation and application of RMA tools.*

Recommended approach:

- Develop a national position on best practice for water allocation planning processes.
- Demonstrate good practice through projects related to setting allocation limits
- Maintain a watching brief over all water allocation planning processes and provide national advice at appropriate stages.

Discussion:

The recommendations are all related to the overarching process – planning processes – that guides scientific investigation, definition of values and issues, collection and interpretation of monitoring data, policy development, consultation, policy implementation and policy review. It concerns the integrated use of all RMA tools, one of which is the preparation of regulatory plan documents. A variety of approaches are recommended.

A national position on best practice

There is a need to develop a national position on what is considered good practice with respect to the application of RMA tools to water allocation planning processes. It is very important that any national input on water allocation planning processes via direct advice to councils, specific projects, submissions to plans, or other channels is consistent. The Table in Section 3 of this report outlines an ideal water allocation process combining all RMA tools. The Table was intended as a starting point and the appropriate roles and integration of RMA tools needs further critical debate. We recommend that MfE further develop the Table and determine best practice in discussion with regional councils and stakeholder groups.

Once a position of best practice has been reached, MfE should publicise its expectations with respect to application of RMA tools to water allocation. There are parallels between this and the recommendations in the previous section relating to national leadership. The previous section relates to resolving specific questions on the interpretation and use of the RMA. This section's recommendations related to a more detailed level of practice, where the "best practice" will evolve continually with experience in application of RMA tools.

We do not recommend a formal process-related guideline because such guidelines, prepared in isolation from practical experience, appear unsuccessful in improving practice. It is probably best as a flexible document that can be updated easily as experience with practical situations develops. What is needed is method for ongoing distribution, analysis and assimilation of the expertise gained through wider initiatives, application of tools, and ongoing council experiences. The experience of regional council staff must be used. For example, incorporating current work by the regional council Resource Managers Group with respect to regional policy statements

A watching brief over all water allocation planning processes

Ensuring that the collective expertise developed within regional councils is used to its potential will require a watching brief over the water allocation planning processes of all councils. Existing processes are all at different stages, and have different emphases. National advice to councils should occur long before the preparation of a regulatory document and include advice on issue identification, consultation, and the scope and form of plans. Existing plans show a definite progression from setting environmental bottom lines, addressing allocations to individual consents, setting allocation limits, through to options for micro-allocation. National work/research should focus on working in partnership with the councils that are taking the lead on an issue, and subsequently ensuring that the lessons learnt are communicated to all other councils.

Demonstrated planning tools

Another mechanism that has considerable potential to improve practice is projects similar to the current REMF² project which applies technical tools in an actual situation, and tests how the results could be incorporated into policy development. Further development and testing of process-related tools to address conflict resolution and communication methods would also be useful.

We recommend that the setting of allocation limits for surface water **and groundwater** would be the most appropriate topic to advance. Allocation limits have aspects of both micro- and macro-allocation decisions, and would require addressing flow variability, and supply reliability. It would build on the experience gained in the current REMF project. The current project could be followed up by demonstrating how the outcomes could be used in consultation, and how ongoing monitoring programmes could be developed to evaluate the success of the policies and methods at achieving the objectives.

Promote strategic thinking in stakeholder groups

Similar to promoting best practice among regional councils, promoting a strategic approach by stakeholders is probably best achieved by demonstrating the use of strategic input into an actual planning process. In addition to direct input, strategic input to planning processes can be provided by Iwi documents, Fish and Game Management Plans, public water supply strategic assessments or strategic irrigation assessments. It will be important to find and use examples where a strategic approach has been taken, such as the database developed in the Tasman Region by Nelson Marlborough Fish and Game with input from Department of Conservation and Tasman District Council.

² Environmental Management Services Ltd (2001): REMF applied to regional water allocation planning. Report to Ministry for the Environment.

Inclusion of water allocation in other MfE initiatives

The recommendations for improved planning processes apply in all aspects of resource management, not just to water allocation, and should therefore be addressed in wider initiatives such as the Quality Plans Project and development of approaches to education and effective community involvement. It is important that the specific needs of water allocation planning are taken into account in these wider initiatives, and that the expertise gained through the wider initiatives is incorporated into water allocation practice.

5.3 Provide, Demonstrate and Disseminate Technical Tools

Purpose:

To assist councils in addressing the scientific and technical complexities involved in water allocation decisions.

