



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

+
+
+

Report of the Land and Water Forum: A Fresh Start for Freshwater



**Report of the
Land and Water Forum:
A Fresh Start
for Freshwater**

This report may be cited as:

Land and Water Forum. 2010. *Report of the Land and Water Forum: A Fresh Start for Fresh Water*

Cover image acknowledgements:

Image of cows in field courtesy of John Barran.

Image of kayaker courtesy of Wayne Steedman, Glacier Country Kayaks.

Published in September, 2010 by the Land and Water Forum

ISBN: 978-0-478-33296-4

This document is available on the Land and Water Forum website:

<http://www.landandwater.org.nz/>

Contents

Foreword	v
Executive summary	vii
List of recommendations	1
Water and its management in New Zealand	7
Land use, soil and water are linked	7
Taking account of natural variability	8
Water use and interests	9
Goals and principles	11
Goals	11
Principles	11
Problems with water and its management	12
What we need to do	18
Set limits for quantity and quality	18
Achieving targets	22
Improve allocation	34
Rural water infrastructure	40
Changes to governance	43
Science and knowledge	54
Water services management	55
Drainage	57
Floods	57
Appendices	59
Summary of Terms of Reference	59
Letter from the Minister for the Environment on the draft National Policy Statement for Freshwater	61
Glossary	62
Small Group Members	66
Plenary Organisations	66
Land and Water Trust and Secretariat	67
Thanks	68

Foreword

A Fresh Look at Freshwater

The Land and Water Forum came together because we knew that water provides great opportunities for all of us – our ecologies and our environments, our farms and our cities, our recreation and our tourists, and for energy production and industry. It is a source of life and food, and for iwi it is also central to their identity. To maximise these opportunities for us all, and for future generations, we needed a better way to manage water in New Zealand – less confrontational, more collaborative, and more effective.

Nevertheless, we were aware that water is an increasingly hot topic in New Zealand lately; and behind the headlines in Canterbury or the Manawatu or the Waikato there is both anxiety and a lack of information about the way we are managing one of our most precious resources. Water is vital to us all, and a mainstay of our economy. Overall it is still relatively clean and abundant – but we are faced with more frequent shortages in east coast catchments; the quality of a number of our lowland rivers and streams is causing concern; we have expensive clean-ups going on in iconic lakes; and there are questions about the state of our groundwater. We know that what happens to our streams and rivers in turn affects our coastal environment – our beaches and marine life.

Water is also causing disputes – disputes about Water Conservation Orders and water infrastructure development; disputes about the intensification of farming and about run-off; disputes about water infrastructure in cities and towns, its discharges, and how it should be organised and paid for; disputes about who should be involved in its management, including around the role of iwi. Recent attempts to improve our policies for dealing with these problems have not succeeded and New Zealanders have spent a great deal of time fighting one another about them, politically, at hearings and in Courts – and often with sub-optimal outcomes.

The Forum was established in the belief that the stakeholders needed to engage directly with each other if we were to find a way forward. Because it was a large body (58 participating organisations), it established a Small Group, consisting of 21 major stakeholders, assisted by six active observers from central and local government, to prepare the Land and Water Forum Report and to report regularly to the Plenary on progress. The membership of these two groups is listed in the appendix.

For more than a year now we have shared views, received reports, listened and debated (sometimes heatedly) about what would best meet the needs of all interests and all New Zealanders. And over time, little by little, people who were accustomed to disagree found that their views were coming together. We built understanding and trust and we developed a substantive set of high level recommendations on the way forward.

The government asked us to recommend potential reform of New Zealand's fresh water management – to identify shared outcomes and goals, and options to achieve them. We have done so. It is a beginning, not an end – there is plenty still to do to work up proposals and flesh out policies and the government will have choices to make. But in this report we believe we have provided a series of options which frame the debate and help us to move forward together.

In carrying out its work the Small Group has received great assistance from the Plenary, through reports and articles that its members have prepared, and through their readiness to discuss their needs and perspectives. The Small Group has reported to the Plenary regularly and worked through its recommendations with them in detail to get their input.

Because of our tight timeframe, and the way our Report came together, many in the Small Group and in the Plenary alike have not yet been able to take it to their governing bodies in its final form, and those with wide membership have not of course been able to consult them.

