BusinessNZ
The voice of business

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WATER MANAGEMENT

ISSUES AND SOLUTIONS

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EXECUTIVE SUMMARY

INTRODUCTION

- Business New Zealand is New Zealand's largest business advocacy body, committed to championing an export-orientated, competitive business environment in which productive enterprise can thrive.

- Water is an essential natural resource which plays a significant role in many sectors of the New Zealand economy. In this respect, Business New Zealand is concerned that policy decisions surrounding the allocation and use of water are soundly based supporting the development of business and the economy while at the same time providing for the social, environmental and cultural goals of New Zealanders. This paper is particularly targeted towards providing a business perspective on the issues surrounding water management.

- Tangata whenua have a special role to play with respect to water. To be successful, any water management reform process needs to involve the Crown working in good faith with tangata whenua to settle on a clear understanding and recognition of their role.

- There are many complex issues which require addressing in respect to water management if business investment is to be encouraged, productivity improved and the country's standard of living raised.

- Overall New Zealand is a water-rich country although current allocation regimes have resulted in water being over-allocated in some catchments while adverse environmental affects have resulted from intensive water use. Uncertainty over property rights to water results in significant sunk-cost investment in plant and equipment being delayed or not considered at all. This paper discusses and addresses these, and many other complex issues in respect to water management.

- Government has announced its intention to address water management issues and has established the Land and Water Forum (LWF) as one mechanism for achieving a broad consensus.

- The paper is intended to contribute meaningfully to the LWF process of broader stakeholder consensus, by achieving a broad business community consensus.

- The views in this paper have been expressed with a view to advancing mutually beneficial value to business, customer, citizen, environment and economy. To this end the paper has been developed with input from and consultation with representative members of the Business NZ Sustainable Business Forum.

- Many of the paper's recommendations, if implemented, would require changes to existing legislation.

SECTION 1

BRIEF BACKGROUND ON WATER ALLOCATION IN NZ

- Under section 30 of the Resource Management Act 1991 (RMA) regional councils have primary responsibility for water management. Regional councils consider applications for consents to take, use, dam and divert water for up to a 35 year term (although shorter terms are granted in many circumstances) but a consent does not provide ownership of the water or guarantee its availability.

- Existing water allocation policies as reflected in the RMA are based on a first-come-first-served approach. Factors such as more irrigation in traditionally dry land areas have put increased pressure on the allocation of available water supplies. While production has increased markedly as a result of the greater use of water, this has led to degradation of aquatic and riparian ecosystems and declines in biodiversity in some cases. However, ecological values associated with in-stream water flows are now increasingly recognized and given priority.

- Much water used is of a private good nature but water also has public good aspects. When left in situ whether for reasons of habitat or for people to enjoy, water is functioning as a public good, having important non-use value to the community.

SECTION 2

THE PRINCIPLES OF A GOOD WATER MANAGEMENT REGIME

- A sound water policy regime should ultimately ensure that current and future generations gain the greatest economic, social, environmental and cultural benefits associated with water use within a sustainable framework. From a business perspective this means that scarce resources allocated to productive uses are used efficiently, thereby flowing to their most highly valued uses. A number of considerations are involved, including security of property rights, reasonable internalisation of costs associated with water use (user pays), and the ability to efficiently transfer rights where appropriate. Such considerations are often given little or no account under current water management regimes; they must therefore be part of any water reform agenda.

- While clearly a water user does not have the right to own a water resource, a resource consent does allow the user to take, dam or divert water and to that extent is a property right and is valued as a right, particularly where increasing demand for water exists. This is reflected in large infrastructure investments such as electricity generation and large-scale irrigation schemes. In many cases the value of consents has been capitalised into land values.

- Individual users need ***(i) Security of Property Rights*** and ***(ii) Clear Specification*** of water use***.***

Security of Property Rights: a water right is provided in perpetuity ensuring confident investment but with the ability to trade such rights where appropriate.

Clear specification: any constraints on water use are well-defined, publicly known, and not subject to arbitrary change. E.g. any risk sharing arrangements are clearly defined.

- An initial allocation of water rights within a tradeable rights framework should be based on historical allocations and/or use, providing protection for existing investments. This is consistent with the approach taken to the allocation of resource use rights such as New Zealand fisheries quotas in the mid-1980s.

- There must be agreed mechanisms to deal with current or potential cases of water over-allocation. Other jurisdictions give some indication of the range of options available in respect to over-allocation. In Australia, where water has been over-allocated, Federal and State Governments have purchased permits on the open market thus compensating users for any losses incurred.

- Ideally anyone wanting to reduce water usage (private individual, interest groups, or government) should compensate current users whose allowable take would be reduced. This is consistent with the idea that all parties should be at least as well off after the exchange as if the exchange had not taken place.

- The ability to transfer (or trade) a right to take water is fundamental to ensuring an efficient longer term allocation of resources. It may also help to minimise any possible conflict between existing and potential abstractive water users by ensuring water flows to its most highly valued uses (either through short or long-term lease arrangements or sale). This said, environmental, social, and cultural considerations of transfers between different points within catchments or (especially) between catchments, must be taken into account.

- Different catchments have different flow characteristics, different hydrologies as well as different demands on water use. A sound water policy regime will need to balance the need for certainty for water users through better national level direction and consistency in management practices across catchments, whilst allowing water management authorities to address specific local problems with local solutions.

SECTION 3

OPTIONS FOR WATER ALLOCATION REGIMES

- International approaches to water management vary. Some rely heavily on administrative mechanisms (e.g. existing approach in New Zealand), some adopt a more market based approach (e.g. Australia), some are almost purely market-based (e.g. Chile). Most jurisdictions clearly define property rights to take water.

- There are many ways of allocating water that may involve regulatory, voluntary, and market-based instruments. Two points should be noted with regard to the latter. Firstly, these are not limited to tradable instruments, but include non-tradable measures e.g. water charges. Secondly, market-based instruments must be underpinned by laws and regulations that e.g. define and enforce property rights and trading rules.

- A one-size-fits-all approach to water allocation is unlikely to be satisfactory with the appropriate mechanism often dependent on whether or not water is scarce in a given catchment. In catchments with an abundant water supply relative to user or potential user numbers, a first-in-first-served approach may work well. However, this may not be the case for catchments where the water supply is severely limited.

- There are a number of other allocation mechanisms which could be used in circumstances when water is becoming scarce to ensure resources are available for use by those who value them most. For example, allocating water shares to different users, comparative economic assessments of competing uses for strategic planning or project purposes, and auctioning or tendering rights to water. Some have suggested resource rentals as a mechanism for authorities to obtain value from what is in numerous catchments, a relatively scarce resource. Many of these approaches have pros and cons which are discussed in more detail in the main text.

- It is imperative that there is a consistent national framework within which water allocation is implemented. However, there must be flexibility to address the specific characteristics of different regions and catchments. These include the level of pressure on the resource from allocation and the key environmental problems that exist or are likely to arise in the future.

SECTION 4

ISSUES AND SOLUTIONS SURROUNDING WATER MANAGEMENT

- Issues and solutions surrounding water management and use are complex and a number of contentious issues need to be addressed.

- Various issues affecting tangata whenua will need to be addressed as part of water management policy development. These issues are complex, but need to be worked through in good faith between the treaty partners to ensure that water management policies are durable.

- To ensure the best outcomes and optimal use, allocation decisions must reflect the important economic, environmental, social, and cultural values attached to water. If account is not taken of these values, water use is likely to be sub-optimal.

- Complicating factors include whether water is used for consumptive or non-consumptive purposes, whether water is used for its assimilative capacity, and the extent to which ground water use affects the amount of surface water.

- Likewise there are also issues associated with the quality of any water returned to the environment. Economic externality arguments are particularly relevant to the quality of water after it has been used for various purposes.

- It is important to set water quality standards at appropriate levels. If standards are too high, there may be wasteful over-investment in pollution control and reduction of output and value from water use. But if standards are low or non-existent, environmental damage may result and cultural and recreational uses may suffer.

- The interconnectedness of water systems means that economic externalities of water use are pervasive in relation to the timing and quantity of takes, and the quantity and quality of return flows.

- General principles for addressing environmental externalities should be set at national and regional or catchment levels. However, operationalisation of these principles must be targeted to location and scale; generally a one-size-fits-all approach will be inappropriate.

- Many water quality issues also relate to water allocation in general: setting appropriate allocation limits and dealing with over-allocation – its potentially unacceptable effects and/or how it can prevent new users/dischargers from undertaking some activity.

- There is a strong case for initially allocating existing rights to discharge point and non-point pollution with regard to historical emissions, protecting the value of current investments. This is consistent with arguments for grandparenting rights to water and with the approach taken to allocation of fisheries' rights under the 1980s' ITQ framework.