Recommendations:

- *Develop a consensus on the needs for technical tools*
- *Ensure appropriate technical tools are provided*
- *Promote effective use of existing and new technical tools*
- *Increase understanding of technical tools by stakeholder groups*

A technical tool is defined as a means to determine the biophysical, social and economic effects of a proposed activity.

Recommended approach:

Carry out a gaps analysis and develop (or promote existing) technical tools in the following priority topics:

- Understanding the capacity of groundwater systems (macro-allocation)
- Flow variability for surface water (macro-allocation)
- Describing natural character and cultural values (macro-allocation)
- Supply reliability criteria (micro-allocation)
- Setting abstraction limits for aquifers to meet reliability criteria (micro-allocation)
- Determining the economic effects of allocation regimes (macro and micro-allocation)
- Determining the social effects of allocation regimes (macro and micro-allocation)

Discussion:

Macro-allocation topics

There is a strong consensus from regional councils of the need for tools in specified areas - flow variability, small streams, groundwater-surfacewater interactions, understanding of capacity of groundwater systems, and setting abstraction limits for aquifers. These are predominantly biophysical issues that reflect the traditional areas of regional council expertise. We would add tools to assess the economic and social effects of macro-allocation decisions.

Micro-allocation topics

For micro-allocation decisions, regional council staff have identified a need for tools for assessing the appropriate allocation to individual consents, and for specifying the availability of a resource relative to a specified reliability of supply. We would add tools for assessing the economic implications of various allocation regimes at the individual user and catchment scale, and the use of water transfer (permanent and temporary) as a tool for promoting efficient use of water.

Gaps analysis

Each of the topics listed above requires a critical analysis to establish whether there is a scientific gap, a lack of data, a data analysis gap, or difficulties with policy development, policy implementation and review. In some cases the technical tools are available but not widely known about and used.

Tools demonstration

Tool development must be followed up by demonstration as is happening with the current REMF project. The REMF approach is worthy of particular note in that it potentially provides an over-arching framework for bringing together values, applying technical tools, policy development, and monitoring. It provides a solution to issues of coping with a large number of very different surface water resources at the region-wide planning scale. Its ability to improve water allocation planning is currently being tested in consultation with an advisory group of regional council staff. A similar level of national attention to groundwater resources seems warranted.

Existing tools may be more widely used if demonstrated. For example, an application of the Flow Guidelines for Instream Values³ that demonstrates how values vary across a range of flows, gives advice on presenting the results in a public/political forum, assesses the various options for managing abstraction when there is less than the full allocation available, and indicates how subsequent monitoring will be used to assess if the minimum flow is achieving the objectives set.

Fund adequacy

It may be worth examining the existing funds to see if they provide for adequate demonstration of tools. Factors such as the need to get support from multiple councils, particularly given that it may be only one lead council that is actively addressing an issue, may create unnecessary hurdles for accessing these funds.

Priorities

We suggest the following priorities for gaps analysis and tools development. We have given them priority, as they are necessary inputs to the setting of allocation limits.

- Understanding the capacity of groundwater systems - micro-allocation decisions
- Flow variability for surface water
- Supply reliability criteria
- Setting abstraction limits for aquifers

³ Ministry for the Environment (1998): *Flow guidelines for instream values*. Volumes A and B.

5.4 Other Policy Initiatives

Purpose:

To provide longer term strategic policy advice to the Minister.

Recommendations:

- *Investigate the role of the RMA, planning processes and agencies with respect to water harvesting as a specific strategic issue*
- *Investigate the issues and potential of resource rentals for water.*

Recommended approach:

- Identification of impediments to water harvesting schemes.
- Identification of issues and alternate approaches to resource rentals.

Discussion:

These two areas have the potential to dramatically change the political landscape of water allocation. Water harvesting can remove some of the direct conflicts from macro-allocation decisions by providing for increased abstraction without increasing pressure on instream values at times of low flow. It deserves greater attention at a national scale to ensure that there are a minimum of impediments to implementing harvesting schemes. Many proposed development projects emerging under the AGMARDT fund involve water harvesting. Water harvesting initiatives will raise many micro-allocation issues and allow the issues to be worked through within a private/community arrangement that does not necessarily involve regional councils. There will be issues associated with equity given the options of providing water only for those willing to pay at the current time or providing for all potential users. Water harvesting will also raise issues associated with water pricing as a cost recovery mechanism.

