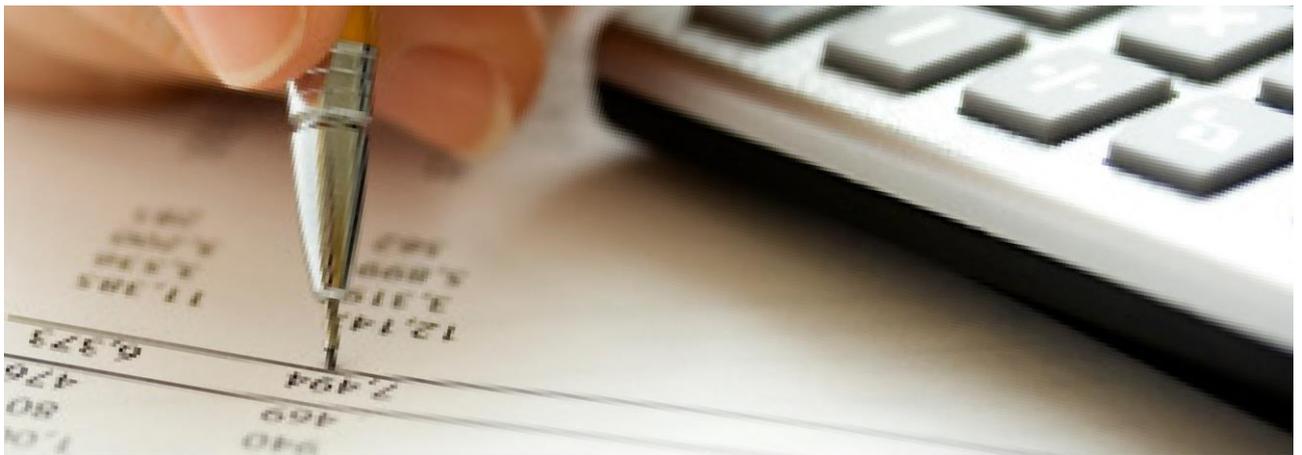

Report prepared for the Iwi Advisors Group

The costs and benefits of an allocation of freshwater to iwi

Kieran Murray, Marcus Sin, Sally Wyatt

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About the Authors

Kieran Murray provides expert evidence, testimony and reports in the fields of public-policy, competition analysis and regulation, including market design. He has served as an economic consultant on these matters for public agencies and private companies in Australia, Canada, New Zealand, Philippines, Tonga, Singapore, Vietnam and the United States. Kieran is a Managing Director and co-founder of Sapere Research Group. He is a lay member of the New Zealand High Court and serves as an International Arbitrator for the PNG Independent Consumer and Competition Commission.

Marcus Sin has energy sector background with experience in derivatives and carbon markets, transaction advisory, strategy and regulation projects with various entities in New Zealand, Australia and the Asia-Pacific region. Marcus holds a Bachelor of Commerce (1st Class Honours) degree specialising in Economics and Finance from The University of Auckland.

Sally Wyatt applies principles from the field of law and economics to provide practical solutions to complex regulatory problems. As a consultant economist, she has worked across a range of topics in the fields of public-policy, competition analysis and regulation. Particular areas of focus include electricity market design and regulation, natural resource regulation, complex asset valuations (in particular, valuations of fresh and coastal water and valuations of network infrastructure). Sally holds a European Masters of Law and Economics from the Università di Bologna and Université de Paul Cézanne, Aix Marseille III, and a LLB and BCA from Victoria University. She is a member of the Law and Economics Association of New Zealand and Water New Zealand.

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For information on this report please contact:

Name:	Kieran Murray
Telephone:	+64 4 915 7592
Mobile:	+64 21 245 1061
Email:	kmurray@srgexpert.com

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Executive summary

Iwi are proceeding to resolve with the Crown how iwi proprietary rights in freshwater might be recognized. One avenue being explored by iwi is a nationwide recognition of iwi interests in the form of an equitable, permanent, share of water allocated for commercial use.

This report examines the direct and indirect benefits involved in furnishing to iwi a share of the allocable quantum of fresh water, and in doing so, shifting the allocation system from the current resource consent regime to a rights-based regime.

A permanent allocation of water to iwi would not be the first time a mechanism has been considered that simultaneously recognises the commercial value of a natural resource to iwi and a societal need for more clarity around interests in that resource. For example, the Quota Management System in the 1990s was used to recognise iwi proprietary rights in fisheries and to revolutionise the management of the fishery resource for the benefit of New Zealand.

We have found that a rights based regime offers strong economic advantages over a consents based regime.

For an estimated cost of \$40 - \$52 million to transition to the new regime, plus an annual cost of no more than \$30 million (which could be levied on those that use the resource rather than ratepayers), we might expect the following benefits:

1. **Better 'pricing' of water:** The benefit of better pricing is more efficient decisions by resource owners (including iwi) due to a far higher degree of transparency about what the water is worth, and an easier 'path to market'. For the government, the benefit of better pricing is the potential to levy resource taxes on rents earned from use of the resource.
2. **Awaken sleeper consents:** Sleeper consents are those that are allocated, but often remain unused. Having better defined rights will mean that water allocations are more easily able to be transferred, leased, divided or shared. We estimate a benefit of \$370 million if 5% of the un-used consented portion ('sleeper share') is re-allocated to higher value uses.
3. **Less costly droughts:** Easier transfer and trade benefits an economy in times of shortage or drought. We estimate a benefit of \$500 - \$630 million if a drought of the magnitude of \$1.5 billion (as estimated by Treasury in 2013) hits New Zealand. This estimate assumes that transfer and trade lessens the impact of New Zealand drought in similar ways to that seen in the Murray Darling basin.
4. **Reduced cost of resolving over-allocated catchments:** The Australian experience illuminates that greater security of water rights and allowing trades of these rights substantially reduces the economic costs of reducing over allocations of water. In a report by Peterson et al (2005), the long run effects of moving from no trade to intra- and interregional trade together was estimated to more than halve the impact of the reductions in water on the gross regional product (GRP) of the southern Murray-Darling Basin.

5. **Reduced costs of conflicts:** Under the status quo, there is a general uncertainty regarding the definition of individual rights for water. This causes many stakeholders to engage in costly disputes to settle conflicts in ownership of water rights. We might expect to see substantial savings on processes like the Waikato Variation 6 (\$3.7 million, 3 years) and the Rakaia Selwyn Groundwater Zone (\$2.5 million, 2 years).
6. **Improved capital formation:** Existing consents for water are subject to various uncertainties and risks which impede investment; consent terms are not standardised and cannot be easily compared, and vary from region to region and from consent to consent, and might not be renewed. Consents are therefore difficult to use as collateral for credit, and hence can less easily be used to produce additional value – for example, for the creation of securities which support capital raising and investment. The economic impairment will be substantial as the economic value of water to New Zealand is estimated by the Ministry of the Environment at \$34.85 billion per annum.

These results are not all additive - there may be overlapping benefits in the estimated impacts. However, all of these benefits will contribute to improved economic performance, especially in the primary production, energy generation, and water intensive industry sectors.

Existing holders of freshwater consents could expect substantial increases in the financial value of the consents they hold as the gains from reduced uncertainty and improved opportunities to realise the benefit of the right to the resource are capitalised into asset prices. The empirical evidence from greater certainty of rights over resources in other sectors in New Zealand, and over water in other jurisdictions, found increases in the financial value of the right of 20% to 70%, or higher.

One estimate found the settlement of iwi rights to fishery quota increased the value of quota by about 45% through removing residual uncertainty from the entitlement to fish. A similar gain in the value of water assets to the primary sector would translate into a gain of \$5.5 billion, and \$2 billion to the electricity generation sector.

These results are not the final word; they are the beginning of a conversation. The estimates represent a credible first approximation of the magnitude of benefits to New Zealand, and to existing consent holders, from recognizing iwi ownership of water through a rights based regime.

1. An economic assessment

1.1 Introduction

This report presents an economic assessment of the value (benefits and costs) of a permanent allocation of freshwater to iwi in New Zealand.

Iwi, through representative groups like the Iwi Leaders Group, are proceeding to resolve with the Crown how iwi proprietary rights in freshwater might be recognised.¹ The Waitangi Tribunal 2358 report, released on 24 August 2012, summarised the historical legal position of iwi in relation to their rights in freshwater, finding that Maori had “...Treaty rights of a residual proprietary nature.”

One avenue being explored by iwi is a nationwide recognition of iwi interests in the form of an equitable, permanent, share of water allocated for commercial use. A permanent allocation of water to iwi would not be the first time a mechanism has been considered that simultaneously recognises the commercial value of a natural resource to iwi and a societal need for more clarity around interests in that resource. For example, the Quota Management System in the 1990s was used to recognise iwi proprietary rights in fisheries and to revolutionise the management of the fishery resource for the benefit of New Zealand.²

Like the Quota Management System, the iwi share of freshwater would be defined as a proportion of the commercially available ‘allocable quantum’. The iwi allocation would be distinct from iwi interests in water left in situ, which are largely non-commercial interests.