- Some sector groups have argued for further storage development to supplement current water supplies, given seasonal variations in need, water flows and provision. The logic and benefits of storage are obvious; the contentious issue is who should pay. Funding arguments to some degree revolve round whether storage facilities are private or public goods. The pursuit of storage facilities will tend to be driven by commercial imperatives although there will also be cases where public investment is called for.

- To ensure the granting of up-stream water takes does not affect the value of down-stream use, and that existing holders have reasonable certainty of future use before future consents are allocated, the principle of non-derogation of existing consents must be taken into account during all new water allocation decisions.

RECOMMENDATIONS

Whilst there are a large number of issues to be addressed, Business New Zealand considers that the following key recommendations should form an important part of the framework for the future of water management in New Zealand.

It is important to note that each of these recommendations is explained in context in the body of the paper.

Business New Zealand **recommends**:

1. **The Crown working in good faith with tangata whenua to settle on a clear understanding and recognition of their role in water management.**

2. **Recognition of water consents as an important and valuable property right.**

3. **The principle of non-derogation of existing consents be taken into account during all new water allocation decisions.**

4. **The imposition of constraints on water use rights is well-defined, publicly known and not subject to arbitrary change, with any risk-sharing arrangements clearly understood.**

5. **Providing for the existence of water use rights in perpetuity.**

6. **Grandparenting of existing allocation or use rights before any further water rights are allocated.**

7. **Allocation regimes for any unallocated water take into account the unique economic, environmental, social and cultural factors associated with each catchment area.**

8. **Setting allocation limits requires appropriate consultation and scientific modelling towards developing appropriate catchment plans.**

9. **Full compensation is paid to affected users from any reduction in water use rights so that there can be public confidence in the long-term value of property rights to water.**

10. **Compensation will in principle be paid by whoever wants or benefits from the reduction in water usage (e.g. private individuals, interest groups or Government).**

11. **Moving forwards from the establishment of the water policy regime, with the full cost of behaviour (internalisation of costs), as a general principle, to be borne by individuals and companies to avoid under or over-use of a resource.**

12. **The ability to transfer (or trade) the right to take water be recognised as a fundamental objective, ensuring an ongoing efficient allocation of resources over time.**

INTRODUCTION

Water is essential to life and the sustainability of our environment on which we rely for our export production, tourism, and recreational activities.

Water plays a significant role in many sectors of the New Zealand economy. In this respect, Business New Zealand is concerned that policy decisions surrounding the allocation and use of water are soundly based supporting the development of business and the economy while at the same time providing for the social, environmental and cultural goals of New Zealanders. The paper is particularly targeted at providing a consensus business perspective on water management issues and solutions.

While overall New Zealand is a water-rich country, difficulties arise in areas where water demand often outstrips available supply, where demand for water for agricultural and electricity production is particularly strong at certain times of the year.

Similarly in a number of urban areas, regular water use restrictions have been placed on households as a result of droughts and lack of infrastructural capacity to meet demands from consumers at peak times. Uncertainty has constrained investment and consequently economic growth, while at a domestic household level it has caused significant frustration to consumers when faced with regular sprinkler bans and the like.

The Government has announced its intention to address a number of issues surrounding water management through the establishment of the Land and Water Forum (LWF) as one mechanism to try and achieve a broad consensus. It is understood that the LWF will be focusing on a number of issues, including governance, allocation and water quality.

In order to provide business input into this process, it is necessary to clearly understand the principles which should inform a sound water management regime and build consensus amongst the broader business community as to the best approach. Fragmented approaches are unlikely to be successful; therefore it is important that NZ business has a clear position on water management which broadly reflects member company views, accepting that as with all policy decisions, there will be elements of disagreement. Business NZ has, in consultation with members and representative bodies including the Business NZ Sustainable Business Forum, worked to develop this paper, to this end.

The overwhelming objective of water policy should be to ensure that there is a fair and efficient water management system taking in account the important economic, environmental, social, and cultural aspects associated with water. Sound water management is not solely an environmental management issue, but is essential to the pursuit of sustainable economic development and improving overall productivity in the economy. These perspectives have been taken into account and inform the views expressed throughout this paper.

This paper deals specifically with issues relating to water allocation for industrial, commercial, agricultural and environmental use. It does not deal with the wider issues of water management in respect to household use or the structure of water

provision to households. While many issues arise from the provision of water to households, including in some cases, a lack of effective pricing signals on the costs associated with water use and an overly fragmented approach to delivery of water services, these are outside the scope of this paper.

For convenience, the paper is divided into four sections:

Section 1 provides a brief background on water allocation in NZ.

Section 2 provides a background to the principles that should inform a good water management regime.

Section 3 outlines issues in respect of water allocation regimes.

Section 4 outlines potentially contentious water management issues and provides potential solutions.

Feedback on this paper is welcome.

SECTION 1

BRIEF BACKGROUND ON WATER ALLOCATION IN NZ

The Resource Management Act 1991 (RMA) is the main legislation governing the allocation of water in New Zealand, and for that matter all natural and physical and resources. For resource allocation Part 2 is key. Here the Act's overall purpose is defined as: *"to promote the sustainable management of natural and physical resources".*

For the RMA, sustainable management means the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while:

(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
(b) safeguarding the life-supporting capacity of air, water, soil and ecosystems; and
(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment. (Part 2, section 5).

Regional Councils have primary responsibility for water management under the RMA. Their functions are set out in section 30 which confers responsibility for considering applications for consents to take, use, dam and divert water for up to a 35-year term (although many permits are for 5-15 years). A consent does not provide ownership of the water or guarantee its availability.

Notwithstanding the above, while there is no automatic right of renewal when a water permit expires, an amendment to the RMA in 2005 strengthened existing consent holders' position by requiring consent authorities to "have regard to the value of the investment of the existing consent holder."

The RMA allows for water to be taken or used (without consent) for:

(i) An individual's reasonable domestic needs; and
(ii) The reasonable needs of an individual's animals for drinking water (provided the taking or use does not, or is not likely to, have an adverse effect on the environment).

Water may also be taken without a permit for some other uses, for example, for fire fighting purposes (section 14).

Existing water allocation policies as reflected in the RMA are based on a first-come-first-served approach. However, owing to a range of factors, including greater opportunities for irrigation in traditionally dry land areas, pressures on the allocation of available water supplies have increased. Additionally, ecological values associated with in-stream water flows are increasingly recognized by communities, and are prioritised.

In many areas of New Zealand, water is not particularly scarce and there is generally enough available to satisfy the needs of all users. This means it may be necessary

to look at different water management, and particularly water allocation, models depending on the particular area. It is not immediately obvious that a one-size-fits-all approach will necessarily be optimal.

Even in so-called water-short areas, in general the amount of water used compared with the amount ultimately flowing out to sea is relatively minor. The more important factor is the amount available for allocation, which is often related to seasonal demand. The lack of significant storage capacity is also an issue in this context.

Water can be consumed or used for a variety of purposes. In no priority ranking, specific uses of water include:

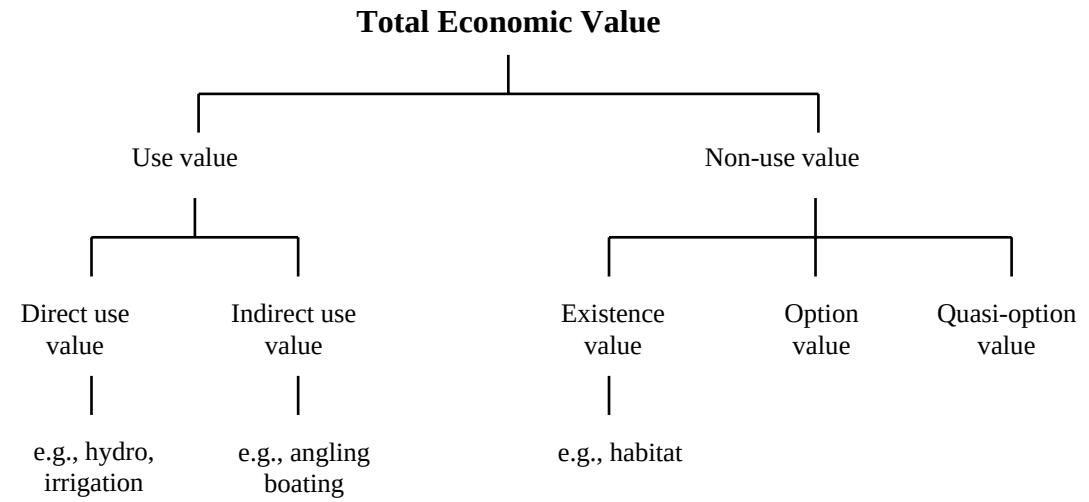
1. Drinking and sanitation water
2. Stock water
3. Industrial production
4. Power generation[1]
5. Irrigation, including agriculture and amenities (golf courses and parks)
6. In-stream recreational activities (fishing, boating and water sports)
7. Environmental, including both in and out of stream habitats, flora and fauna, and ecosystem health
8. Food gathering activities.