All members of the Plenary nevertheless consider the report to be of real value as a framework for better water outcomes, so they support its being sent to Ministers without further delay.

All Small Group members, who represent 21 major stakeholders from primary industry, electricity generation, tourism, environmental and recreational interest groups, and iwi, have put their names to the report individually to reflect the consensus that they have reached.

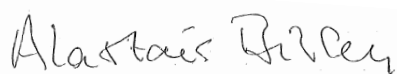
Everyone, Plenary and Small Group alike, places importance on the next phases of the process. They look forward to the public engagement that the government wishes the Forum to undertake as a next step – and of course to the more detailed policy engagement which will follow.

A great many people have contributed to this success, but there are some that need to be acknowledged in this foreword. In the first place, we are grateful to the government for funding this work, and in particular to Hon Dr Nick Smith, the Minister for the Environment, and Hon David Carter, the Minister of Agriculture, who formally commissioned our report. Both Ministers made themselves readily available, took a keen interest in what we are doing and gave us every encouragement while leaving us free to find our own way.

In the second place, I must acknowledge the work of the “active observers” from central and local government. They added great value to our discussions through their knowledge of the issues and the perspectives of the councils and ministries to which they belong. They became an essential part of the group. With them, I should also thank the National Institute for Water and Atmospheric Research (NIWA) which has made its resources available to us with unstinting generosity. Dr Clive Howard-Williams attended most of the meetings of the Small Group. He and his associates supplied us with invaluable information and advice.

The Secretariat has administered, advised and assisted this project with skill and dedication. Colin James made a particular contribution when he facilitated the first part of the work. Glen Lauder has kept us in counsel and good humour.

Finally, there is the Small Group itself. Its members, participants and active observers alike, have devoted extraordinary amounts of their time to this process over a period of about eighteen months – as well as knowledge, humour, optimism and creativity. Without these qualities we could never have managed the widely differing perspectives we began with and reached the current resolution.



Alastair Bisley
Chair, Land and Water Forum

Executive summary

Water and the way it is managed

We all agree that water is one of New Zealand’s major national advantages. It sustains life; it is part of our heritage and identity and a special taonga to Māori; it supports our unique ecosystems and species; it is widely valued for pleasure and recreation. At the same time, it is a key economic advantage. It is essential to key industries, including the generation of power, the production of food and wine and the manufacture of goods. It underpins tourism, and it is part of our brand.

So there are multiple uses for water which sometimes complement each other and sometimes conflict. As the pressures we place on it continue to grow through population increases and the more intensive use of land we must have systems to help us agree on the outcomes that we want – and to implement management regimes for water and its associated land use which let us optimise our benefits across all of its uses and all of the services it performs.

To make sure we do this it is vital that we manage water in the context of the hydrological system as a whole. The way we use and manage our land affects the quality and quantity of our water. Water bodies – springs, streams, groundwater, rivers and lakes – are connected; and our coastal and estuarine waters are affected by the quality and quantity of the waters that flow into them.

We must also recognise New Zealand’s natural variability. Rocks and soil types, climates and land environments differ throughout the country, so that water bodies do not all share the same properties or natural ecosystems and do not respond in the same ways to human-induced pressure or change.

Iwi and water

For iwi, the contemporary discussion of freshwater evokes legacies of loss and exclusion and the denial of rights and responsibilities. The discussion of iwi rights and interests in water proceeds between iwi and the Crown outside our Forum and was not on our table.

Iwi have however participated fully in our discussions. We have recognised that the relationship between iwi and freshwater is founded in whakapapa, that freshwater is recognised by iwi as a taonga of paramount importance, and that kaitiakitanga – the obligation of iwi to be responsible for the well-being of the landscape including water and waterways – is intergenerational in nature and has been and may be expressed and given effect to in many different ways.

Iwi see economic development as vital for New Zealand, but subject to the constraints of reducing environmental footprints, including through smart technologies and innovation. They look to formal participation in setting strategic priorities at the national level, and involvement at the local level which allows them to ensure that their values and objectives are taken into account in practice. Iwi seek outcomes from water that sustain the physical and metaphysical

health and well-being of waterways as a matter of first principle; ensure the continuation of customary instream values and uses; and satisfy iwi development aspirations.