Resource rentals, as noted elsewhere in this document, are problematic and are likely to surface a variety of value laden debates. While we agree that it is likely that resource rentals for water are very problematic for a variety of historical and cultural reasons, we recommend further investigation of issues and options in this area. The potential for resource rentals to resolve many concerns regarding efficiency, as well as potentially providing a source of revenue for mitigating measures, means that further investigation is important. While their implementation may not be universal, there may be circumstances, locations and formats which the community are more willing to accept and which do not create problems in other spheres.

6 RESPONSIBILITIES AND ROLES

6.1 Lead Agencies

Provision of national direction

The lead agency for these recommendations is the Ministry for the Environment because, in the first instance, it is an assessment of the RMA. Considerable input from experienced regional council staff is very important.

Improving plan processes

The lead agency for implementing these recommendations is the Ministry for the Environment. Considerable input from experienced regional council staff is very important.

Provision, demonstration and dissemination of technical tools

These recommendations can be implemented by MfE and MAF through their operational research, and the various research funds. Where science gaps occur, FRST can be used. Both agencies should assess whether sufficient and appropriate funding mechanisms are available. The most sensible division is that MfE takes the lead on macro-allocation tools and MAF on micro-allocation tools for the productive sector. Micro-allocation tools for sectors other than the productive sector, and for addressing inter-sector allocation fall through the gaps under this division. We recommend MfE, or possibly MED, assumes responsibility for these gaps.

There are two outcomes from projects to develop technical tools – advice to regional councils on policy development, and education of users, stakeholders and the public. Where micro-allocation projects result in advice to regional councils, MfE should be involved.

Other policy initiatives

The lead agency for these recommendations is MfE with input from MAF and MED.

6.2 Roles

Ministry for the Environment

MfE is the lead agency on all recommendations in this report with the exception of micro-allocation tools for the productive sector. Its key role is to provide national leadership and direction in two key areas. Firstly, to provide clarity on RMA implementation and the ability of the Act to address strategic water resource management, economic efficiency and equity issues. The second key area is ongoing direction on best practice on the implementation of RMA tools. This requires that MfE understands and critically reviews existing planning processes, and state its expectations with respect to the processes followed and the outcomes achieved under the RMA. As stated above, MfE must recognise and use the water allocation expertise that lies with regional councils. Continued use of the Water Allocation Steering Group

is recommended, as is the use of review groups such as that established for the REMF⁴ project.

MfE must continue to ensure that environmental and instream interests continue to have input to its initiatives. MfE should also ensure that abstractive interests other than those of the productive/agricultural sector are catered for. This may be a role that MED can adopt in the future.

Ministry of Agriculture and Forestry

MAF will have a major input to all initiatives recommended in this report. In respect its interests in the productive sector, it is important that MAF develops a position on the questions outlined in the recommendations for national direction in consultation with the various sector groups. It is probably the only agency that can take an overview role in determining the extent to which protection of existing users is hindering economically efficient allocation of water for agriculture.

We recommend that MAF is the lead agency in the development and dissemination of technical tools to assist micro-allocation decisions relating to the productive sector. It should assess whether there are sufficient and appropriate funding mechanisms available. Two priorities identified in Section 5 are an assessment of supply reliability criteria and tools for assessing the regional economic implications of allocation regimes.

MAF, through the AGMARDT fund, has been promoting strategic thinking on potential water demand in the agricultural/horticultural sector. MAF has a role in ensuring that the outcomes of these projects are recognised and provided for in regional council planning processes.

In the same way that MfE uses a Water Allocation Steering Group, MAF could establish a group with representatives of various agricultural/horticultural sectors to guide its work in this area. The groups interviewed expressed an interest in being involved in such a role.

Ministry of Economic Development

While MAF can encourage strategic input from the productive sector, there are other groups with economic interests in the resolution of water allocation issues including public water supply authorities and hydro-electric generation companies. These interests are often addressed through consent processes, but it is important that they are catered for in implementing the recommendations of this report. MfE can encourage input from individual companies, but there is no obvious representative body. There is also no mechanism for assessing national strategic interest in, for example, generation capacity. We believe this is a role MED could adopt. However, MED is in the process of establishing the policy framework under which it will work, and may not in the short term be able to adopt this role.

⁴ Environmental Management Services Ltd (2001): REMF applied to regional water allocation planning. Report to Ministry for the Environment.

Department of Conservation

DoC has a role in providing input on freshwater biodiversity and the management of native flora and fauna. It will have continued input to the development of macro-allocation tools, and input to other initiatives to ensure that conservation interests are provided for.