It is important to understand that water can have significant non-use values which need to be objectively looked at when it is valued. While traditionally, the focus has been on consumption uses, this fails to grapple with other important factors associated with water such as non-use values.

While much water use is of a private good nature, water has public good aspects as well. For example, when it is left in situ for whatever reason - habitat, general enjoyment, and scenic, recreational or through the desirability of leaving it in or close to its natural state – water is functioning as a public good. In other words it has important non-use value to the community.

A paper by Kieran Murray *"Water allocation: The strengths and limits of economic analysis"* delivered to the Water NZ Conference (September 2009) puts the total economic value of water in a very useful diagrammatic fashion, explaining the various values associated with water. This is important when decisions are made to reflect to value of water in terms of allocation and use.

[1] Water is used for both directly for hydro-electricity generation and also indirectly for purposes associated with thermal generation e.g. generation plant cooling.



Use values associated with water allocation need to be understood in the context of the total economic value of water, including both use and non-use values. A sole focus on use values to the exclusion of non-use values is likely to result in an over-allocation of water resources. But a disproportionate focus on non-use values may well see resources underutilised and economic growth lower than it might have been otherwise.

It is important to note that in some cases water is largely consumed e.g. irrigation (i.e. a proportion cannot be reused), whereas in other cases it is simply used for a process and is returned to the environment for reuse (e.g. power generation).

As this paper explains, a good regime will allow for water to be transferred to another use. This will occur when there is an economic incentive to do so. This said, the overarching water management framework should allow for social, cultural, environmental and economic considerations to be taken into account and weighed up when making decisions on water allocation.

SECTION 2

THE PRINCIPLES OF A GOOD WATER MANAGEMENT REGIME

A sound water policy regime should ultimately ensure that current and future generations gain the greatest economic, social, environmental and cultural benefits associated with water use within a sustainable management framework. From a business perspective this means that scarce resources allocated to productive uses are used efficiently, thereby flowing to their most highly valued uses. For this to occur, a number of considerations are involved, including security of property rights, reasonable internalisation of costs associated with water use (user pays), and the ability to efficiently transfer rights where appropriate. Such considerations are often given little or no account under current water management regimes; they must therefore be part of any water reform agenda.

Assessing water catchments

Obviously, for water allocation purposes, the amount of water available for allocation must be clearly understood. If available water resources are not adequately understood hydrologically and scientifically, they may either be under-utilised, at a time when they have many potentially beneficial uses, or over-allocated, thereby threatening the long-term sustainability of the resource. Many Regional Councils have been relatively tardy in requiring metering of water use, perhaps surprisingly given the continued pressure on water use in particular regions.

Developing catchment plans and allocation limits through thorough consultation and appropriate scientific modelling is a pre-requisite to ensure an effective framework for establishing tradeable water rights. In fact, it is essential for fostering efficient markets.

There is the potential for debate about who should fund the above activity. Some suggest it is local government's role to collect the base information, assuming broader community benefits. Others go so far as to suggest a role for central government which could help to fund the information gathering process. Information gathering is an expensive activity and possibly beyond the means of some councils.

However, it is recognised by most people that there is a need for a user (beneficiary) to invest in information at an individual level, although there is debate about the extent to which any benefits have the characteristics of a private rather than a public good. Obviously water metering is a prerequisite to better quantifying water use and providing base information. Issues of payment for information and who should pay are covered later in this paper. Such issues are of real concern, particularly in areas where water demand has increased substantially and where information on known water resources is relatively scarce.

Security of tenure and clear specification

Property rights and enforcement of same are a fundamental pillar of a market economy. Without reasonable security from confiscation by the state or others, the

incentive on individuals and business to invest and build up productive assets is severely weakened.

There is still much debate about property right boundaries. At one extreme, property rights can generally be considered reasonably clear, for example, a private title over land and buildings. At another level property rights can be assigned by government - resources such as fishing quotas, for example. Here property rights are generally reasonably secure or, if reductions in take are made (e.g. because of over-fishing), current quota holders have reasonable certainty that their proportion of the total take remains the same. At the other extreme, government, or its delegated authorities, give rights to particular people to do certain things or use particular resources, but with significant restrictions. For example, water permits are issued to users for periods of up to 35 years (but often for much shorter periods) but with authorities able to modify/change those permits during their tenure if new information comes to hand. The point here is that while some property rights are relatively certain and enduring, others are not.

For water allocation in New Zealand, resource consent (a water permit) is generally required. However, the RMA states in Section 122 that resource consent *"is neither real nor personal property".* Therefore some might argue whether resource consent to take water (a permit) is indeed a property right.

While clearly a water user does not have the right to ownership of the actual water resource, resource consents do give the user the right to take, dam or divert water. In this regard, a resource consent is a property right. Moreover, water permits are recognised and valued as rights, particularly where there is an increasing demand for water. Therefore semantics aside, water consents are water rights, as reflected in the large infrastructure investments undertaken in New Zealand - electricity generation, large scale irrigation schemes, manufacturing, processing and mining etc. In many cases the value of consents for agricultural irrigation has been capitalised into land values.

Clearly investors would not invest in such schemes if they considered their rights to future water would be unduly jeopardised. However, it is certainly the case that some investments have been delayed or simply abandoned because of uncertainty over existing and future water property rights. To secure future investment in water infrastructure, current property rights to water need to be enhanced to ensure greater certainty of future use.

Regardless of which water allocation mechanism is adopted, individuals need a high degree of certainty that their right to take water will not be unduly jeopardised, restricted or taken away without their agreement.

The requirement is for ***(i) Security of Property Rights*** and ***(ii) Clear Specification*** of water use***.***

> ***(i) Security of Property Rights***: a water right is provided in perpetuity ensuring confident investment but with the ability to trade in such rights where appropriate.

(ii) Clear specification: any constraints on water use are well-defined, publicly known, and not subject to arbitrary change e.g. any risk sharing arrangements are clearly defined.

Notwithstanding the above, it is important to appreciate that supply of water cannot necessarily be guaranteed in each catchment all of the time due to extraordinary circumstances beyond the control of consenting authorities e.g. unforeseen extreme weather events which may adversely impact on water supply for a time.

This means that it may be necessary in extreme circumstances for water takes to be reduced for a period of time. In most situations, percentage reductions across users would generally be the fairest mechanism to deal with such events. However, these issues clearly need to be addressed in any consent issued so users are clear as to their rights and responsibilities and the relative value attached to their consent.

In catchments where demand for water is relatively high and significant uncertainty of supply occurs, it may be desirable for authorities to issue “A” and “B” (or even “C”) grade water use rights where “A” grade rights almost certainly guarantee supply through to “C” grade use rights which may be used when “A” and “B” grade users have taken their allocation and significant water remains which can be used without adversely impacting on current takes or the environment. Obviously the value attached to “A” grade rights is likely to be greater given the greater certainty of supply.

Grandparenting existing rights

It can be strongly argued that the initial allocation of water rights within a tradeable rights framework should be based on historical allocations and/or usage. This would provide for the protection of existing investments and would be consistent with the approach taken towards the allocation of other resource use rights such as the ITQs in respect to fisheries (see Appendix 1).

The initial allocation of water rights based on historical usage means that there are potentially rents that can be captured by the holder of those rights, although the value which can be captured will depend on a number of factors, including the relative scarcity of water in a particular catchment area. For example, in catchments where water is relatively plentiful, it can be easily captured for use, and where demand does not outstrip supply, the value of water may be quite low. However, this is not necessarily the case in regions where constraints on allocatable water mean that demand can far outstrip supply (i.e. where water is fully or over-allocated) within a catchment.

Obviously, an initially free allocation of water based on historical use may mean that a user can later on-sell the right and make a considerable profit, assuming of course that the demand for water increases over time within the catchment where the right has been allocated.

While the capture of such rents may be politically contentious, this does not lessen the importance of ensuring that existing investments are protected.

An alternative to grandparenting rights would be to re-allocate them (when the term of the current permit expires) based on a number of possible approaches such as auctioning the rights. However, auctioning existing allocated rights to water would seriously undermine the protection of existing rights and the value of what in some cases would be significant sunk cost investments.

Businesses would have limited incentive to invest in expensive irrigation equipment and land development, or electricity generation if they had a strictly limited time frame in which to use water and no reasonable guarantee that their right to access the water would be renewed. It is fair to say that most individuals investing in irrigation systems and hydro-electricity generation have built their developments on the expectation of their consents being renewed. As mentioned previously, often the value of water consents is capitalised into land values.