Problems with water and its management

Set out below is our analysis of the problems that we have in managing water in New Zealand, and some of their consequences. We prepared it because without understanding the problems we could not find solutions. It is on the solutions that we have focused our attention – they follow this analysis, and make up the main part of our report.

Though New Zealand's freshwater is still good overall and rates well internationally, its quality and availability has been deteriorating. There are a number of reasons for this trend.

A central difficulty is that as a nation we have found it hard to set or manage limits. Without limits it is hard to manage diffuse discharges – nutrients, microbes, sediment and other contaminants that wash into water from the land – and impossible to deal with the cumulative effects on water bodies of water takes on the one hand and diffuse and direct discharges to water on the other.

Besides its effect on water bodies, the failure to set limits has had economic consequences. It has inhibited the development of more flexible means of allowing water permits to be allocated and transferred amongst users. The allocative principle of first-in first served is adding to the difficulty. These factors, plus lack of regional planning, have encouraged the proliferation of small takes and schemes at the expense of larger but possibly more beneficial options. All up, these problems have caused frequent resort to adversarial processes and expensive litigation, led to protracted delays, and put investment at risk.

There are a number of reasons why limits have been difficult to set. Central government has not used national instruments to provide direction though two are now in preparation. Few regional councils have had the consistent and coherent policy and planning frameworks to put the necessary management regimes in place. In the nature of things it is difficult to get agreements about what limits should be, how quickly they should be achieved and who should bear the cost – but stakeholders and iwi have not always been fruitfully engaged, either at the national or the regional levels. Monitoring and enforcement of rules, consents and their conditions is also variable.

There are other governance problems. Some councils need additional resources and stronger governance skills. Iwi, who have a Treaty relationship with the Crown, have no clear path to engage as a partner with Councils. There has been an absence of strategic process at a national level to make the link between water management and the variety of other questions which bear on it, including agriculture, tourism, energy, biodiversity, landscape and land use.

We have a strong base in the science needed to manage water, but there remain inconsistencies in our data collection, monitoring and analysis. Investment in scientific research on water has fallen by about one third since the late 1990s and we are not keeping pace with new demands for knowledge and capability. No single organisation is tasked with providing leadership and coordination. Even with uncertain knowledge we have to make wise decisions about water management – but we often do not use the considerable knowledge that we do have to the best effect.

Water services management is a significant infrastructure issue for New Zealand. Stormwater, wastewater, drinking water and flood control have major impacts on the state of our water bodies. They are controlled by some 67 local utility providers and 12 regional councils. Significant capital expenditure is projected over the next decade (\$11.46 billion), but reports suggest that management is inconsistent, in part caused by inefficiencies of scope and scale.

Current situation

New Zealand has made good progress in clearing up point source pollution over the last twenty years, but monitoring shows that our water quality is declining in many places, particularly in lowland waterbodies. Also, urban waterways remain highly polluted, including on account of sewage leakages, stormwater run-off and discharges from processing factories. At a national level, diffuse discharges now greatly exceed point source pollution.

Impacts of land use on water bodies can be subject to considerable lags and around 64% of monitored lakes in pastoral landscapes are already classed eutrophic or worse. Declining water quality impacts on biodiversity, aquatic ecosystems and instream uses. It can affect human and animal health. It affects the credibility of our international brand.

Many catchments are over-allocated or approaching full allocation. Water scarcity is an increasing problem in some areas, and may be worsened by changing weather patterns, but our current system of allocating water does not encourage efficient use or easily allow transfer to best use.

The development of irrigation and hydro electric schemes has been litigious and slow. Urban infrastructure has in many places been subject to deferred investment, leakage and waste and sewage overflows.

Water is vital to our economic development, but our water management is getting increased scrutiny from New Zealanders concerned at declining water quality, from tourists, and from overseas buyers, driven by their customers' insistence that their suppliers follow good environmental practices. We have a reputation as a producer of high quality, safe, fresh food consistent with our clean green image and our ability to live up to our 100% pure New Zealand brand is increasingly important in many of our high value markets. If we can meet growing demand with products originating in first class, well managed, environmentally responsible systems, we can use our competitive advantages of water plus know-how to achieve value-added economic growth.