Historically DoC has concentrated on terrestrial concerns, but the Action Plan contained in the New Zealand Biodiversity Strategy specifically addresses freshwater ecosystems. Two proposed actions for which DoC is the lead agency – *“Progressively protect priority representative freshwater habitats”* and *“Review the range of available protective mechanisms for freshwater biodiversity”* – should provide strategic input as to measures necessary to protect national conservation interests.

Regional councils

Regional councils are ultimately responsible for implementing improvements in water allocation practice. It is important that they allow and respond to peer review of their water allocation initiatives from MfE and other councils. They need to recognise that as a national position on best practice for planning processes and water allocation evolves they may be required to change their existing approaches. Over time there will be more consistency among regional planning processes, although the priorities, objectives, policies and methods selected may be very different from region to region.

Experienced regional council staff will be required to input to national initiatives either through the Water Allocation Steering Group or as part of review teams on specific projects. As part of MfE building an overview of all planning processes, time will need to be given to provide information to MfE through formal (surveys, interviews) and informal means.

Stakeholder groups

All environmental, instream and user groups have a role in providing more strategic input to regional councils that identifies their current and potential needs, and sets priorities. A variety of organisations have assumed the strategic role in projects under the AGMARDT fund, in many cases district councils have been involved. Stakeholder groups welcome and would benefit from opportunities to input to technical tool development.

Particularly in the agricultural sector, national groupings could be used as a means to educate users on specific tools. Involving such groups in the development of any micro-allocation tools, such as recommendations for determining individual allocations, would help ensure that tools developed met users needs and were understood. The groups interviewed expressed an interest in being involved in the development and testing of such guidelines for individual allocations. Such groups can also adopt the role of extension services. In theory, this should mean more understanding and less challenging from users when councils implement a tool.

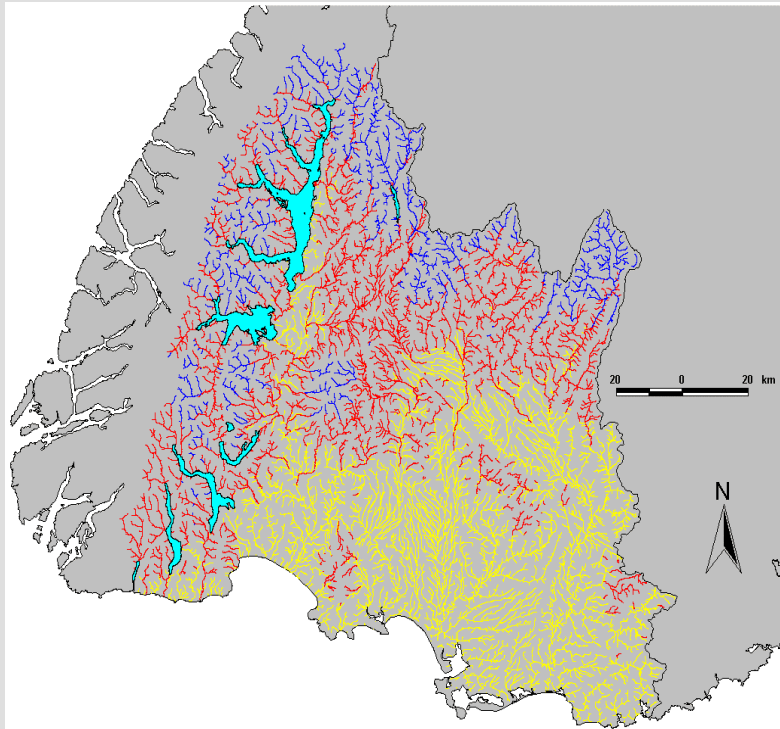
Although agriculture represents the majority of abstraction, there are other sectors that have an interest in the resolution of water allocation issues including public water supply authorities, hydro-electricity generators, and Maori interests. Representatives from these sectors are more difficult to identify than in the productive/agricultural sector. The Federation of Maori Authorities is a suggested contact for Maori interests. One of the difficulties of involving these interests is the lack of an obvious representative group, for example, a representative from the power generation sector.

APPENDIX I:

Discussion Scenarios

TOPIC 1: STRATEGIC WATER MANAGEMENT

Scenario



In this region, there are five types of water resources: lakes, aquifers, and three types of rivers. The rivers have been grouped into three classes relating to river flow patterns and river size (two key aspects for water allocation).