A diagram showing the iwi allocation in the context of Maori values around water – Nga Matapono ki te Wai - is appended as Appendix 1.

1.2 Scope and approach

The Iwi Leaders Group are exploring how an iwi share might be realised in practice. This work involves considering the institutional and legal frameworks for freshwater management and control in New Zealand. Two possibilities emerge: a ‘rights based regime’ in which

¹ The Freshwater Iwi Leaders Group was formed in 2007 to advance the interests of all iwi in relation to fresh water through direct engagement with the Crown. The Freshwater Iwi Leaders Group comprises the leaders of Ngai Tahu, Whanganui, Waikato-Tainui, Te Arawa and Tuwharetoa and reports regularly to all iwi through the national Iwi Chairs Forum. The ILG constituted the Iwi Advisors Group to work alongside Crown officials and participants of the Land and Water Forum (the LaWF) to articulate the nature and extent of the relationship between iwi and freshwater. The IAG is also considering how iwi settlement objectives could be accommodated in new approaches to water management.

² The land tenure review for South Island high country farms provides a (non-iwi) example where societal interests in environmental values are resolved alongside more certain rights in productive farm land.

institutional and legal change will be required,³ and a regime which utilizes the institutional settings for fresh water currently ('the status quo').

This report examines the direct and indirect benefits involved in furnishing a share of allocable quantum of fresh water to iwi, and in doing so, shifting the allocation system from the current resource consent regime to a rights-based regime.

We have applied an 'economic lens'. Samuelson and Nordhaus perhaps best defined economics when they said:⁴

"Economics is the study of how societies use scarce resources to produce valuable commodities and distribute them among different people."

The allocation of resources may take place through markets or through administrative processes. Economic analysis is largely focused on markets, where exchange takes place between buyers and sellers and is guided by prices. More recently the volume of economic analysis of administrative decision frameworks such as the Resource Management Act has grown.

The tools of economics allow us to evaluate the efficiency impacts of an iwi allocation under different institutional settings. In economics, institutions are defined as systems of established and prevalent rules that structure social interactions.⁵ The evaluation of intrinsic values (such as fairness) is outside the scope of this paper.

³ For example, there would need to be legislative change to allow for in rem property rights to be held in water. Regional plans would also require amendment and review in line with the legislative change.

⁴ Samuelson P A and Nordhaus W D (1989) "*Economics*." 13th Ed. McGraw-Hill: New York, Page 5.

⁵ Language, money, law, systems of weights and measures, table manners, and firms (and other organizations) are thus all institutions. See Hodgson G M (2006) "*What Are Institutions?*" Journal Of Economic Issues, Vol. XL No. 1 March 2006.

2. Recognising iwi interests in water and economic performance

2.1 A ‘rights based regime’

Iwi are seeking recognition of their “residual proprietary rights” in fresh water, and are seeking this recognition alongside other changes to fresh water management being sought by the Land and Water Forum. As the Forum noted:

“An important influence on transition will be the resolution of iwi rights and interests in freshwater.”⁶

We understand iwi are seeking an equitable share of the available allocable water quantity;⁷ this share would recognise iwi commercial interests in water. The iwi allocation would be distinct from iwi interests in water left in situ, an interest which is largely non-commercial.

A ‘rights-based’ allocation of freshwater to iwi would transform the pre-existing property rights and interests of iwi into a form which is recognised easily in modern New Zealand law. This translation of rights is important because recognising the rights in a standard form makes the right more easily understood and applied in economic activity. Appendix 2 summarises what a property ‘rights based’ recognition of iwi interests in water might look like relative to the status quo.

The essential difference between the existing consents based regime and a rights based regime is who owns the residual rights of control over the resource.⁸ Under a consent-based system (like the one at present) the consent-holder is given a time-bound use right with no residual right of control. The ability to extract allocated quantities, and the use or transfer of allocated water, is determined using an administrative decision-making process.

In contrast, under a rights-based system the ability to extract, use and transfer a resource is determined by the owner, except where expressly restricted by law. In economics, a property right refers to the right to use a resource for certain purposes. There is no simple match

⁶ Land and Water Forum, 2012, p 55.

⁷ Iwi also seek to have their interest in water quality recognised; this report focus on an allocation to recognise interests in water quantity. There are linkages between water quantity and water quality which are not discussed in this report as this discussion would add complexity but not alter the key findings.

⁸ The ‘residual right of control’ is the ability to determine what happens with the resource, for example, how it can be divided, sold, used or added to other resources. It is a critical feature of what legal analysts term an ‘in rem’ property right. The ‘residual right of control’ feature of property is regarded as critically important by modern economists. The importance of this feature of property to economic development, for example, has received renewed emphasis by authors concerned with explaining the lacklustre economic performance of many post-socialist and developing countries. Advanced economies, without exception, have secure, enforceable property rights over a vast range of resources. The origins of property are the subject of many a political treatise, but the common view amongst them is that societies create property (and the government that enforces it) as a legal right to discourage theft, encourage production, and reduce the costs of protecting goods.

between the term property right, as used in economics (and in this paper), and the concept of ownership as it is used in popular language. For an economist, the quality of a property right is determined by the nature of the right (exclusivity, duration), ownership limits (minimum or maximum quantities) and limits over transfers (divisibility, restrictions on sale, leasing options).

Because property rights create duties that attach to everybody else (including the Crown), they provide a basis of security that permits people to develop resources and plan for the future.⁹ In general terms a property right is secure when the right holder perceives it to be stable and predictable over time and protected from expropriation or arbitrary change. Security typically implies the ability to appropriate benefits arising from a particular right.

It is likely that a separate set of water rights for iwi would in turn trigger the need to provide broadly equivalent rights to other users in the same catchments.¹⁰ If the iwi allocation remained in customary ownership, where rights and duties were less clear, it would be difficult for people to understand where they stood in relation to each other. Resolving rights for all users would lower transactions costs for those who have duties in relation to water. For example, potential users of water would have resort to the common law of property when entering into lease arrangements with iwi involving water or with other holders of entitlements to water.

Having clarity over *everyone's* water rights, not just iwi, is essential to achieving better outcomes from the management of freshwater resources¹¹ This is why resolving iwi claims with property rights is likely to mean resolving rights for all water users.¹²

A 'rights based system' would involve a degree of unbundling of water rights. For example, in Australia historically most states and territories aggregated individual rights into a single right including land property title, water access entitlement, water allocations, water use rights, delivery rights, irrigation rights and works approvals. Appendix 3 summarises how rights have been unbundled in Australia.

A system in which water entitlements can be traded independently of land is known as unbundling. An unbundled water instrument has only one water right. To achieve efficient market-based trade - the theory suggests - the rules and institutions need to support two factors: high quality property rights and low transactions costs (Coase, 1960).

⁹ Kieran Murray, Sally Wyatt and Douglas Birnie, *Economic Analysis of a Permanent Allocation to Iwi*, report to the Iwi Advisory Group, October 2012

¹⁰ While some aspects of recognizing iwi rights in fresh water might be distinct, the methods of measuring rights in volumetric and quality terms in each water catchment would need to be the same for all water rights in each river catchment.

¹¹ The history of the fishing sector illustrates how important resolution of iwi interest is prior to wider changes being introduced. In New Zealand, the introduction of the QMS assumed that there would be no effect on Maori fishing claims, which were established in the Treaty of Waitangi. But subsequent claims and reports by the Waitangi Tribunal disputed this, leading to a significant and lengthy settlement process between Maori and the Crown. This process delayed the introduction of species into the QMS.

¹² By analogy, development of a sustainable fishery would have been slower and more costly under a system where iwi obtained quota with perpetual rights and all other fishers were required to obtain resource consents with limited terms and potentially varying conditions.

2.2 Economic benefits from more secure interests in water

Existing consents are subject to various uncertainties and risks including:

- uncertainty around the boundaries of the right holder relative to upstream and downstream users of the same water resource; this uncertainty arises because consent terms are not standardised and cannot be easily compared, and vary from region to region and from consent to consent
- uncertainty about whether the rights will be re-granted when consents expire at the end of their term (maximum of 30 years, but often less)
- uncertainty as to the approach the government or regional council may take, how it might interpret its mandate, how it will weigh its objectives in deciding whether to recommend law or Regional Plan changes, and how that approach might change in response to events or over time as new representatives are appointed¹³
- uncertainty as to how the current and future Ministers may respond to the weight of public opinion when policies are set, how the powers residing with the Minister might be used to recommend laws, National Policy Statements and other tools of freshwater management.

These uncertainties cause real costs on all stakeholders in water, including councils, water permit holders and their communities. A rights based regime could be expected to convert an uncertain right into one with greater certainty.

Economic literature and applied studies identify four main aspects of how secure property rights affect economic activity:¹⁴

- facilitating gains from trade - a productive economy requires that resources are used by those who can use the resource most productively; improvements in property rights enable a resource to shift to its highest value use (for example, via a rental market)
- insecure property rights lead to costs as individuals defend their access to the resource or seek to gain access; these costs of conflict are, from the economic point of view, unproductive
- insecure property rights increase the risk that investors may fail to realize the fruits of their investment and efforts and hence deter economic growth
- secure property rights support other transactions; modern market economies rely on collateral to support a variety of financial market transactions and rights to resources increase productivity by enhancing such possibilities.