If it became evident that permits to take water were simply being transferred to other users when they expired, all existing water users would have their legitimate expectations of continuing water property rights eroded. This would constitute the Crown making spontaneous and ad hoc decisions about the developments it would promote and would drive at the heart of established property rights, seriously undermining the ability of many businesses to continue operating. This is particularly so given the high sunk costs of investment in the land development which accompanies irrigation conversion or on a more significant scale, electricity generation. It is therefore fundamental that existing rights be maintained and enhanced to encourage investment in assets which utilise water as a significant input.

Allocating tradeable rights on the basis of historical usage is fundamentally important to ensuring that the value of current investment is protected. In respect to any non-allocated rights, a range of possible allocation mechanisms is possible. Section three provides details on some possible allocation mechanisms.

Compensation for loss of property rights

While it can be argued that property rights to water should be allocated based on current rights/use with any water left over allocated for example, through auctioning or other means, this does not deal with the potential problem which currently exists in some areas where water has arguably been over-allocated so that some water allocations need to be taken out of use (or the users bought out).

While the issue of over-allocation has generally not been significant for most catchments in New Zealand, a number of catchments are considered to be fully allocated, or indeed over-allocated in some cases. This may make it necessary to determine how water use can be reduced without unnecessarily interfering with the property rights of existing users.

Examples from other jurisdictions with respect to the loss of water property rights may serve as an indication of the range of options available in cases of over-allocation. In Australia, for example, in cases where water has been over-allocated with significant environmental implications, some voluntary cost sharing arrangements have been developed between users (generally farmers) and Federal and State Governments.

While farmers have sacrificed a share of their current allocated take (which is, in effect, a cost to them), Federal and State Governments have purchased permits on the open market, and have thus minimised the cost to both farmers and taxpayers. This could be an effective approach to compensation for the loss of water property rights in New Zealand as well. Under the approach, those who value their allocation the least would likely be inclined to sell a portion of it. In addition, the costs to the state of obtaining such permits would likely be lower than the cost of compensating all users. This would be less intrusive than a mandatory across the board reduction for all users.

It is important to differentiate between over-allocation because of a temporary weather event and what could be described as structural or long-term over allocations.

As mentioned earlier there will be situations from time to time in which water users cannot use all of their permitted takes because of an adverse weather or related event. It is suggested that such reductions in take be based generally on a proportion of the total take for the catchment area. However, where permanent reductions are required due to inappropriate planning by the consenting authority then the user should arguably be compensated for any permanent loss of take.

The issue of compensation is particularly complex in cases where the amount of water used by an individual is significantly less than the amount he or she has been allocated. Trying to differentiate between actual water used and the amount allocated to individuals in order to determine the financial impact of taking a portion of an individual's permitted allocation could be a time-consuming and difficult task. Arguably, compensation should be provided to both current water users and also those holding rights to unused water, given both have valuable property rights.

Some have suggested that where consents allow for a greater amount of water take then necessarily used then some form of reasonable use, best practice or historical use test should apply. This is the case in Queensland, Australia, where to prevent windfall gains from people who have never used their water entitlements, legislation prohibits the selling of water, unless a history of use can be proved. While on the surface this sounds perhaps a considered approach, when one looks at the implications on users, it could have significant ramifications.

Based on historical use, if a farmer had only recently moved to install irrigation and had had a few particularly wet summers, then based on historical use, his/her new allocation might be relatively low.

A ‘reasonable’ use or best practice test may or may not reflect the investment a user has put in to their productive assets. For example would a best practice test reflect the assets currently being used or the most modern and sophisticated available which could have significant implications for the property rights of current water users?

Notwithstanding the above, some users who have been allocated water rights far in excess of what they require or are likely to need may be prepared to voluntarily reduce their allocated takes with or without compensation. In some cases it is possible that consent holders may be prepared to reduce their total allowable take

provided that they are given more certainty and security over the minimum amount they are allowed to take. In this case it may be possible in many circumstances for a "win-win" situation rather than any significant loss. In some catchments each case may need to be addressed on its merits taking a range of factors into consideration. Obviously voluntary (but enforceable) agreements between the parties is the ideal outcome rather enforced outcomes wherever possible.

Reasonable internalisation of costs

While it has been argued earlier that current rights should be ideally grandparented, new allocations need to reflect the implications of resource use to encourage efficient investment decisions.

As a general principle, individuals and companies should bear the full costs associated with their behaviour (i.e. costs should be internalised) or individuals will over-consume resources if they can shift costs on to third parties. Management of water, and perhaps more importantly, water quality, is no different in this respect. In order for individuals to make rational decisions about water use, they should ideally bear the costs (and benefits) associated with specific water use options.

Efficient transferability of water rights

While the RMA technically allows water taking permits to be transferred amongst users in the same catchment area under certain conditions (section 136), and while some transfers do occur, the practice is not widespread. There are likely to be a number of reasons for this, including the following:

- Water permits attach to individual consent holders. A water permit granted to dam or divert water may only be transferred to a new owner or occupier of the site in respect to which the permit is granted.
- Water permits to take or use water can be transferred, in whole or in part, to another person on another site, if both sites are in the same catchment or aquifer. However, a requirement for transfer is that the transfer must be expressly allowed in the regional plan or the transfer must be approved by the consent authority. Not all regional councils expressly permit transfers in their regional plans and approval processes can be administratively burdensome.
- In many catchments, water has not been fully allocated and a new consent will likely be less expensive than one purchased from an existing user.
- Because a right to take water is often reflected in land values, a permit to take water can be a valuable asset and worth retaining.
- Farmers whose property has been developed for irrigation are unlikely to want to return to dry land farming.
- Presently users who have historically been allocated too much water are more likely to have their use cut back via a reasonable use test (or use it or lose it) than to be afforded the opportunity to sell or trade excess water rights on the open market.
- In many cases it may be impractical to "move" surface or "run of the river" water to a neighbouring property.

Notwithstanding the above, the ability to transfer (or trade) the right to take water can be considered a fundamental objective in ensuring an efficient allocation of resources over the longer term. In other words, those who value the water most will generally be happy to purchase rights to use it, and those who value the water less will generally be happy to sell or lease any rights to it they may have. Such a market can only exist in an environment where water rights are certain and secure.

An efficiently functioning transfer system is also beneficial in reducing the potential for conflict between existing and potential water users by facilitating trade in water to its most valuable uses over time.

In many respects the initial method of allocating water may not be so important provided that users have the ability to move water to higher valued use over time through transfer/trading options.

To ensure public confidence in a market system, a number of conditions must be present:

a. The amount of water available for allocation needs to be clearly determined.

b. Individuals and companies need to ensure they have secure tenure and clear specification of water rights so that existing users and potential users are certain those rights exist.

c. A central registry of available water rights and permit holders is required, including mechanisms for recording transactions via a water trading registry.

d. Monitoring of water use is required to ensure that individuals and companies only take what they were entitled to. Enforcement will also be necessary.

A properly functioning market would make it possible to transfer water to its most highly valued uses (either through short or long term lease arrangements, or sale).

In a number of jurisdictions throughout the world, markets have been established to facilitate the distribution of water rights.

Tradeable rights are not a unique concept in respect to water but have also been successfully implemented for a number of scarce resources with the objective of ensuring efficient allocation e.g. commercial fisheries management. Simply put, the basic concept is allowing resource users to trade rights with resources moving to those who value them more.[2]

There is little to suggest that the same benefits could not apply in respect to the allocation and trading of water rights in NZ. Obviously water raises some of the same issues which affect fisheries, for example, variation in quantities available

[2] See Appendix 1 for a case study on the implementation of transferable fishing quota in NZ, including grandparenting of rights.

(perhaps weather dependent). This means that rather than absolute allocations, it may also to necessary to provide for variations in water availability through a proportion of total allocation available approach, as now applies in respect to fisheries management.

It is important to note that whilst one ideal water transfer mechanism or set of mechanisms needs identifying to ensure certainty and consistency for water users and managers, different catchments have different flow characteristics, different hydrologies as well as different demands on water (e.g. consumptive versus non-consumptive uses). A sound water policy regime needs to balance the need for consistency and direction against allowing water management authorities to deal with specific problems or issues at the local level.

SECTION 3

OPTIONS FOR WATER ALLOCATION REGIMES

International approaches to water management vary with some based on administrative mechanisms (e.g. New Zealand), through more market based approaches (e.g. Australia) to almost pure market based approaches (e.g. Chile). In most jurisdictions, property rights to take water are clearly defined.