Each resource type differs in:

- The values associated with the resource – in-stream or in-aquifer;
- The resilience of the resource and hence its vulnerability to the effects of activities;
- The desirability of the resource for water-use activities.

For the purposes of the scenario, assume that there are only 2 river types and that the only activity affecting the values is abstraction:

River Type 1

Provides salmon habitat
Low flows in winter
Mean flow 100 m³/s

River Type 2

Provides eel habitat
Low flows in summer
Mean flow 1 m³/s

Management Decision

- 1) How can we determine the values and activities to manage for each water resource?
- 2) Where is there a need for management?

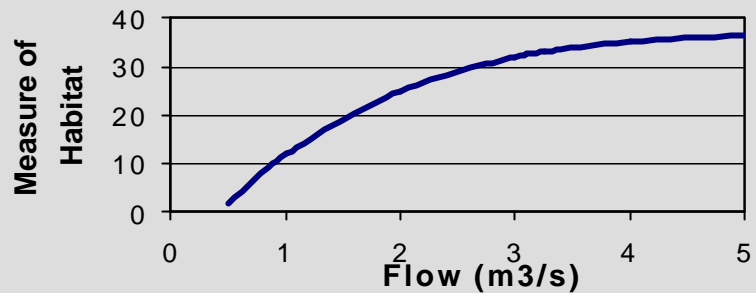
- *There is a lack of strategic overview of a region's water resources and how they will be protected and used to provide for a suite of values and activities.*
- *Some water plans provide little more guidance than the RMA as to the relevant values and their priorities.*
- *In the absence of a plan, there is no mechanism to assess cumulative effects and catchment wide issues are either not addressed or addressed at the cost of the applicant.*

TOPIC 2: DETERMINING MANAGEMENT ACTIONS

Scenario: Setting minimum flows

In Catchment D, three values have been identified as important – the habitat of a fish species, swimming, and use of the water for irrigation. The following information is available and is agreed to by all those involved in discussions:

- 1) Of the two instream values, fish habitat is the most sensitive to abstraction, and a relationship between river flow and fish habitat has been developed.
- 2) Swimming opportunities decline once the river flow is below 4 m³/s
- 3) Irrigation users have identified an acceptable level of reliability.



The management decision is the setting of a minimum flow below which abstraction will cease. Assume for the purposes of the scenario that it is a choice between 3 and 4 m³/s. Analysis provides the following:

Potential minimum flow	Habitat measure at minimum flow	Suitability for swimming – % of time river below 4 units	Amount water available at required reliability for irrigation
3 m ³ /s	32	5%	10 units
4 m ³ /s	35	3%	7 units

Management Questions

- 1) How do you assess the minimum flow?
- 2) What do you monitor?

- *Environmental bottom line thinking provides a simplistic representation of effects (above OK/below not OK) rather than recognising a continuum of increasing risk to some values and decreasing risk to others.*
- *Plans or other council documents do not clearly specify the relationship between the chosen management action and the management objective.*
- *The emphasis is often placed on values that can be quantified as a function of flow. Other values – such as cultural and natural character - can be overlooked.*
- *Opinions differ on the extent to which the effects on abstractive users should be taken into account.*
- *Ongoing monitoring is often not aimed at ensuring the management objectives are being achieved.*

TOPIC 3: HOW MUCH WATER DOES AN INDIVIDUAL GET ALLOCATED?

Productive or Technical Efficiency

Scenario

Catchment A can provide 30 units of water and still meet all in-stream/in-aquifer environmental flow requirements. There are only 10 potential users - all using the same equipment which requires 1 unit of water for efficient operation. One of these users requests the right to take 3 units. Assume there are no environmental effects on the receiving water of using more water.

Management Decisions

- 1) How many units should they be given?
- 2) What if there were only 10 units of water available?
- 3) Would you make different choices in a) and b) if the person requesting 3 units has a valid reason for their request (e.g. lower cost equipment, lower labour requirements)?
- 4) What if someone has 3 units allocated but only uses 1 unit?