¹³ Arguably, the consent regime heightens insecurities because discussions concerning environmental issues are bundled with discussions about who-owns-rights. Having greater clarity around rights would focus attention on environmental management and simplify the economic tools for dealing with environmental damage.

¹⁴ For a detailed discussion see De Soto, H. (1989). *The other path: The economic answer to terrorism*. New York: Basic Books, pages 158 – 163.

Economic theory would predict that a law change which allows for: a) a clearer definition of rights to fresh water; and b) a corresponding change in the institutions that surround the transfer of water, will – in most cases - help to facilitate a greater volume of transfers; that is a shift of water from lower to higher value use. It will be easier to separate and re-allocate rights if the unit of property is unbundled, divisible, recognizable and has permanent duration rather than time-bound. These transfers would be in the form of trades, short and long-term leases, and other types of private re-allocation arrangements.

A shift of water from low value to high value use would create net benefits (gains from trade) for not only for those who re-allocate the water between themselves but for the economy in general. This theory has been put into practice in other countries, and we touch on that experience in this report.

Under the status quo, there is a general uncertainty regarding the definition of individual rights for water. This causes many stakeholders to engage in costly disputes to settle conflicts in ownership of water rights. With clear and more certain rights, users of water would expend less resources on achieving clarification of rights or on defending rights.¹⁵

Uncertainty is particularly important given the nature of much infrastructure that is required to use water. Water pipelines, irrigation schemes and hydro dams tend to be very expensive long-life capital assets that often exhibit “sunk” characteristics once built (that is, it is not possible to shift them to another location or use them for other purposes). Firms and individuals making these investments must incur substantial certain costs in return for uncertain future benefits. The nature of rights around the use of water is critical to mitigating some of the risks associated with such investments.

Consent terms vary, and are subject to a high degree of discretion from local and central government decision-makers. Consent terms are not standardised and cannot be easily compared and are therefore difficult to use as collateral for credit. Modern market economies rely on collateral in supporting other transactions, and hence less certain rights impede capital formation.

In summary, a rights based allocation to iwi appears to offer considerable advantages. The Crown has acknowledged that iwi proprietary interests in water exist, but views those rights as uncertain in nature. Stakeholders are less able to make plans in relation to water than they would be if Maori rights, and their own rights, were clearly defined and transparent.

In the sections that follow we estimate the magnitude of benefits to New Zealand, and to existing consent holders, from recognizing iwi ownership of water through a rights based regime.

¹⁵ For example, defending an allocation in the event that the Regional Council cancels or lapses a consent or reviews the conditions attached to it. Regional Councils are subject to the requirements of the RMA, and therefore they can only lapse or cancel a consent in certain situations (as specified in Sections 125 and 126 of the RMA). Section 125 essentially says that you have five years (or such shorter or longer term that is specified in the consent) to start using the water permit, or it “lapses” (i.e. can no longer be used). The amount of water you take can only be reduced by a Regional Council initiated review of consent conditions in the circumstances defined in Section 128 of the RMA (such as when a regional plan becomes operative, or when adverse effects are occurring, or as provided for in the consent conditions).

3. Quantifying the benefits of a rights regime

3.1 Property rights affect economic activity

In this section we outline and quantify how resolving iwi rights to fresh water will contribute to improved economic performance under the following broad categories:

- helping ensure water moves to its highest value use by:
 - ‘pricing’ water
 - awakening sleeper consents
 - working better in times of drought
 - reduce the cost of resolving over-allocations
- reducing the costs of conflicts (an unproductive use of resources) allowing more resources to shift to productive uses
- improving capital formation and investment incentives.

3.2 Enabling water to move to highest value use

3.2.1 New Zealand’s allocation systems could be improved

While transfer of fresh water consents is allowed in New Zealand,¹⁶ and there is widespread acknowledgement of the potential benefits of trade, very little of it occurs under current settings.¹⁷ The Land and Water Forum found that an ability to more easily transfer and trade water would improve New Zealand’s current systems for water management. It found that improved mechanisms for transfer and trade would help to manage demand, reduce contamination and maximise the value of water for the economy.¹⁸

The text box below summarises the Land and Water Forum’s findings on allocation.

¹⁶ Section 136 of the Resource Management Act 1991 (RMA) allows a holder of a permit to take water to apply to the relevant Regional Council to transfer the whole or any part of their interest in the permit. There are conditions attached to who the transfer may be made to (for example it has to be within the same catchment or aquifer), and the Regional Council has to approve the transfer.

¹⁷ Entities like HydroTrader have developed to help facilitate these transfers. Only very few transfers are undertaken, however. For example, in its seven years of operation, HydroTrader has only seen 49 transfers – all in the Canterbury region. In the Southland region, the region with the highest annual consented volumes and volumes of actual use, only minimal transfers have been made in the last decade.

¹⁸ Their findings were summarised in the Phase 1 and 3 reports (April 2011 and November 2012, respectively).

The Land and Water Forum on transfer and trade

Source: Land and Water Forum, 2012. Third Report of the Land and Water Forum: Managing Water Quality and Allocating Water, p13

“In some catchments, the ability to transfer and trade authorisations to take water and to discharge contaminants could make a contribution to improving the dynamic efficiency of the freshwater management regime. This is particularly likely to be the case in those catchments where water takes come predominately from groundwater sources, where infrastructure is in place or is feasible to develop and where contaminant discharges are easily identifiable and attributable. Enabling dynamic transactions of this kind may help drive water use efficiency and improvements in land-management practices, and may be a key mechanism for allowing fresh water to move its highest valued use over time – including by providing opportunities for new participants to enter the water economy.

By making it easier for individuals and enterprises to transfer and trade freshwater-related consents, we will be opening opportunities for markets to emerge. Markets of this kind could facilitate entrepreneurial decision-making at the individual and enterprise level. This will be more straightforward in the context of allocating water quantity than it is in the context of managing water quality.

That is not to say that facilitating the transfer and trade of consents to take water and to discharge contaminants will be a silver bullet. The capacity and characteristics of markets will be highly dependent on local conditions, public perceptions and the spatial and geographical characteristics of the catchment. These factors vary from catchment to catchment and will need to be taken into account in the catchment planning process – markets will not emerge everywhere. The type of market that might emerge is voluntary, catchment-based, subject to national and catchment planning and subject to physical and environmental limitations.

There are some concerns that a regime that supports the transfer and trading of authorisations could have unintended consequences. We have discussed anxieties regarding the potential emergence of so-called “water barons” or “nutrient barons” – people who amass authorization in excess of what they need to provide for their activities in order to trade and profit from them.

[The Forum] have also discussed the risk that the emergence of markets in freshwater-related consents could make local users of water vulnerable to the influence of “out-of-catchment” capital investment.

The general statutory framework, including the Overseas Investment Act and Commerce Act, is designed to protect against these risks. In addition, successive governments have shown a willingness to put in place specific regimes in a number of sectors where there is a need to actively ensure that markets operate fairly and effectively, and are free from abuse or anticompetitive behaviour (e.g. electricity, telecommunications and fisheries).”

Economic theory suggests that transfer and trade is seldom something that happens on its own. One cannot wish it into existence. For a start, there is a need for adequate market conditions. That is, demand for water and supply of it. Then, there needs to be well functioning rules and institutions which would result from recognizing rights, not just for iwi but for other uses.

3.2.2 A rights regime prices water

Greater activity in the transfer and trade of water rights and resources would “price” water in a “market”.¹⁹ Driven by market demand and supply dynamics, these market prices reflect the wholesale water price, the cost of transport and economic ‘rents’.

Under existing arrangements there are no pricing mechanisms to determine the commercial value²⁰ of water; its value is hidden. Hidden prices prevent the discovery of the most productive use of that water resource, and may even encourage wasteful hoarding of water entitlements since many holders of these rights do not know the true value of what they own.

Because users do not know the true cost of production there is no incentive to find alternative methods to use water more efficiently. When a price for water is discovered under the transfer and trade regime, users are able to determine, more accurately, their economic cost of production and also the economic value of any new technologies to use water resources more efficiently (e.g., water metering equipment etc.).

An advantage of pricing water is that it encourages parties holding water assets to keep accurate information about what they have and how it is used. At the moment, there is little policy-relevant empirical information about water and its use (NZIER, 2014). The extent of fully or over-allocated catchments suggest that the RMA process has struggled to manage this information. An important area of uncertainty is the interconnectedness of surface water and groundwater, and the interactions of different groundwater resources or aquifers. The highly sophisticated information systems utilised by the gas, petroleum and mining industries suggests that a profit motive gives a strong incentive to invest in accurate knowledge.