Although trade in water markets is increasing in parts of Australia, the markets are complicated to some degree through issues associated with sleeper licences (previously unused water licences) and ongoing droughts which have seriously restricted water supply. Most trades are on the spot market (lease arrangements) rather than permanent transfers of property rights.

In Chile, water markets have operated for a considerable time. Water rights have no limit and cannot be cancelled. Rights holders may freely sell, mortgage or lease water rights for any purpose, at a price negotiated between the parties. New rights are either allocated free of charge (if there is enough water to satisfy demand) or are allocated to the highest bidder via an auction system, if there are competing users. Rights are either permanent or contingent. Permanent rights allow the extraction of water without restriction, except during times of low flow. Contingent rights can only be exercised if there is an excess of water available from a resource and the requirements of all permanent rights holders have been met. Rights may also be designated consumptive (where the users have no obligation to return any of the water) or non-consumptive, where the entire amount of water must be returned to the water resource (e.g. hydro-electricity generation).

In the case of Colorado (US), there is a long history of developing efficient methods to deal with the allocation of scarce water resources by applying the principle of first in time, first in right. In short, this means senior rights holders are given first priority to ensure their allocation is satisfied, while junior rights holders have their allocations reduced. Water rights do not have any time limit, and some priorities on major streams go back as far as the 1850s.

Lessons from overseas can be useful in providing NZ policy makers with guidance, but New Zealand's particular circumstances must also be considered e.g. significant use of aquifers and difficulty in clearly determining limits. International lessons include:

1. Having clearly defined property rights to water use and clear specification as to when those rights (to use) may be reduced e.g. due to flow viability. This obviously requires a priority system which allows water users to manage their risks. For example, the encouragement to issue A and B grade water use rights, i.e. where A are almost universally guaranteed whereas B will be dependent on water flows and use by A.

2. Defining property rights for an indefinite time period in terms of users having continued access to water and the ability to profitably on-sell those rights. This is the ideal.

3. Designating rights as consumptive (where users have no obligation to return any of the water) or non-consumptive where the entire amount of water must be returned to the water resource (e.g. hydro-electricity generation). This is likely to be particularly important if water rights' trading is to take place within or between water catchments.

4. Deciding on the most appropriate means of initially allocating new water rights.

5. Providing for clear institutional arrangements, including a legal framework to facilitate trade in water.

Approaches

There are many ways of allocating water that may involve regulatory, voluntary, and market-based instruments. Two points should be noted with regard to the latter. Firstly, these are not limited to tradable instruments, but include non-tradable measures e.g. water charges. Secondly, market-based instruments must be underpinned by laws and regulations that e.g. define and enforce property rights and trading rules.

It is unlikely that a one size fits all approach to water allocation will be satisfactory. In some cases, the extent to which a specific mechanism is appropriate may depend on whether or not water is scarce in a given catchment. For instance, in catchments where the water supply is abundant relative to the number of users or potential users, it may be argued that the first-in-first-served approach works well. However, this may not be the case for catchments where the supply of water is severely limited.

The allocation options described below are an indication of the range of strategies that could be adopted in a water allocation policy for New Zealand for new or unused water.

First-in-first-served

The first-in-first-served approach, which essentially guarantees rights to the resource to the first applicant, largely reflects the manner in which permits to take water are currently allocated throughout much of New Zealand.

Pros

- In catchments where the supply of available water far exceeds the legitimate expectations of users and would-be users, first-in-first-served is likely to be a highly satisfactory approach to water allocation. In short, this would result in a scenario where everyone who needed bulk water would have access to it.

Cons

- First-in-first-served potentially allocates a valuable property right for free.
- If on sold quickly, this could provide those with rights, windfall profits at little or no cost.
- Users would not have a significant incentive to use “free” water efficiently unless it could be on sold.

"Balloting" of water

Under this approach, permits would essentially be randomly distributed to applicants through a ballot system until the available water had been fully allocated.

Pros

- Everyone would be provided with an equal opportunity to access the right to take water, irrespective of their economic status or other criteria.

Cons

- On its own, a ballot system has no built-in mechanism to ensure efficiency of use.
- Balloting would take no account of the value that various water users (or would be users) place on water as access to available water would be purely random.
- It would potentially allocate a valuable property right for free to those people allocated rights under the ballot system.

Allocating "water shares" to the general public

Under this approach, the Crown could issue water “shares” to households or ratepayers possibly either nationally or regionally, in a similar fashion to the way in which the assets in electricity trusts have been allocated back to ratepayers living in the area covered by the trust.

Pros

- Individuals would be able to sell, to give away, or to retain their shares as they thought appropriate.
- Water share allocations could be considered consistent with the belief widely held by many individuals and organisations that water is a public resource and therefore the public should have some say in its use.

Cons

- It can be argued strongly that given that rights to allocate water are vested in the Crown, the idea of giving away what in some cases might be valuable property rights is misguided when such rights could be auctioned to maximise revenue and encourage efficiency of use.

- The cost of transferring permits for small amounts of water could be significant, relative to the value obtained, although new technology options would assist in efficient trading.
- Individuals may "sit" on water rights (sleeper permits) and therefore the allocation would not be available for use. However, the incentives to sit on a water right (without either selling it or leasing its use) are likely to be minimal given the lost opportunity (cost) of non-use.

Comparative economic assessments of competing projects

Water permits can be allocated based on a comparative economic assessment of projects for which applications have been made. In this case, permits would be allocated based on the recommendations of expert panels. This approach would look at the relative merit of projects as assessed against each other.

From the outset, the assessment of competing projects would to some degree require a ranking of priority uses or some other measure of calculating "better" use of water.

Pros

- Allowing for the relative merits of competing projects to be ranked in order of importance could provide for a more efficient use of water.

Cons

- Central planning is inconsistent with the concept of markets allocating resources to their most highly valued uses.
- The demands for water and uses for water are likely to change over time, therefore any allocation based on the views of "experts" is at best a view based on a particular point in time. This approach could potentially be seen as flawed if it locks water into a particular project over a long term when in due course more efficient uses of that water might be found.
- Also, the balance of experts could swing towards a certain view i.e. the process is high-jacked over time.
- The system could result in significant administrative costs as the relative merits of competing projects would need to be assessed (and probably adjusted regularly to account for potentially new uses).
- If the system required the user to present a cost-benefit analysis of water use to the administrative body, then the user would have an incentive to overestimate the benefits while underestimating the costs in order to ensure a high priority ranking. Much might depend upon how good the analysis was. While the analysis could be conducted independently, this again would result in high administrative costs.

Auctioning or tendering rights to water

One way of ensuring that resources are available for use by those who value them most at any particular time is to have water taking permits distributed by auction or tender.

Pros

- Individuals who have purchased a right to the resource would likely value it and have a financial incentive to use it wisely.
- Individuals and companies would have the opportunity to purchase water in a timely way.

Cons

There would appear to be no obvious cons associated with auctioning or tendering rights to water although the issue of the potential for monopoly rights is discussed briefly below.

Resource rentals

It has been argued in some quarters that government or the regional authority could decide to obtain value from its control of water resources by imposing a resource rental or tax on water users. This effectively could be used as a simple charge for water use or a defacto allocation regime as presumably those who did not see value in retaining (and paying) for their water allocation would either on sell (or lease) their allocation or give it back to the local consenting authority. Resource rentals are essentially payments for non-depleting use or occupation of a resource rather than royalties, which are payments for extraction or depletion of a finite resource. In such cases, rather than deciding on the total amount of water resource to be allocated, the Government or regional authority could charge a rate, which might vary with supply and demand conditions in particular catchments, effectively limiting the likelihood that the resource would be over-allocated. Under section 36 of the RMA, regional councils already have the authority to levy administrative charges, but not on water use itself.

Pros

- The positive aspect of resource rentals is that they would provide a return on what, in some areas, is an increasingly scarce resource. The Crown could invest this money in storage facilities, or could use it to fund the costs of monitoring the system and better understanding the available water supply in a particular catchment. This would maximise the use of resources in a sustainable manner consistently with RMA principles. Nevertheless, it is not obvious that all resource rentals obtained from water would necessarily be spent on activities associated with water use; there may be other higher priority uses for such revenue unrelated to water.

- It is likely that those who value the resource the most would seek to obtain permits, and moreover, users would have a financial incentive to conserve water and use the resource efficiently. In this respect the objective of a resource rental would be to encourage the allocation and management of rights so they would flow to their most highly valued use. It would also allow for changes over time between uses. Use would then not only relate to economic development but could also reflect environmental, social and

cultural values which may change over time depending on particular circumstances.