Setting limits for water quality and flows

It is in all our interests to maintain and improve the quality of freshwater in New Zealand, including instream values. For that we need limits, standards and targets in line with national needs, values and objectives which are applied taking account of the needs, values and objectives of communities. They must address contaminants and flows.

Setting limits will require us to address degradation in some areas, but will enable more resource use in others. Limits need to be clear enough to achieve certainty, but able to be adapted in the face of new information and new technology development.

We propose the adoption of a standards framework for New Zealand which:

- Stems from a strategic view of water for New Zealand
- Defines national objectives for the environmental state of our water bodies and the overall timeframes within which to achieve them through National Policy Statements (NPS's) and National Environmental Standards (NES's) made under the Resource Management Act (RMA)
- Requires regions to give effect to this national framework at regional to catchment (or sub-catchment) level taking into account the spatial variation in biophysical characteristics of their water bodies and their current state
- Within that framework, requires regions to engage communities, including iwi, about the ways in which their water bodies are valued, and to work collaboratively with relevant land and water users and interested parties to set catchment-specific targets, standards and limits
- Maintains regional councils' control of the use of land for the purpose of the maintenance and enhancement of the quality of water in water bodies and the maintenance of the quantity of water in water bodies and coastal water.

This framework would address direct and diffuse discharges, both urban and rural, as well as flows.

The approach that we describe is possible under present legislation, but an NES would be required to establish uniform processes for its implementation.

Achieving limits and targets

There is a variety of tools for managing limits or achieving targets once they are set. They need to be developed and deployed – in collaboration with stakeholders and iwi – in ways which recognise differences between catchments and objectives, and which allow the different approaches to support and enhance one another.

Good management practice is a critical tool for improving water quality and efficiency of use. It is not always without cost, but it can deliver significant benefits to practitioners as well as to the environment, whether from using phosphates, nitrates and water more efficiently or preventing loss of soil and pasture. Audited self management schemes allow industry and regulators to put in place templates of good practice developed with wide stakeholder involvement, and assure themselves that outcomes are being met.

In promoting good management practice, we do not begin with a blank sheet. Schemes are already in existence and under review. Some have been sponsored by industry and some worked out by communities themselves, including in collaboration local government, and with bodies such as the Landcare Trust. The dairy industry is currently updating and strengthening its approaches to effluent and nutrient management, and it and other industries have given details of existing and new initiatives.

Good management practice and audited self management are part of a suite of tools for managing water quality, including

- Regulatory approaches, which should recognise robust industry standards and audited self-management schemes and as far as possible be consistent across catchments and between regions.
- Price-based measures for activities that affect water quality, which need further investigation by regions and central government.
- Continued investment in the clean-up of contaminated water bodies.

For any of these tools, or combination of them, processes and outcomes need to be monitored and consistently reported on.

The growing problem of scarcity must be managed better

More efficient and effective means of allocating water permits and allowing them to be transferred can help to manage demand, reduce contamination and maximise the value of water for the economy.

The first element in any allocative process is to establish how much water in each water body is available to be allocated for productive use. Determining how much water should be reserved for ecological, environmental and recreational purposes (instream flows) is part of the wider process of setting limits and targets referred to earlier in the report, including the application of a spatial framework.

New Zealand has been able to rely on the principle of “first-in first-served” for allocating water while there was plenty of water for all, but that is no longer the case in many catchments, and will soon not be the case in more. Storing water may, as we discuss below, sometimes provide part of the answer to the problem. We think that it is urgent, however, as part of the process of establishing instream flows, for regional councils to set a threshold of pending scarcity (for example a proportion of the water available for productive use). When that threshold is reached, a more effective allocation scheme should be employed.

In catchments which are over-allocated or approaching over-allocation, we think that it would be helpful to develop a set of principles, including efficiency of use, even-handedness as between users and consistency of practice across regions. In the light of these principles we suggest that the Government investigate in detail three broad options for allocation:

- Continue existing consents but as they expire use the occasion to change conditions, to seek for example greater technical efficiency in water use, or allocate for a shorter period where there is uncertainty.
- Establish a different system of allocation through rules set out in a regional plan. These might be based on criteria relating to efficiency and to community considerations, and could provide a degree of preference for existing consent holders.
- Establish a payment system, for example the tender, auction or re-tender of permits, and so establish a value for the use of the water, recognising its relative scarcity and the extent to which various users might be prepared to pay for it.