Efficiency gains in the use of water translate into significant economic benefits. The Ministry for the Environment estimates that a 1% increase in the availability of water (through improved efficiency) would result in an economic benefit to New Zealand of \$389 million per annum.²¹

Recognizing rights and prices allows for levying resource taxes. A property right to water is recognition that the water has value and is, in economist-speak, earning the owner ‘rents’. Rents can be taxed and thus can provide an additional source of revenue for local and central governments to support their initiatives. For example, taxes can be used to fund restoration

¹⁹ A national, highly competitive, water market is not a likely outcome. This is because water is location-specific: water users are not easily able to consume water resources located outside their area (water is heavy to transport). Over time, in larger zones with very high demand you might see the emergence of more traditional ‘market’ structures and market specialisation – water market operators, wholesalers, major water users and resellers, small water users. But in most zones it is likely that only in periods of scarcity there will be a degree of voluntary reallocation among users. So in most zones one would not observe traditional ‘market’ structures but instead informal networks of people participating in trades at certain times of the year or under certain trigger conditions.

²⁰ See the diagram Te Mana o te Wai in Appendix 1. A core assumption is that reallocations would only operate between rights holders who own part of the ‘allocable quantum’. This is the commercially available share of water.

²¹ See <http://mfe.govt.nz/rma/central/nps/regulatory-impact-statement.html>

or regional policy processes.²² NZIER estimate that a tax of 1 cent per cubic metre of water allocated would raise \$39 million in revenue.²³

3.2.3 A rights regime will awaken sleeper consents

Under existing arrangements there is limited incentive for parties with entitlements to water to re-allocate water to other parties, as most water is not priced and the RMA process imposes high transaction costs. The high application costs:

- mean that improvements need to be large to make an application worthwhile
- create incentives for large transfers, which spread the fixed costs over a larger base, rather than smaller, potentially more innovative (high value) applications.

In a rights-based regime small volumes of water are more likely to be traded, and therefore to be allocated through a demand and supply dynamic which determines the most productive use of that water at the particular time.

This effect is clearly evident in other jurisdictions, most notably, in Australia:

“Previous studies have provided some evidence of activation and trade in sleeper and dozer licences. In the interstate trade pilot project, 99% of the 9.5 GL of water traded was previously not being used by sellers (Young et al. 2000). In an assessment from 2004, sleeper and dozer licences represented 50% of sales in northern Victoria (Alankarage 2004). Similar results were [also] reported by Bjornlund and McKay (2000).”²⁴

The economic gains that can be achieved through the transfer of water rights from low value to high value uses are likely to be very substantial in the New Zealand environment due to the large volumes of currently unused water allocations that can be observed across different regions. Figure 1 shows estimated water use as a percentage of consented volumes:²⁵

²² The use of taxes on water ‘rents’ to fund New Zealand’s long term water resource management and restoration needs would also appear to be a very good fit with a government that is seeking to:

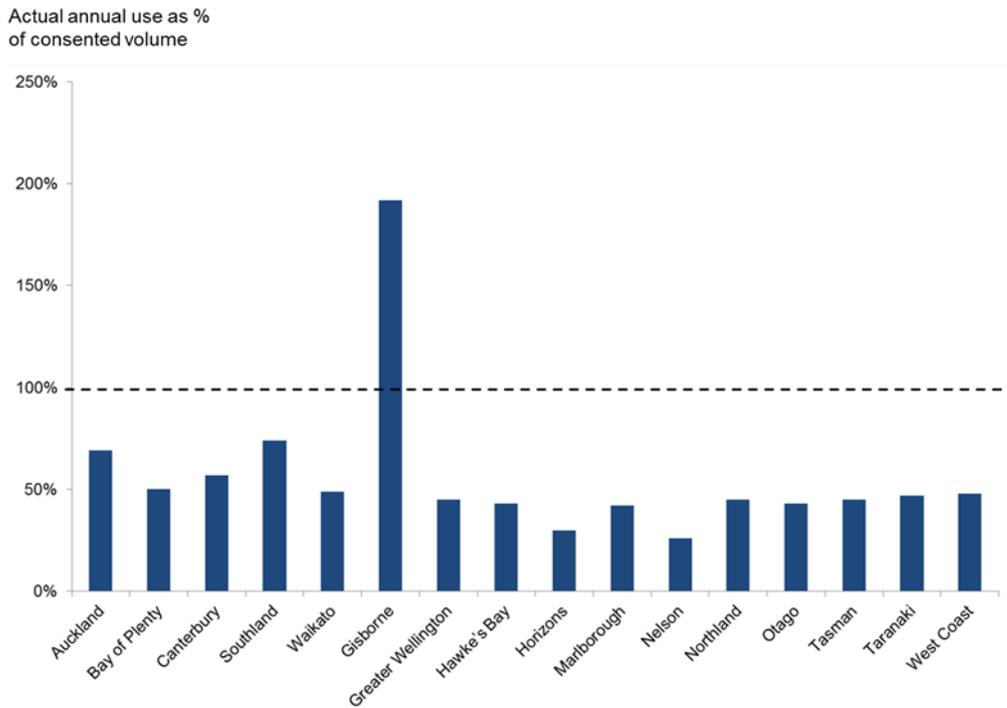
- ease fiscal constraints using politically palatable taxes (pricing water is more likely to be widely accepted if the rents for its use are applied to restoring the health and well-being of water bodies, at the same time reducing pressures on landowners and local authorities to fund this entirely from local resources);
- harmonise good environmental management and economic growth, using market mechanisms;
- raise revenue from assets which are not internationally mobile.

²³ NZIER, 2014, Implications of party policies on water regulation, Report to Federated Farmers, September 2014. Available at <http://www.fedfarm.org.nz>

²⁴ Australian Government, National Water Commission, “Impacts of water trading in the Southern Murray–Darling Basin between 2006–07 and 2010–11”, 2012.

²⁵ Report prepared by Aqualinc Research Limited for the Ministry for the Environment, “Snapshot of Water Allocation in New Zealand”, November 2006.

Figure 1: Annual water use by region (2010)



Source: Sapere Research Group

If only five per cent of the current water allocation were transferred from unproductive uses to higher value uses, we would expect an additional economic benefit of approximately \$370 million, assuming that the proportions of water being used by each sector remains constant (i.e., irrigation, domestic, industrial and stock use).

To calculate this figure we have estimated a weighted-average price for water of \$0.27 per cubic metre based on a total annual allocation of consumptive water of 26.9 billion cubic metres.²⁶ Our weighted average price is based on the individual prices for each type of water use – irrigation, domestic, industrial and hydro.

Our price estimate for irrigation use is \$0.37 per cubic metre, which is based on the results discussed in MAF (2004) and escalated to current values.²⁷ We adopted the relationship between the irrigation values, and the values for domestic, industrial and stock use discussed in academic literature to establish respective “multipliers” of 1.44, 3.55 and 1.00.²⁸ Applying these “multipliers” against our irrigation price above, we estimate the individual prices of \$0.53, \$1.30 and \$0.37 per cubic metre for domestic, industrial and stock use respectively.

²⁶ Our assumption for total annual allocation of consumptive water is based on results from Aqualinc Research Limited (2010)

²⁷ This MAF ‘national average’ value of water used for irrigation is higher than estimates we have produced elsewhere for specific projects in the Waikato and Canterbury, but lower than values we obtained for the Hawkes Bay (which has a higher mix of irrigation used for horticulture).

²⁸ The domestic and industrial use multipliers that we have used are calculated as an average across the two studies, Aylward et al (2010) and White, Sharp and Kerr (2001)

We have used a constant water price of \$0.05 per cubic metre for water used hydro electricity generation.²⁹

3.2.4 A rights regime will be better in times of drought

Water markets are most valuable when there is scarcity and re-allocations need to be made in a low-cost, quick way. International experience (for example in the Goulbourn and Murray river systems in Australia) has shown that in the absence of scarcity, trading activity remains low:

“When allocations are at 200 percent [of the normal level], trading accounts for only 8 percent or less of water use; this level of trade probably reflects irrigators buying water to benefit from good commodity prices or high demand for their commodities. As scarcity increases, trade accounts for a higher proportion of water use. In the Murray System it went up to about 22 percent when [at the normal level] and up to 36 percent [when allocations fell] to 43 percent during 2007-2008...”

...it is apparent from these data that the allocation market has had a significant impact on irrigators’ ability to cope with risk and scarcity by allowing high-value producers with capital investments in plantings, herds and equipment to protect their investments and stay in business by paying low-value producers not to use their water.”

Source: Hansjurgens, B (ed), (2011) *Permit trading in different applications*, Routledge

The New Zealand situation is different to Australia’s, because of New Zealand’s rainfall patterns. As a result, the degree of scarcity is lower here than in Australia. However, there are a number of catchments around the country that experience drought on a regular basis.

The presence of drought heightens the economic benefits of easier transfer and trade. Drought (or high degrees of scarcity) makes transfer more desirable in two ways:

- it lessens the impacts on farmers from lack of water, because they can access water from others in the market in a more efficient way
- water markets can lessen unnecessary water use or ‘waste’. This is because if a farmer can undertake an investment or activity that can reduce water use at a cost less than the price of water (determined by the water market), this will be done because it will increase the farmer’s net returns. Thus, the higher the price of water in a water market, the greater the number of efficient water use investments and activities (Qureshi et al., 2010).