Cons

- One issue with resource rentals is that any charging regime would need to minimise compliance and transaction costs and be uniform across users. A resource rental could either take the form of a lump sum or a periodic payment, with certainty an important factor in the mix. Second, a resource rental would need to provide investment certainty for users that it would not be subject to significant changes at little notice. Implementing and setting a resource rental would not be an easy task. If set too high, some investments might not be undertaken; if set too low it would have limited effect in ensuring efficient resource allocation.

- Resource rentals try to capture some of the costs associated with funding activities (such as information requirements/research into water availability) and to deal with some negative externalities associated with water use. Perhaps at the same time they also seek a return on what may be very valuable property rights. But, arguably, each of these issues is best addressed separately rather than through one ad hoc resource rental.

SECTION 4

ISSUES AND SOLUTIONS SURROUNDING WATER MANAGEMENT

Issues and solutions concerning water management and use are complex and there are a number of contentious issues which need to be addressed in order to move forward.

Topical issues are briefly outlined below, along with possible solutions. Some are perceived as significant when this is not really the case – concerns expressed by sections of the community about the potential for monopolies associated with tradeable water rights, for example. Other issues – particularly Maori governance issues - are extremely difficult to address and more work needs to be undertaken.

Tangata whenua/Governance

Business NZ is aware of the importance that tangata whenua attach to water and management of same. While difficult to work through, it is important that all parties clearly understand the nature of obligations and rights in respect to water use and management in order to develop a sound and lasting framework in respect to water allocation and use.

Clearly the issues are complex and require careful thought going forward, and, should they arise for Maori, need to be resolved with the Treaty partner – the Crown.

Since the enactment of the Water and Soil Conservation Act 1967 the sole right to take use, dam and divert water has been vested in the Crown. Previous common law/riparian rights to water have been extinguished. This situation has continued under the RMA.

Notwithstanding the above, the RMA requires a number of factors to be taken into consideration when making water allocation decisions, including ensuring the purpose of the RMA is met (section 5), namely to promote the sustainable management of natural and physical resources.

Section 6 of the RMA outlines matters of national importance which must be recognised in respect to water allocation including *"the relationship of Maori and their culture and traditions with their…water,….and other taonga"*

Section 7 requires that regional councils have particular regard to various matters including, but not limited to, *"Kaitiakitanga"* (guardianship by tangata whenua) and the ethic of stewardship.

Section 8 outlines a requirement to consider the principles of the Treaty of Waitangi.

While none of the above implies any form of ownership or right to veto water allocation, the sections do emphasise the important place of tangata whenua in terms of the values of water and of guardianship under the RMA. To this end, a number of co-management regimes are being established for significant water resource areas e.g. the Waikato River settlement.

Optimal use of water and consumptive/non-consumptive use

Perhaps one of the most contentious issues in terms of water allocation concerns the amount of water that should be allocated. Obviously, the amount of water available for allocation will depend on a number of factors including environmental considerations, variability of flows and so on.

The setting of allocation limits is likely to incorporate the setting of minimum flows to provide for tradeable values. For example, the RMA provides for the setting of environmental minimum flows to protect the habitats of fish, and also to provide for recreational values, as well as Maori cultural values.

It is important, given the potential benefits of water use in particular catchments (e.g. Canterbury in respect to irrigation), that the value of water and of potential trade-offs between competing uses are well understood and accepted by the general public. It is important that those who value water most are prepared to pay for its use for a particular purpose, whatever this may be - enhanced recreational activities, industry and so on.

In respect to optimal use, it is crucial for allocation decisions to reflect the important economic, environmental and social values attached to water. Unless account is taken of all these values, water use is likely to be sub-optimal. It is possible to have an under-allocation of water resources (where water flows out to sea without being effectively harnessed) or alternatively, an over-allocation, where potentially long-term environmental damage occurs which may take years to heal or in some cases may adversely impact on human health and safety.

While issues dealing specifically with quality will be looked at later in this paper, a particular concern with optimal use is differentiating between consumptive and non-consumptive uses and the net impacts of trading in water returned to the environment. The assimilative capacity of the water which remains in the river is also critical.

On the one hand, some situations involve using water as part of a process (e.g. electricity generation) where most if not all is returned to the environment in a similar state (and amount) to that which originally existed (non-consumptive uses). In other cases water is used largely for consumptive purposes where only some will be returned to the environment (e.g. agricultural land irrigation).

Therefore there is a need in developing a good water policy regime, to differentiate between consumptive and non-consumptive uses when allocating water so that over (and under)-allocation does not occur. To give an example, a river with full use allocation may have 40% going to electricity generation (non-consumptive and returned to in-stream) with 60% going to agricultural land irrigation (largely consumptive) down-stream.

If, for example, an electricity generator did not need all their allocation and opted instead to trade 50% of it (20% of total river allocation) to farmers irrigating down stream, the trade from a non-consumptive use to a consumptive use might

effectively result in an over-allocation (because of the nature of the trade from non-consumptive to consumptive). Similarly the reverse could also be true if a trade were to flow from consumptive to non-consumptive use. Accounting for both consumptive and non-consumptive use needs to occur within an allocation regime.

Taking account of how much water will be returned to the environment when specifying water take entitlements would perhaps enhance water use efficiency, where reduced return flows may substantially reduce water availability for environmental purposes, or for other consent holders. This is particularly important if water is to be traded amongst competing users involving consumptive and non-consumptive uses or where use will have a significant impact on the quality of the residual water discharged into the environment.

Water quality

Economic externality arguments are particularly prevalent in relation to the quality of water after it has been used for various purposes. For example, degradation of lakes and rivers as a result of non-point source pollution (waste run-off).

Many of the environmental externalities associated with irrigation are complex and the links between sources (cause) and effect are not well understood. It is often difficult to indentify, observe and measure effects from individual sources and link them to resultant changes in environmental conditions.

It is important to set water quality standards at appropriate levels. If standards are too high, there may be wasteful over-investment in pollution control and reduction of output and value from water use. But if standards are low or non-existent, environmental damage may result and cultural and recreational uses may suffer.

The interconnectedness of water systems means that economic externalities of water use are pervasive in relation to the timing and quantity of takes, and the quantity and quality of return flows.

Any mechanism for addressing environmental externalities needs to be targeted appropriately to location and scale as generally a one-size-fits-all approach will not be possible. Obviously this could include the possibility of a cap and trade on discharge which might be appropriate at a catchment level but would be much less acceptable at the individual enterprise or farm level. An appropriately designed cap and trade regime could provide a mechanism to allocate discharge rights to landowners who value them most highly, although it is accepted that there would probably be significant establishment and implementation costs in developing a discharge cap and trade for each region.

The OECD, in their Economic Survey of NZ (April 2009) recommended: *“Implementing RMA provisions in regional use plans to allow trading of water consents and provide guidance and resources to regional councils on establishing targets for nutrient flows in their respective catchment areas that balance environmental quality, economic, social and cultural objectives.” (p.89)*

A cap and trade regime would obviously need to reflect the costs and benefits of implementing such an approach based on a wide range of environmental and

economic factors. One standard across the economy would be totally unacceptable and irrational given wide variations in the value of economic and environmental landscapes across various regions. But that reality notwithstanding, a one standard approach could be considered consistent with the position of most of NZ's major business organisations which have generally supported an Emissions Trading Scheme (ETS) in respect to green-house gas emissions, or in some cases, a carbon tax. However, within this framework, initial allocations could be distributed for free to eligible industries, based on historic emissions.

Effectively, many water quality issues are the same as those relating to water allocation in general: setting appropriate allocation limits and, dealing with over-allocation represented both by potentially unacceptable effects and/or the inability of new users/dischargers to undertake a specific activity.

There is a strong case for initially allocating existing rights to effectively pollute on an historical basis to ensure the value of existing investments is protected. This is consistent with the arguments for grandparenting existing rights to water as outlined above and also with the approach taken to allocating rights in respect to fisheries under the ITQ framework adopted in the mid-1980s.

Monopoly concerns

With the introduction of a tradeable water rights regime, it would be theoretically possible for a single party or perhaps a small number of individuals to purchase a sufficiently large share of the water rights available in a catchment or a neighbouring catchment, theoretically controlling the market for water and reaping monopoly profits from any sale of water. In the absence of competition between sellers, this could create conditions in which users or potential users were forced to pay more than a fair market value for water rights.

While theoretically possible, there are a number of reasons why a result of this kind would be very unlikely.

In very few regions would all water be available for allocation. In other words, particularly in water short areas, a substantial amount of water has already been allocated. As previously argued in this paper, there are strong justifications for grandparenting current rights, so the amount of water available for allocation is likely to be relatively low (as a proportion of the current take) in water-constrained catchments.

Second, in catchments with a plentiful water supply and very few uses for the water, the value of obtaining a large proportion of water rights (even at relatively low cost) is likely to be limited given there is little need for water usage.