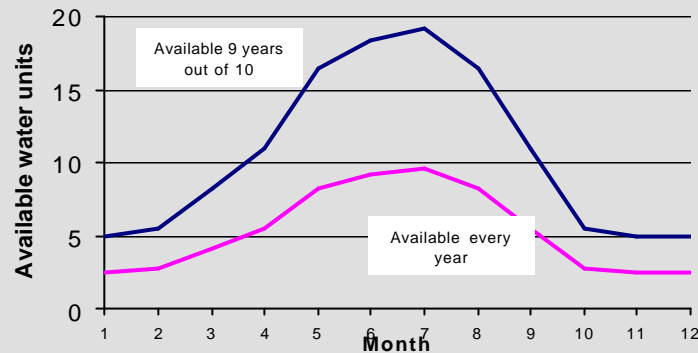
- *There is some concern among users with councils setting water use rates for their industry, or that tying allocation to a specific end use commits them to a given (say) land use. Is it realistic to expect all users to achieve a given level of technical efficiency? If so, who works out what that level should be?*
- *In a potentially water short situation, how much water an individual is allocated will influence the availability of water for future applicants. There is concern that potential users do not have a voice in the process.*
- *The environmental effects on receiving water are often not considered*

TOPIC 4: DESCRIBING THE AVAILABILITY OF A RESOURCE

Scenario: Allocation limits and supply reliability

In other scenarios, we have described the availability of a resource as a single figure (e.g. 100 units) and used a constant demand from an industry. In reality, availability and demand vary within a season and from year to year, and with the type of end-use.

The graph indicates the availability of water from Catchment C by month. The lower line indicates water that is always available, and the upper line is water that is available at a lower reliability.



There are three industries/end-uses interested in the water – they require water at different times and differ in their ability to cope with reductions:

- Industry/End-Use A needs water in all months and can accept no reductions;
- Industry/End Use B needs water in all months and can accept the lower reliability;
- Industry/End Use C needs water in months 7 to 9 and can accept the lower reliability.

Management Decision

- 1) How do you express the availability of a resource (set allocation limits) and allocate water given the varying requirements of potential users?

- *Limits on the total amount of water that can be abstracted from a resource determine the reliability of supply for water users, yet there are many resources for which no limit has been set.*
- *Under some current allocation systems, the first applicant for water will be given the highest priority water (i.e. the 2.5 units that is available all the time). If the first applicant was an Industry C person, they would be given water that was more reliable and available for longer than they require.*

TOPIC 5: INITIAL ALLOCATION AND SUBSEQUENT REALLOCATION

Allocative Efficiency

Scenario 5a

There are 100 units of water that can be allocated from catchment B. There is no existing use (i.e. starting from scratch). Two types of end-users – X and Y – request the full 100 units of water at the same time (note: assume a static situation and that profitability etc. does not change over time).

User X

Makes \$5 per unit of water
Employs 1 person per unit of water
Is one big company

Users Y

Makes \$2 per unit of water
Employs 3 people per unit of water
Is lots of small companies

Management Decision

- 1) Who should get the water?

- *Nearly all existing allocations are made on a first-in first-served basis which gives preference to current rather than potential users, and avoids having to address how the water is best used. Any alternative to first-in first-served would require establishing a criteria for allocation such as maximising \$ from water or maximising jobs.*

Dynamic Efficiency

Scenario 5b

Assuming the full 100 units has been allocated to maximise profit and a new, innovative Industry Q is interested in the water. Industry Q makes \$10 per unit of water and could use all 100 units.

Management Decision

- 1) Should movement of water to Industry Q be encouraged?

- *The situation in Scenario 5b currently exists in some New Zealand catchments where there is no regulatory barrier to transferring water permits, yet transfer of water occurs very infrequently.*

TOPIC 6: OPTIONS FOR MORE WATER

Scenario: A fully used catchment

In Catchment E all the water available for allocation is being used. Everyone has only enough water to operate their equipment and water transfer is used, where appropriate, to maximise benefits from the water. However, there is still an unmet demand for water.

The following are all potential options for obtaining more water:

- Provide storage (filled when river flows are high);
 - Further exploration/development of groundwater resources;
 - Upgrading all users to the “lowest water use” technologies appropriate to their activity;
 - Encouraging a shift to end-uses that use less water;
 - Where there is scientific uncertainty resolving the uncertainty could enable more water to be abstracted. This assumes a precautionary approach has been adopted in which uncertainty about the effects of abstraction has resulted in less water being allocated than would have been allocated if the most likely effect was assumed.
-
- *Concentrating on improving allocation systems may not be the most cost-effective way of increasing the economic benefits obtained from water resources.*
 - *Existing allocation systems do not cater for increased instream demand for water (e.g. a new jet-boating venture or research that indicates an existing minimum flow is too low for an important sports fish).*