Under the status quo, there is some ability for farmers to respond to drought conditions by operating in Stream Management Zones, however anecdotal evidence shows that water might take up to four weeks to transfer via the Council allocation process, even for parties that are within the ‘zone’.

²⁹ This estimate is derived from information published in the Waikato Variation 6 hearings for electricity generation from the Waikato river schemes. Estimates derived from other generation schemes, such as the Waitaki, would vary. As with other estimates in this report, the estimate is provided to indicate order of magnitude.

Research done in Australia has highlighted the relationship between drought and the advantages of a regime that allows for easier transfer and trade. This research found a clear linkage between water trading and the impacts of drought. The authors found (using a combination of assumptions about production, irrigation, and economic behaviour) that allowing for intra-regional trade would lessen the impact of drought on the gross regional product of the Southern Murray Darling Basin by 35-42%. A further 22-24% is reduced if inter-regional trade is assumed (Peterson, D., et al. (2004)). While this is clearly a result that is specific to the Southern Murray Darling Basin, the general finding that trade lessens the impact of drought, is equally applicable here.

We have applied the Australian findings to provide an illustration of the potential for easier trade to lessen the impact of drought. Although drought events in New Zealand differ substantially in terms of magnitude and frequency to those experienced in Australia (on average, there is a drought in some part of New Zealand once every 1-2 years), their potential impact on the overall New Zealand economy can be very significant.

The NZ Treasury estimated that in 2013, the adverse impact of a drought situation would reduce real GDP by \$1.5 billion (i.e., a 0.7 % reduction on real GDP).³⁰ This is consistent with historical estimates for the economic impact of drought conditions:³¹

- 2010 – The worst drought in Northland in 60 years occurred when record low rainfall levels were recorded between Nov 2009 and April 2010. Instead of the 748mm which fell during the previous year, only 253 mm fell, leading to parched soils, significantly reduced pasture growth, and decreased farm productivity.
- 2008 – Much of New Zealand encountered very dry conditions at the start of 2008, with the Waikato experiencing its driest January in a century. Severe moisture deficits continued throughout the North Island until April/May, with the estimated cost to agriculture exceeding \$1 billion, and an 11% fall in sheep numbers.
- 2007 – Low rainfall and significant soil moisture deficits persisted throughout summer and autumn with record low rainfall totals occurring in many northern and eastern areas. This resulted in a severe shortage of feed for livestock, and lower than normal spring lambing and beef numbers, costing more than \$500 million.

Applying an estimate of a 35-42% reduction in drought impacts and the Treasury's cost estimate for 2013's drought of \$1.5 billion, the ability to transfer and trade could create between \$500 million and \$630 million of benefit to the economy.

There may be some overlapping benefit with the estimates of the gains from better use of sleeper consents.

³⁰ In 1997/98 and in 2007/09 the New Zealand Ministry for Primary Industries estimated the economic impact of droughts to be about \$1 billion and \$2.85 billion. For these estimates, see <http://www.mpi.govt.nz/environment-natural-resources/climate-change/impacts-and-adapting-to-climate-change>

³¹ See <https://www.niwa.co.nz/natural-hazards/hazards/droughts>

3.2.5 A rights regime will reduce costs associated with over-allocations

The Australian experience illuminates that greater security of water rights and allowing trades of these rights substantially reduces the economic costs of reducing over allocation of water. This reduction in economic cost occurs because the process of reducing an over allocation increases scarcity in much the same way as a drought, but on an ongoing rather than transitory basis. The ability to transfer and trade allows water to move to the highest value use (revealed by market prices) and encourages investment to economise on the use of water – there are strong incentives to invest in reducing water use where the cost of that investment is less than the value of the water.

In a report by Peterson et al (2005), the long run effects of moving from no trade to intra- and interregional trade together was estimated to more than halve the impact of the reductions in water on the gross regional product (GRP) of the southern Murray-Darling Basin.³²

We have not located a regional breakdown of the economic cost of reducing existing over allocations.

3.3 Reduced cost of conflicts

Under the status quo, there is a general uncertainty regarding the definition of individual rights for water. This causes many stakeholders to engage in costly disputes to settle conflicts in ownership of water rights. Recently, a submission from Waikato Regional Council to the Productivity Commission noted that:³³

“Variation 6 (to improve the way water is allocated in the Waikato region) took six years (three years resolving appeals) and cost more than \$3.7 million. These are just WRC costs. Total costs for the regional economy would have been significantly more (perhaps as much again).”

Similarly the Rakaia-Selwyn Groundwater zone hearing for 69 applicants in 2007/8 cost \$2.5 million.³⁴

These are not one-off costs; the costs are ongoing as regional plan reviews (and the appeals and hearings associated with them) are required at least once every 10 years. With 16 regions, there is on average always a review underway.

The costs associated with these conflicts could be avoided under a transfer and trade environment provided that ownership rights, the types of rights traded and processes are

³² Peterson, D., Dwyer, G., Appels, D. and Fry, J. 2005, ‘Water trade in the Southern Murray-Darling Basin’, *The Economic Record*, vol. 81, no. 255, August, pp. S66 – S78.

³³ Waikato Regional Councils. Response to Productivity Commission inquiry into local government regulatory performance <http://www.productivity.govt.nz/sites/default/files/Sub%20045%20-%20Waikato%20Regional%20Council%20-%20Submission.pdf>

³⁴ Unofficial. Source: www.hydrotrader.co.nz

clearly defined and understood by all. In a rights-based regime, there would be a public registry of rights (as there is with other resources like land, natural gas, and so on).

A rights-based regime means that everyone knows where they stand. As noted earlier, the Waitangi Tribunal has acknowledged the presence of unextinguished rights iwi hold in freshwater. The practical implications of these rights are not yet fully appreciated: not by Maori, nor by other water users. Resolving historical grievances in relation to a resource can conflict with the desires of others to obtain consents for the resource on reasonable and commercial terms. Similarly, conflicting commercial interests can obscure statutory consultation processes.³⁵ This means that processes that involve the allocation of water between parties or major consenting decisions on water are drawn-out and strained. Resolving the property rights issue would remove some of the conflict.

The best example of this is what has come to pass in the fisheries industry. At the start of the QMS, Maori fishing claims dominated and made further development of the system difficult.³⁶ The allocation of commercial assets to individual iwi saw not only the number of disputes over fishing rights fall away but also the development of a large Maori industry (Maori control up to 37% of New Zealand's domestic fishing quota, and have fisheries assets worth an estimated \$700 million).³⁷

3.4 Improved capital formation and incentives to invest

Existing consents for water are subject to various uncertainties and risks, as described earlier. These uncertainties impede investment and capital formation.

Businesses that are subject to uncertainty and risks will take steps to protect themselves. If the uncertainty is temporary (for example, because the regulatory structure is new), investors will likely wait until the uncertainty has been resolved or reduced before making an investment decision. If the uncertainty is inherent in the regulatory framework, investors will require higher rates of return (higher hurdle rates) for the investments that they do make. As a result, investment would be below the socially optimal level. Sustained underinvestment would imply higher costs in the future and/or potentially capacity constraints and other symptoms of a deterioration in service levels.

Industries characterised by large irreversible investments, such as the electricity generation, irrigation, and water intensive industry, are particularly susceptible to uncertainties because,

³⁵ For example, the case of *Waikato Tainui Te Kaubanganni Inc v Hamilton City Council* [2010] NZRMA 285 describes a situation in which the Council had both a statutory obligation to consult and commercial concerns about revealing information to Waikato Tainui ahead of public notification.

³⁶ Lock, K and Leslie, S (2007) *New Zealand's Quota Management System: A History of the First 20 Years* Motu Working Paper 07-02, Motu Economic and Public Policy Research.

³⁷ BERL (2010) *The Maori Economy – A sleeping giant about to awaken?*

once investments have been made, they cannot easily be withdrawn in response to unfavourable changes:³⁸

An investor considering committing substantial funds for an activity which relies on a water consent must commit that money on the basis of an ‘insecure’ right, or more accurately, a ‘privilege’. This uncertainty will mean that some investments that would otherwise have proceeded will not be approved, or investors will require a higher return to compensate them for the additional risk. As observed by North and Weingast (1989):³⁹

The more likely it is that the sovereign will alter property rights for his or her own benefit, the lower the expected returns from investment and the lower in turn the incentive to invest. p.803.

The New Zealand economy, like other modern market economies, relies on collateral to support a variety of financial market transactions and to release financial capital to enhance productivity. Existing consents are not standardised and cannot be easily compared; consents vary from region to region and from consent to consent, and might not be renewed. Consents are therefore difficult to use as collateral for credit, and hence can less easily be used to produce additional value – for example, for the creation of securities which support capital raising and investment.⁴⁰ As a consequence, existing consents are less easily used to produce additional economic value.⁴¹

While a rights regime will not remove uncertainty entirely (rights holders will likely have a % share of allocable water rather than a fixed volume available to them, for example) it will provide sufficient certainty about the boundaries of the right which will enable parties to establish its value and, if the right is well-specified, to allow it to be used as collateral.