Third, where water resources are limited, it is likely that provisions of the Commerce Act 1986 will kick in if individuals or companies were acting in an anti-competitive manner.

Fourth, even if well-resourced parties could buy up all water rights in a catchment, assuming they were profit maximising, they would only buy if the water rights produced a commercial return. Holding water rights without utilising them represents an opportunity cost. There will likely be strong incentives for potential speculators at least to lease water to other users in order to gain a return on their investment. It follows that if water has a significant value it is likely to be utilised.

Water storage and funding

A number of sector groups have argued for the further development of storage as a means of supplementing current water supplies, given seasonal variations in need and also the nature of water flows and provision. While there is no arguing about the logic and benefits of storage, obviously there are contentious issues around where and how storage should be built, the cost (particularly capital costs), rate of return, and who should pay.

The arguments over funding to some degree revolve around the issue of whether storage facilities are private or public goods or whether they incorporate aspects of both.

The distinctive features of public goods are, first, that non-payers cannot easily be excluded from receiving the benefit that others pay for (that is, public goods are susceptible to free riding) and, second, that one person's consumption does not reduce the consumption opportunities of others. These are known as the non-excludability and non-rivalry characteristics of public goods.

Goods with both of these characteristics are likely to be undersupplied by private firms or not supplied at all.

Notwithstanding the above, most goods and services provided do not have public good characteristics. They are provided by firms and funded from the revenue raised. They are termed private goods in the sense that the benefits accrue directly to the individual paying for the service, while others can be excluded from the benefits of the service provided.

Water storage can either be an almost pure private good at the one extreme or a pure public good at the other, with varying degrees in between. Many dams and storage facilities developed in New Zealand over the years have elements of both.
Three broad potential funding options are practicable for funding storage:

- full Crown funding from general taxation where the storage is purely a public good; or
- a mix of funding from third parties (i.e. local ratepayers (or possibly targeted for flood protection, for example), the Crown, and users (i.e. applicants – most likely electricity generators and irrigation providers)); or
- the applicant (user) of the storage.

Trying to differentiate between the amount of storage which could be considered of a public good nature would likely be fraught with difficulty and not easily resolved. It is

virtually impossible to determine with any accuracy the precise nature of the public - private good split.

There may be cases where a dam might have significant benefits to a locally defined population from which contributions could be sought either directly or via a targeted rate. Local flood protection is likely to be a case in point. However, targeted rates should not be introduced lightly.

The key and perhaps the only satisfactory test of whether a service is being provided for someone's benefit is whether the individual freely agrees to purchase the service at the given price or to be levied to fund the service. Compulsory payments extracted without the consent of those on whom they are levied indicate that the benefit of the levies is being conferred on other parties.

Given that overwhelming incentives for storage facilities are generally driven by commercial imperatives, e.g. for irrigation potential or electricity generation, storage facilities should generally to be funded by direct beneficiaries of the facilities and the development of such facilities should stand or fall based on commercial returns to potential investors. However, each case will need to be examined on its merits as storage options will vary and there may be cases where public investment is warranted.

Water research and administrative charges

Section 35 of the RMA requires every local authority to gather information and undertake or commission research, necessary to effectively carry out its functions under the RMA.

Section 36 allows for applicant administrative charges. However, administrative costs are restricted to the costs associated with the receiving, processing and granting of resource consents and for their monitoring and supervision and do not apply to the actual water itself.

Given that it some cases applicants do not bear the full costs associated with resource (water) use as often administrative and monitoring costs are paid for out of general rates, there may be a tendency for them to seek larger consents than they actually need given that the opportunity cost of doing so is relatively low.

While some authorities charge individual consent holders for undertaking these functions, other pay for them through general rates.

It is noted that Environment Canterbury is endeavouring to introduce charges based on the principle that larger water users should pay more rather than setting a flat rate charges to cover some of its water investigations and monitoring work. These costs are currently 100% funded by general rates.

Despite the ability to charge users for the administrative and monitoring costs of water use, users may in fact obtain a very valuable property right (i.e. water use) essentially free.

There is a strong case for water authorities not only recouping the administrative and monitoring costs associated with water use from water consent holders, but also obtaining a return on what in some cases is a very valuable property right.

Uncertainty over quality of property right to water

Certainty of property rights and subsequent compensation for any loss as proposed in this paper will depend on the nature of a resource consent and also on factors such as sunk cost investment, amount of resource used over length of time etc.

Some water uses are permitted without the need for a water permit under the RMA (e.g. stock water and takes for an individual's reasonable domestic needs). Such use of water is likely to be based on historical considerations or customary practice.

Water permits are required in most other cases for use of water whether directly from aquifers, in-stream, or from dams or diversion races.

While there is no automatic right of renewal when a water permit's term expires, a 2005 amendment to the RMA strengthened existing permit holders' position by requiring consent authorities to "have regard to the value of the investment of the existing consent holder."

Water permits vary in their terms and conditions (e.g. from volumetric annual takes to simply allowing water to be taken where it reaches a particular dam). Given such variations, the quality of the property right to water also varies.

Issues concerning water use and the quality of the property right need to reflect a number of considerations, in addition to those associated with the water consent. For example, the nature of the sunk cost investment for which the water is used, historic usage and so on. In this respect, water rights, whether via a water permit or expressly provided for (e.g. for reasonable domestic use or stock water), should be grandparented to ensure the value of the current investment.

Where allocation is being considered for new users in a catchment area and where the defined amount of water takes for existing users is uncertain (e.g. allowing existing hydro-electricity generators to use water which arrives at a particular dam), the presumption should be against issuing new permits, if these would undermine the rights of existing users. In the absence of volumetric limits etc, other criteria should determine whether a new water permit would impact on a current consent. Criteria could include the amount of sunk cost investment in a particular business (e.g. hydro-generation or irrigation equipment etc), historical takes and any investments planned by the current consent holder going forward.

Third party impact on water rights and value

One of the important issues of sound water management is the principle of non-derogation of existing consents be taken into account during any new allocation decisions.

At least five particular issues are important in respect to the impact of third parties on existing consents which need to be managed. They are introduced below and then explored in greater detail in subsections 'a' through 'e'. They are documented in no particular order as each is important in its own right.

The first issue concerns the potential impact of a significant and rapid expansion in water use in particular areas where historically, water consumption has been relatively low. For example, land use changes associated with an increase in dairying is a case in point for particular regions e.g. Southland. Such changes can be exacerbated by the complexity associated with aquifers and rivers when trying to determine, with reasonable accuracy, what water is available for allocation without impacting adversely on current takes or adversely affecting quality.

The second issue relates to changing land use options which may also affect water availability.

The third issue arises where increased effluent or runoff impacts on quality (value) for existing consent users who use water for alternative purposes (e.g. for drinking water). Here the degradation of consents is an increasingly important issue particularly in respect to water quality.

Fourth is the issue of water diversion which may impact on down-stream users (e.g. as a result of diverting water to a storage facility etc).

The fifth issue involves the potential effect of a trade in water permits from one allocation to another which could impact on the water availability to existing holders. Moreover, if allocated water moves from non-consumptive to consumptive uses, this could impact both on the quantity and quality of water supplied to down-stream users.

(a) Increased water allocation in water constrained areas

The rapid expansion historically of water use, in particular areas where water consumption has been relatively low, can present difficulties to those responsible for determining water allocation (currently regional councils under the RMA). This can be particularly problematic where there are many aquifers and rivers, making it hard to determine, with reasonable accuracy, what water is available.

A key problem, in the absence of sound data, is determining the potential impact of new allocations on existing allocations to ensure new allocations do not have an adverse effect on current takes or water quality. An important aspect in this regard is the assimilative capacity of water remaining in-stream.

Notwithstanding the above, the degree of precaution which should be taken will necessarily depend on a whole host of factors, including the likely amount of water available, the amount of water being applied for, climatic factors and any other issues which may be relevant to determining appropriate allocation in a particular catchment.

There is a general requirement under the RMA for regional councils to manage water and other natural and physical resources in a sustainable manner. This implies that existing consent holders will have a degree of certainty over their current allocation.

Clearly, in order to understand and allow for optimal allocation of water within a catchment, knowledge of available water and of the flows and re-charging of that water needs to be as comprehensive as possible. This necessarily requires appropriate funding to determine the amount of water available for use (allocation) and the amount which should be left in-stream for non-use requirements.

Given uncertainty as to the effect of new allocations on current uses, it is crucially important for a relatively precautionary approach to be taken to new consents until judgments based on sound information can be made on the sustainability of current and future resource use.