The Ministry for the Environment estimates that the total economic value of water to New Zealand is \$34.85 billion per year.⁴² This estimate excludes the value of hydro electricity generation. Hence, the impairment in capital formation, and any hesitancy in investing, because of uncertainty as to the strength of the right to water will have a large economic impact.

³⁸ See, Spiller, P.T., “Institutions and Regulatory Commitment in Privatizations,” *Industrial and Corporate Change*, (1993).

³⁹ D. North and Weingast, B., “Constitutions and commitment: the evolution of institutions governing public choice in 17th century England”, *Journal of Economic History*, 49(4), pp 803-32.

⁴⁰ This is not due to legal constraints, but rather the bank's willingness to accept a consent (which is a ‘privilege’ rather than a ‘right’) as collateral. There are exceptions to the rule, however. For example, in the United States, Alaskan fishermen are able leverage against IFQ holdings with some Seattle-based banks though those rights are less secure than the New Zealand ITQ.

⁴¹ For a discussion on how firm rights support capital formation and economic growth, see De Soto, H. (2000). *The mystery of capital: Why capitalism triumphs in the west and fails everywhere else*. New York: Basic Books

⁴² See <http://mfe.govt.nz/rma/central/nps/regulatory-impact-statement.html>

4. Financial benefits to existing consent holders

The quantitative estimates discussed above are not all additive - there may be overlapping benefits in the estimated impacts. However, all of these benefits will contribute to improved economic performance, especially in the primary production, energy generation, and water intensive industry sectors. The economic gains will also be capitalised into the financial value of existing consents.

Existing holders of freshwater consents could expect substantial increases in the financial value of the consents they hold as the gains from reduced uncertainty and improved opportunities to realise the benefit of the right to the resource are capitalised into asset prices.

In this section we outline the empirical evidence of the impact on asset values from greater clarity and security of rights in other resource sectors in New Zealand – fisheries and land tenure reform. We also consider evidence from reforms to water rights and other resource rights in other jurisdictions.

In the 1990s, the fisheries Quota Management System was used to recognise iwi proprietary rights in fisheries and to revolutionise the management of the fishery resource for the benefit of New Zealand.⁴³ Individual Transferable Quota (ITQ) rights were introduced at about the same time in Iceland and have since been established in several countries, including the United States, Canada, Peru, Chile, and Australia. However, the security of the property right under the various ITQ management systems differs.

A recent paper by Grainger et al (2011) empirically examines the impact of clearer and more secure property rights on asset values in ITQ fisheries.⁴⁴ The New Zealand ITQs is a perpetual right to fish; the quota is a legal asset whose owner can use as collateral in establishing credit with banks. In Canada and the United States ITQ ownership is considered a revocable privilege, and the future of ITQ property rights (at least in the long run) is uncertain.

These systems offer strong parallels with the two systems for water we compare in this paper. The ITQ system in New Zealand is a ‘property rights’ regime, whereas the US and

⁴³ Under ITQ management, shares of the total allowable catch (TAC) are allocated to individuals (or firms or cooperatives), who then hold the right to harvest their share each year. Typically, the holder of an ITQ can exercise that harvest right, lease it to another fisherman, or sell it. This has been shown to help achieve allocative and technical efficiency (Grafton et al, 2000), which adds significant value in a fishery. In addition to eliminating the race to fish, ITQ management has been shown to reverse the collapse of fisheries (Costello et al, 2008).

⁴⁴ Grainger, C, Costello, C., ‘The value of Secure Property Rights: Evidence from Global Fisheries’, April 27, 2011.

Canadian systems of quota are ‘privilege’ regimes. The Canadian system is particularly similar to our resource consent regime for water.⁴⁵

The authors’ use sales and lease prices from these countries to show that that the impact of having a ‘privilege’ rather than a ‘right’ raises the dividend to price ratio by 7% percentage points in Canada and by 13.5 percentage points in the United States.⁴⁶ A higher dividend to price ratio results from a lower asset value for a given quota lease value. Using the quota and lease values reported in Newell, et al (2007),⁴⁷ we calculate that these differences in the dividend to price ratios imply quota trades in New Zealand at 70% to 1.5 times the value of quota in Canada and the United States (once adjusted for fishery specific factors and markets factors).

Grainger et al (2011) also estimated the change in dividend to price ratio for ITQ in New Zealand before and after the settlement of iwi interests in fisheries. Their results suggest that the average asset value of ITQs after these reforms was estimated to be 45% higher, controlling for interest rates and fishery-specific characteristics. Grainger et al attribute the decrease in the dividend price ratio (increase in quota values) as resulting from:

“This policy decision formalized the government’s position and removed substantial uncertainty about the future of property rights in New Zealand fisheries.”⁴⁸

In May 2012, Barichello and Soliman estimated the change in policy risk in the Canadian sablefish industry.⁴⁹ The resulting change in dividend price ratios implies an increase in asset values of 20% as the industry has gained increased confidence in the policy settings.

Tenure review of the South Island high country pastoral leases provide another example of increases in asset values as rights over resources (in this case high country farming land) are made more secure. Since 1992, farmers holding pastoral leases could apply to acquire a freehold interest in part of the leasehold land, subject to selling the balance of the leasehold to public conservation land. The pastoral leases have 33 year terms, but are perpetually renewable.

Some landowners who purchased their farms freehold were able to subdivide and sell land for purposes other than farming at considerably higher values than the land was valued at for farming purposes.⁵⁰ It would also seem that when the land was sold for farming purposes its

⁴⁵ Under Canadian law, ITQ shares are considered a revocable privilege, and a resistance to ITQs has led to other catch share systems (called Enterprise Allocations) in the Atlantic Provinces. Although fish are considered “Property of the Crown” in Canada, in 2008 the Supreme Court ruled that fishing quota are “property” for the purposes of the federal Banking and Insolvency Act. There are strong restrictions on trading where there are ITQ fisheries in place (e.g. British Columbia).

⁴⁶ Table 3, column 6, Op cit.

⁴⁷ Newell, R, Papps, K, Sanchirico, J, ‘Asset pricing in created markets’, Amer. J. Agr. Econ 89(2) (May 2007) pp 259-272.

⁴⁸ Op cit, page 18.

⁴⁹ Barichello, R., and Soliman, A. “ITQs and Fisheries Management: Policy Risk in Canadian Sablefish”, Presentation to Developments and Challenges in Fisheries Economics: Conference in Honour of Dr Colin Clark, University of British Columbia, May 15-16, 2012.

⁵⁰ Ann Brower estimates that 28 new freeholders paid the Crown \$6.9 million for freehold rights then sold 46% of that land for \$135.7 million.

value increased, as would be expected, over the cost of purchasing the Crown's lessor interest. Brower reports the sale of 5 farms, where the entire farm was sold in one transaction (not subdivided), at an aggregate of \$16.5 million over the amount paid for free hold (a multiple of about 19 times the amount paid to the Crown). Brower does not report the value of the lessee interest prior to the land being acquired freehold.

Bjornlund and Rossini (2007) estimated the returns from an investment in water entitlements in Australia.⁵¹ They found that buyers entering the market in the first few years would have achieved a return of about 30 per cent per annum. These initial high returns were mostly derived from capital gains.⁵²

Hence, empirical (though anecdotal) evidence from greater certainty of rights over resources in other sectors in New Zealand, and over water in other jurisdictions, found increases in the financial value of the right of 20% to 70%, or higher (Grainger et al, 2011; Barichello et al, 2012).

One estimate found the settlement of iwi rights in fishery quota to have increased the value of quota by about 45% through removing residual uncertainty from the entitlement to fish. A similar gain in the value of water assets to the primary sector would translate into a gain of \$5.5 billion, and \$2 billion to the electricity generation sector.

⁵¹ Bjornlund, H. and Rossini, P. (2007) "An Analysis of the returns from an investment in water entitlements in Australia", *Pacific Rim Property Research Journal* 13(3):344-360

⁵² *Ibid*, page 358.

5. Implementation costs

5.1 The costs

We would expect that in addition to changing the law and introducing water regulations, there would be costs involved in changing the institutions (regional and national) and the possibility of costs associated with an imperfect transition from one system to another. In addition, there may be intangible impacts on society such as political and community debate.

5.2 The cost of changing the law

It is difficult to anticipate what it might cost to make amendments to the RMA and other legislation to allow for a rights-based allocation to iwi. But we can put it in a range of possibilities. For example, University of Otago, Wellington researchers have recently published a study that estimates the average cost of producing a new law in New Zealand. The research shows a new act costs on average NZ\$3.5 million, while a regulation is estimated to cost around NZ\$530,000.⁵³

We note that the University of Otago estimates were for all laws that are made in New Zealand, many of which are routine and uncontroversial. Any law introducing water rights would be likely to attract significant attention and debate, and might be expected require above-average policy input. The authors noted that the 97.5th percentile estimates were \$6.15 million and \$920,000 for laws and regulations, respectively.

The Australian system gives an indication of the possible number of nested laws and regulations might be needed to establish a rights regime.⁵⁴ In total, there is one Act, two subsequent amendments to the Act, and five sets of Regulations. In addition to the Act and Regulations, there are water charge and water market rules. Also, other legislation (for example the Meteorology Act) was changed to align with the new laws. Regional Plans would have to be changed to reflect the new laws. The cost of this would be included in existing Plan-change budgets.

The cost of changing the law could be in the order of \$20 - \$26 million, as summarized in Figure 2:

⁵³ The researchers developed a method that analysed the number of acts and regulations passed in Parliament from 1999 to 2010. They then considered the costs of running Parliament, particularly 'sitting days', when MPs debate new laws. Also taken into account were the costs of policy advice from government agencies related to law-making. See Wilson N, Nghiem N, Foster R, Cobiac L, Blakely T. Estimating the cost of new public health legislation. Bull WHO [e-Publication May 2012]. http://www.who.int/bulletin/online_first/11-097584.pdf

⁵⁴ Information sourced from: <http://www.environment.gov.au/topics/water/australian-government-water-leadership/water-legislation>

Figure 2 The cost of changing the law

	Description	Cost per Unit	Total cost
A Water Act	This Act would implement key reforms for water management in New Zealand. It would allow for water charge and water market rules.	\$3.5 - \$6.15 million	\$3.5 - \$6.15 million
Subsequent amendments to the Act	The Act would likely need amending to amend for errors. Two amendments have been allowed for.	\$3.5 million	\$7.0 million
Regulations	Regulations can be made to prescribe certain matters as provided for under the principal Act. For example, special powers on Authorities or the process that must be followed for making the market rules. Five sets of regulations have been allowed for.	\$0.53 – 0.92 million	\$2.65 - \$4.6 million
Associated law changes	Amendments to related legislation. Two minor changes have been allowed for.	\$3.5 million	\$7.0 million
Water rules and other non-legislative rules	Such rules might regulate the market and charging practices.	\$0.53 – 0.92 million	\$0.53 – 0.92 million
Changes to Regional Plans	Nothing in addition to existing Plan Change budgets	\$0	\$0
TOTAL			\$20.68 - \$25.67 million

5.3 Costs associated with initial allocations and transfers

There is likely to be costs associated with facilitating an initial allocation of “property rights”, through grandfathering, auctioning or other transition mechanisms. There may be conflict associated with the transition. Consultation would be required, and appeals can be expected.

Some of the possible economic costs associated with an imperfect allocation method are lower economic rents, an increased cost of capital, a loss of specialised local knowledge, and reduced incentives for collective action.⁵⁵ In the Murray-Darling Basin, errors in initial allocations have been corrected (and re-corrected) through subsequent buy-backs and sales which incur a fiscal cost for the Crown. New Zealand experienced a similar process with the initial ITQ in fisheries.

For Regional Councils the cost might be similar to that experienced in Waikato for Variation 6 or Rakaia Groundwater Zone which are described earlier. Across 16 regions, this might add to something in the vicinity of \$40 - \$60 million.

We do not know what the costs associated might be for iwi and other affected parties. A parallel is the transition from fishing licences to transferable Quota. In that case, deciding on a fair allocation model took 12 years and involved extensive consultation with individual Maori, iwi and other interested parties.⁵⁶ One can expect less controversy around inter-iwi allocation than seen in the past.⁵⁷

These costs are one-off costs, rather than repeated. This is unlike costs associated with changes to allocation rules in Regional Plans, which happen every 10 years.

5.4 Cost of institutional change

The recognition of a new, legislatively-defined, right to water will likely prompt changes throughout the system. This is because there are several layers of institutions required to underpin easier transfer and trade. For example, there would be:

- Changes to governance structures to reflect the new rights-based regime. This includes iwi governance groups and existing water zone groups.

⁵⁵ There is a well-established body of economic literature on the efficiency impacts of allocation mechanisms like grandfathering or auctioning. The efficacy of the method used to allocate rights depends critically upon the innovation, investment, and collective actions of the holders of the resource, who discover and enhance stocks and convert them into valuable goods and services.

⁵⁶ Lock, K and Leslie, S (2007) *New Zealand's Quota Management System: A History of the First 20 Years* Motu Working Paper 07-02, Motu Economic and Public Policy Research.

⁵⁷ A lot of the time and cost associated with the fisheries allocation were incurred because it was the first large-scale nationwide settlement of rights and a large proportion of the debate centred on fair ways to recognize iwi, hapu and other groups and how to rightly ascribe shares to these groups. The precedents set by the fisheries claims have been applied in subsequent settlements (for example, in settling Maori aquaculture claims) and there is likely to be more acceptance now of mechanisms for allocating rights among claimant groups.

- Changes to administrative capacities at Regional Councils (to ensure sufficient administrative authority, resources and information to manage and monitor water rights effectively);
- Legal challenges. For example, one might expect that the Courts would hear more disputes about leases over water, the boundaries of rights and so on.
- Investment in conflict resolution mechanisms (appropriate and robust mechanisms for resolving conflict between water users and uses where it arises); and
- Changes to allow for registration/titling (to ensure sufficient processes for ensuring accurate and updated registration/titling of water rights).

Once the changes had been made, the costs of maintaining these facilities would be included in business-as-usual budgets.

We do not know the cost of making institutional changes. However, it could be in the same magnitude as making legal changes.

5.5 Ongoing management costs

It is not clear-cut to try to estimate the ongoing cost of managing the institutions needed in a rights-based system which can consist of the costs involved in monitoring use, operating a registry, environmental monitoring and so on. However, there is a loose parallel in the fishing industry which operates a similar set of activities. In the current quota management system, quota holders and fishers pay levies to fund all costs related to the management of the commercial fishing industry. For 2011/12, the levies paid were \$30.5 million.⁵⁸ One advantage of the quota management system is that the cost of this system is paid for by those who directly benefit from it, rather than the general public.

5.6 Summary

In summary, the costs might be in the order of:

Cost type	Cost
Law change	\$20 - \$26 million
Transition and initial allocation	Unknown. Say, \$40 - \$60 million.
Institutional changes	Unknown. Say, \$20 – 26 million.
Ongoing management costs	Unknown. No more than \$30 million.

⁵⁸ Ministry of Primary Industries *Cost Recovery Levies for 2011/12*

Cost type	Cost
TOTAL	\$80 - \$112 million to establish, no more than \$30 million to operate annually.

6. Comparing benefits and costs

For an estimated cost of \$40 - \$52 million, plus an annual cost of no more than \$30 million (that could be levied on those that use the resource rather than ratepayers), we might expect the following benefits from implementing a rights regime over water:

- Better ‘pricing’ of water – benefit: more efficient decisions by resource owners (including iwi) due to transparency of value, and the ability to levy resource taxes
- A rights regime will awaken sleeper consents – benefit: \$370 million if 5% of the unused consented portion (‘sleepers’) is re-allocated to higher value uses
- A rights regime will be better in times of drought – benefit: \$500 - \$630 million if transfer and trade lessens the impact of New Zealand drought in similar ways to that seen in the Murray Darling basin.
- A rights regime will reduce costs associated with over-allocations – benefit not quantified
- A rights regime gives clarity – benefit: savings on processes like Variation 6 (\$3.7 million, 3 years) and the Rakaia Selwyn Groundwater Zone (\$2.5 million, 2 years).
- A rights regime will improve capital formation has better incentives for investment – benefit: fewer investments deferred or delayed and additional value through creating capital.

Existing holders of freshwater consents could expect substantial increases in the financial value of the consents they hold as the gains from reduced uncertainty and improved opportunities to realise the benefit of the right to the resource are capitalised into asset prices. The empirical evidence from greater certainty of rights over resources in other sectors in New Zealand, and over water in other jurisdictions, found increases in the financial value of the right of 20% to 70%, or higher.

We acknowledge that our results are not the final word. Indeed, they are really just the beginning of a conversation. They represent a credible first approximation of the likely value that could be derived from recognising iwi ownership of water through a rights based regime.

It is also important to note that these approximations are not additive. There may be dynamic effects and interactions that create various overlaps between our estimated benefits. However, the general conclusion remains the same in that we have found that a rights based regime offers several advantages over a consents based regime.

These advantages accrue because a rights based regime is more likely to lead to more efficient decisions, the ability to levy resource taxes, will likely ‘reawaken’ sleeping consents (including part of the share owned by iwi), will be better in times of drought, and will offer substantial savings for councils and submitters in allocation policy. Lastly, a rights regime offers better incentives for investment and capital formation.