(b) Impact of changing land use

Changing land use may also have an impact on water availability to existing users and may have nothing at all to do with water consents per se. For example, a change from pastoral farming to forestry can significantly impact on the amount of water flowing into a river and hence the quantity available to down-stream users, and particularly to water permit holders that may be using the water for other purposes e.g. irrigating land for dairying or uses such as hydro-electricity generation.

The RMA provides no compensation to land users as a result of restrictions on land use, although there are avenues for review where a provision or proposed provision would render the land incapable of reasonable use or place an unfair and unreasonable burden on any person with an interest in the land.

The impact of changing land use in catchments approaching full allocation of available water could be dealt with in a number of ways:

(1) water permits could be under-allocated to ensure changing land uses (such as from pastoral to forestry) did not impact adversely on current water permit holders i.e. there would be some water reserve to account for such changes;
(2) restrictions could be placed on land use changes; or
(3) land-owners could be required to obtain a water permit prior to making significant land-use changes impacting adversely on water availability and flows. Similarly they could get water permit credits if they changed land use which significantly impacted on water use and these could be sold on the open market. Obviously a threshold test would be required which would take into account the particular circumstances of catchments, availability of water and the number of water permits issued. It would not be administratively practical to take account of very small land use changes which did not significantly impact of water use.

While there are some advantages and disadvantages associated with all these options, options (1) and (2) have significant deficiencies and should not be considered further.

Option (1) could result in significant under-allocation of water simply to account for the risk that changing land use may deplete reserves. It would also be highly inequitable, allowing landowners to change land use in some cases without having to bear the costs associated with increased water use (e.g. from pastoral farming to large scale forestry), while effectively penalising other land-use options (e.g. from pastoral farming to highly intensive irrigated dairy land for which a water permit is required).

Option (2) is a very blunt instrument and would likely limit the ability of landowners to change their land use options to those with a more highly valued use. It would significantly affect landowners' existing property rights and could well stifle economic growth by locking in current land use activities and preventing the taking into account of changing markets and international demand for new or different products.

Option (3) would see land use changes and water consumption treated in the same way whether they involved increases or decreases in water flows, such as where a land-owner changed from pastoral to forestry or to intensively irrigated dairying. Similarly, if water was used for hydroelectricity generation, or for another land-based industry with significant water use, no activity would be treated differently from any other. This would encourage an efficient allocation of resources over time without impacting adversely on the property rights of land-owners to change their land-use options based on changes in economic conditions.

Option (3) would be similar to the approach taken by government in respect to the greenhouse gas emissions trading scheme; costs are imposed on those increasing emissions and credits are provided to users reducing emissions.

(c) Quality (value) of current water permit holders impacted upon from third party activities

A second issue of concern in some cases is the potential for increased effluent or runoff which may impact on quality (value) for existing consent users. For example, those who use water for alternative purposes (e.g. drinking water or possibly recreational activities e.g. fishing). Degradation of the consents of current consent holders (or possibly recreational users) is an important issue, particularly as there is increasing concern over water quality in some rivers and catchments. However, the issues involved are not necessarily easily addressed and are quite complex.

First, councils often do not require discharge permits for non-point discharges such as fertilizer, animal waste etc. Non-point discharges are normally addressed by administrative tools such as restricting land-based activities. Second, increases in the use of irrigation can improve the intensity of farming systems, resulting in increased effluent run-off over time.

While such activities are generally permitted and have resulted in significant productivity gains for the agricultural sector in particular, there are concerns with respect to the impacts on other consent holders.

The answers to the above issues are not easy. Bans or significant controls on discharging non-point pollution would be untenable for land-users as they would similarly affect property rights reducing property values. Solutions must, as much as

possible, involve win-win solutions to ensure particular sectors are not adversely affected and economic growth is not unduly jeopardized.

(d) Impacts of water diversion on water rights

The rights of existing water permit holders may also be adversely affected where consent is given to dam or divert water from its current path. This might, for example, be to increase storage capacity to capture water in times of high flow so as to utilize the water at times when flows may be low. Or it might be to divert water from one area (catchment) to another.

It is possible that increased storage might well improve reliability for down-stream users so it is not necessarily obvious that storage or diversion will always be negative. In many cases the effect for down-stream users will be positive, as it will be also for the environment, if greater control over river flows can enhance use and potentially non-use values.

Where diversion occurs, potential impacts on down-stream users need to be carefully considered in a water catchment framework plan.

Where the impact on down-stream users is likely to be minimal but the benefits to those diverting water for storage or other uses are considerable, it should be possible to compensate for any direct losses to down-stream users. On the other hand, where there are significant benefits to down-stream users, users may be prepared to pay some of the costs associated with building storage facilities and the like. Such issues, and how to address them will vary from region to region and therefore are likely to be best dealt with on a case by case basis.

(e) Trade of water permits to a different location and subsequent changes in use

While the RMA does provide for the transfer of water permits between different users within the same catchment (either upstream or downstream) subject to certain conditions, it is possible that transfers could affect other existing permit holders, for two reasons.

A transfer of permits upstream may result in a greater proportion of total water being appropriated at the upstream point. This, depending on the amount of water involved, could well reduce in-stream flows between the new and old extraction or return points. If water carries certain pollutants, reduced in-stream flows might well result in higher pollution concentration and a lower quality of water for intermediate users.

Abstraction of ground water may affect surface flows and abstraction of surface water may reduce the recharge of groundwater supplies in ways that vary according to location.

While the RMA requires the effects of any proposed transfer of consents to be considered, there is potential for the rights of existing users to be affected by water permit transfers. This is not to say that the transfer of water permits should not

occur, but that transfer issues need to be considered in the context of specific catchments and their unique circumstances, given different sources of water and the sometimes complex interactions between variable sources.

A further issue relates to transfers of water permits within the same catchment which may be from mainly non-consumptive uses to consumptive uses where any transfer of permit will impact on actual availability of water for other users.

A possible option to minimise risks associated with the above would be to restrict the areas where trade in permits can occur (e.g. to specific parts of a river for example). However, on the downside, unless clearly based on scientific evidence, this could seriously restrict the ability of parties to trade permits so that they flow to their highest valued uses over time.

As part of good catchment management planning, there should, in general, be a requirement to ensure transfers take account of the total amount of water allocated for consumptive use as opposed to non-consumptive use, where most if not all the water used is returned to the catchment downstream for effective reuse.

APPENDIX 1

A CASE STUDY - TRANSFERABLE FISHING QUOTA

In some countries tradeable rights have extended to fishing quotas and to air and land emissions (where a property right provides an entitlement to pollute air or land).

In New Zealand's case, tradeable fishing quotas have been operating since the mid-1980s. In simple terms, such a framework imposes a cap on the total amount of fish that may be caught (total allowable catch – TAC), and allocates quotas to fishers up to that cap. The quotas are tradeable therefore encouraging efficiency, while preventing exploitation of the fishery resource by imposing a clearly defined limit.

Individual Transferable Quotas (ITQs) were originally allocated by volume, and fishers were given rights to annual tonnage, in perpetuity. Given fluctuating fish numbers (stocks) and concerns over potential over-allocation (over-fishing), the rights were changed to a proportion of the total allowable commercial catch (TACC).

Fishers may lease their allowable catch to other fishers (for a set period of time – say one year) or permanently sell their right to another fisher, resulting in the transfer in perpetuity of a valuable property right. Trading between fishers is generally instigated through brokers. In order for the system to operate effectively, fishers must keep very detailed data and records of their catch to ensure active monitoring by the authorities. There is robust enforcement and there are significant penalties and fines for misuse of the quota and for making false or misleading statements.

Before the implementation of ITQs, fishing was controlled by various forms of regulation (such as vessel numbers) with varying degrees of success. Over-fishing was common while over-investment in capital equipment reduced efficiencies and increased costs.

ITQs result in catches being dependent on fishing zones and particular fish species, in many ways consistent with a water allocation regime applying in a particular catchment area.

The benefit of tradeable rights is that they remove the need for administrative mechanisms (which often result in suboptimal outcomes) and therefore should encourage efficient resource use over time.

Fish stock may be allocated to recreational, customary (Maori) and other non-commercial fishing uses. In terms of original allocations to fishers, in general ITQs were allocated (effectively grandparented) to fishers on the basis of historical catch, using the fisher's average catch over the previous 2-3 years.

In summary, the assessment of the NZ tradeable fishing quota is generally positive with a widely held belief that efficiencies have increased substantially and that it is a much better means of allocating rights than more traditional command and control mechanisms.

There is little to suggest that the same benefits could not apply in respect to the allocation and trading of water rights in NZ. Obviously water raises some of the same issues which affect fisheries, for example, variation in quantities available (perhaps weather dependent). This means that rather than absolute allocations, it may also be necessary to provide for variations in water availability through a proportion of total allocation available approach, as now applies in respect to fisheries management.