Appendix 1: Nga Matapono Ki Te Wai



Appendix 2: The characteristics of a rights based regime

Assumptions about how it would work once established (versus status quo consent regime)

The analysis would make the following assumptions about how the Iwi Allocation would work in practice:

- (a) Regional councils would lead the process to establish freshwater objectives for water bodies—or Freshwater Management Units— through the collaborative planning process⁵⁹. Achieving freshwater objectives will require regional councils to establish and enforce robust limits for water quality⁶⁰ and, the allocation of freshwater. This assumption would also apply in the status quo scenario.
- (b) Iwi/Maori would be active participants in collaborative planning processes for establishing freshwater objectives and the setting of quality and quantity limits. This assumption would also apply in the status quo scenario.
- (c) Iwi would, by right, receive a share of the allocable flow/level for each water catchment in their rohe to be known as the “iwi allocation”. The iwi allocation would provide proprietary, in rem rights to water. The rights would be defined as a proportion of the allocable quantum, similar to how fishing rights are defined as a proportion of available catch. In the status quo scenario, the Iwi Allocation would be expressed through resource consent under the existig regime. The consents may, or may not be, defined as a proportion of the allocable quantum with a maximum duration of 35 years and, upon expiry Iwi would be required to re-apply for resource consents.
- (d) The rights to water would continue to be separate from resource consents⁶¹. When proprietary, in rem rights to water are established, resource consents would instead focus on managing the impacts—the effects on the receiving environment— of the use of the water. This would make water rights more comparable to rights over land, which is an exclusive right with the use being restricted and regulated. In the status quo scenario, resource consents would continue to bundle the access and use of water and, the controls over the impact of using water (if any).
- (e) All rights to water would be permanent (not time-bound) and linked directly to the allocable quantum. In the status quo scenario, resource consents relating to access and use of the water remain reviewable upon expiry, are predicated on certain presumptions for renewal and, may be conditional on demonstrating compliance with managing the impacts of use.
- (f) Iwi water rights would have strict sale requirements and would be akin to being inalienable. This would make water rights comparable to Maori land or fishing rights, which have strict sale requirements. In the status quo scenario, resource consents can be transferred to another party through the sale and purchase of land or within a catchment (if provided for in a regional plan).

⁵⁹ The Draft RMA Amendment Bill 2014 suggested regional councils could opt for the existing First Schedule of the RMA process in lieu of the Collaborative Planning Process.

⁶⁰ <http://www.mfe.govt.nz/publications/rma/nps-freshwater-management-2014>

⁶¹ s122(1) of the RMA

- (g) Iwi can realise rents from leasing their allocation to other users⁶². In this way water would be free to move between water users and different land uses within a catchment. Iwi may or may not choose to restrict lessors from sub-letting or impose other conditions as they see fit. Iwi would be able to leave the iwi allocation in-stream and forego commercial rent. In the status quo scenario, resource consents can be transferred through the sale and purchase of land or within a catchment (if provided for in a regional plan).
- (h) Over time, with a clearer property rights regime, trading and leasing would become the primary means of re-allocating water between water users and land uses. Regional councils would no longer be responsible for the administrative process of transferring water and instead, would ensure that necessary controls were in place⁶³ prior to the trade/lease occurring. In this way water that is available for extractive uses would move via trading and leasing to the highest and best use over time. In the status quo scenario, Regional Councils continue to administer the transfer process for resource consents.

Assumptions about how the rights would be established

- (i) There would need to be legislative change to allow for in rem property rights to be held in water. Regional plans would also require amendment and review in line with the legislative change. The required legislative change would be controversial.
- (j) There would need to be an assessment of whether waterways were under-allocated, fully allocated or over-allocated prior to the rights regime being introduced. Te Mana o te Wai would apply universally to all waterbodies. Where overallocation exists, regional councils would be required to put in place time constrained mechanisms to address overallocated water bodies (or FMUs)⁶⁴ prior to the creation of new rights;
- (k) We have assumed that Regional Councils would be required to make a statement in regional plans regarding the holders of existing resource consents, the expiry date of those consents and the percentage allocated of the total allocable quantum. These measurements would be taken at pre-defined points in each Freshwater Management Unit (FMU⁶⁵).
- (l) A move to set up iwi allocations via a separate set of water rights for iwi, would in turn trigger the need to provide broadly equivalent rights to other users in the same catchments. While some aspects of new rights granted to iwi might be distinct, the methods of measuring rights in volumetric and quality terms in each water catchment will need to be the same for all water rights in each river catchment.
- (m) The newly established in-rem right to access and use water would need to be expressed through some form of licence such as resource consents. The sole purpose of the licence is to control the effects on the receiving environment from the use of water.
- (n) The transfer policy, written into law, would involve some combination of:

⁶² The lease of any part of an allocation would be subject to the lessor securing resource consents to manage the impacts of that use of water.

⁶³ The transfer/lease of any part of an allocation would be subject to the transferee or lessor securing resource consents to manage the impacts of that use of water.

⁶⁴ Refer to Objective B2 of the National Policy Statement for Freshwater Management 2014.

⁶⁵ Freshwater Management Units are defined in the National Policy Statement for Freshwater Management 2014.

- a. The transfer of a percentage of water allocations in direct ownership by the Crown to iwi with a focus on under-allocated FMUs first (where this is feasible);
- b. All existing resource consents would surrender a percentage of allocable water and this would be transferred to iwi as an in rem right . When the iwi allocation transfer is complete, the remainder of existing consents would be converted into an in rem right under the new rights regime all at one time. For example, a permit that allowed extraction of X percent of the allocable flow at a point in the waterway would become a permanent, fully transferable right to extract Y percent.
- c. There would need to be a long lead-in period⁶⁶ to signal the changes to the regime. Options to mitigate impacts on existing consent-holders, once the rights have been transferred to iwi, could be restraints on how iwi can exercise their rights for an interim period. For example, they might be obliged to lease it back to the existing consent holder(s) for a set period of time at ‘reasonable’ rates and under similar terms and conditions as the consent(s) that were supplanted;
- d. The voluntary transfer of existing (impermanent) water allocations from private consent holders to the Crown would be allowed, should private consent holders wish to make the change earlier. If they made the change they could convert their existing (impermanent) allocation to a smaller, but permanent (in-rem) and fully-transferable allocation.
- e. There may be additional monetary compensation for voluntary transfers if the Crown is willing to fund this. For example, a permit that allowed extraction of ten percent of the allocable flow at a point in the waterway could become a permanent, fully transferable right to extract five percent and a compensation package for the remaining five percent might be paid. The compensation would equal to the commercial use value of the water for the remaining term of the consent as verified by independent valuation.
- f. A distinction being made between small consents and large consents, to minimise administrative costs. For example, the large number of small users could be transferred into the new regime with an approach like the regional council reviewing all usage below a certain threshold, taking off unutilised water allocations, taking off any further allocation needed for the iwi allocation and then granting the remainder as a permanent water allocation right to each user. This could happen separately from any review of the larger consents.
- g. Should the Crown wish to progress this option, a form of compensation being available to those who lose water allocations and, are able to demonstrate clear losses that they were not able to mitigate acting reasonably.

⁶⁶ Long lead in period means a set period of time irrespective of whether an existing resource consent would expire during this time

- h. No compensation being available to private users for the loss of time-constrained use rights when existing resource consents expire (assuming the policy was well signalled).

Assumptions about economic behaviour

- (o) We assume a growing demand for water for all uses, in all catchments, in line with a growing population and growing economy.
- (p) Individuals seek to maximise their well-being (with stable and well-defined preferences, including preferences for values that are not traded in markets)
- (q) Firms and organisations seek to maximise the well-being of their owners and constituents (but individuals suffer from agency problems) – the behaviour of firms will be explored in the second report; the behaviour of iwi will be explored in the third report.
- (r) Individuals and firms respond to incentives.
- (s) Voluntary exchange makes those who are trading better off than they were before.

Assumptions about assimilative capacity and the allocation of discharge rights

- (t) For the purpose of this report, regional councils would have the ability to actively manage (control)⁶⁷ the discharge of contaminants to freshwater from all land uses within a catchment—including changes of land use—.
- (u) The lease and transfer of new rights to access and use water would require the leasee/transferee to secure the necessary license to demonstrate any increase in the discharges of contaminants—from the use of that water—are acceptable and fall within the limits set by regional councils. This process should be administratively simple with a low cost.
- (v) The creation of new rights to discharge contaminants—assimilative capacity—and an allocation of those rights to iwi, requires further and indepth analysis and, does not form part of the scope of works at this time.

⁶⁷ Control of discharges was expressed as “managing within limits” by the 2012 Land and Water Forum recommendations.

Appendix 3: How water rights are defined in Australia

There are 6 types of water right set out in the Water Act 2007, as summarised in the table below:

Water right	Description
Water access entitlement	A perpetual or ongoing entitlement to exclusive access to a share of water from a specified consumptive pool as defined in the relevant water plan (i.e., determined by the volume available in the water management area)
Water allocation	The specific volume of water allocated to water access entitlements in a given season, defined according to rules established in the relevant water plan (usually announced by the jurisdictional government as a % of total share to which each water access entitlement holder is entitled)
Riparian right	A riparian right is a water right held by rural landowners for domestic, on-farm purposes (i.e., drinking water, domestic use and fishing) of adjoining bodies of water to their property.
Stock and domestic right	A stock and domestic right is a water right held by rural landowners for domestic, on-farm purposes (i.e., household purposes, watering of animals kept as pets, watering of cattle or other stock and irrigation of a kitchen garden).
Water delivery right	A water delivery right is the right an irrigator has to have water delivered by an irrigation infrastructure operator (IIO) through the IIO's water infrastructure network.
Irrigation right	An irrigation right is the right to receive water from an IIO, which is not a water access right or a water delivery right

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