There are pros and cons for each of these approaches. The RMA might need to be amended to give any one of them effect. All of them give rise to transitional issues, which we discuss below.

More flexible transfer of permits should be enabled

We think that water permits should be able to be transferred more easily. That could allow water to move to its “best use” over time, allow communities to transfer water more easily between their members, provide a quicker means of access to water for those who do not currently hold consents, and allow water to be reallocated without creating winners and losers. It could also help to combat over-allocation though allowing more efficient use within communities. Transfer schemes do not need to be national in scope, but there would be advantages in having national templates.

A framework is necessary to facilitate better transfer of water permits but first standards, targets and limits for water quality and flows have to be set, and over-allocation problems have to be resolved. The divisibility of consents to allow partial or temporary transfers must also be addressed.

We have identified three main options for the transfer of water permits that we think the Government should investigate further:

- Transfer of water permits without financial consideration – an approach which recognises water as a community asset that members of the community can transfer amongst themselves, and which allows communities to deal with their fluctuating needs on a cooperative basis.
- Trading of water permits without payment for the original permit – an approach which already exists to some extent (and does not rule out cooperative arrangements) but which allows the value of water for different uses at different times to be recognised. Even if it is permissible there is no reason to expect that trading of water permits would take place everywhere.
- Trading of water permits after payment for the original permit, which would realise a return for a public asset.

Transition needs careful thought

Changes to the current allocation system for water permits could change the current distribution of benefits. They will need to be carefully handled to minimise problems of stranded assets, including irrigation and hydro-electricity, and investment uncertainty.

The use of market mechanisms for allocation or transfer will depend for its success on a variety of factors including levels of scarcity and market characteristics. Careful thought will also need to be given to equity and implementation issues, including addressing over-allocation, and the application to non-consumptive users.

A particular point which needs to be borne in mind is the relationship between changes in allocative mechanisms for water and the discussions on water between iwi and the Crown. We think that any transition to more effective allocation should proceed hand-in-hand with

these discussions, to avoid the risk that it will need to be revisited later, with disruptive consequences.

We believe that the range of options for allocating water needs further detailed and integrated consideration. A collaborative process to help with this should be considered.

Rural water infrastructure

Better allocation can lead to efficiencies in water use, and effectively create “new water.” We have also given considerable thought to the issue of water storage, and the associated question of rural infrastructure. Improved rural infrastructure can provide a range of advantages for the economy, including through energy production and irrigation – and also for the environment. More reliable access to water can substantially increase primary production, including on dry-land farms. It can lead to more efficient and diverse use of water (higher value crops, for example) and reduce contamination of water bodies. It can produce energy savings and may allow the replenishment of aquifers and the restoration of streams

There are also disadvantages to be avoided or mitigated, including damage to the continuity of rivers and their ecologies and increased rates of contamination resulting from the intensification of land use. Infrastructure development will not be appropriate in all circumstances but we think that there is a way forward, based on best practice in this area, which can avoid expensive stalemate and destructive outcomes.

At its core it involves early collaboration (at the outset of feasibility planning, long before the consenting stage) at both a strategic and consent level with a wide range of stakeholders, and with iwi, to consider impacts, manage risks, improve outcomes and contain costs. Early collaboration is likely to improve a range of outcomes, reducing risks for applicants and reducing litigation and contention over infrastructure schemes.

Regional planning done on a collaborative basis would help us to move in this direction. So would regional rules which govern the way consents above a certain size are prepared and require a collaborative process, and national instruments which give preference to large consents, regional plans, and Water Conservation Orders that have taken this approach.

Compliance is an important issue. We suggest that regional councils and consent holders should be able to withhold water where the environmental conditions of the consent are not being met. The permissible duration of water permits for rural water infrastructure may need review.

Changes to governance

Improved structures and processes are needed to improve national direction and coordination, to better reflect the Treaty relationship with iwi, to ensure better performance at the regional level, and to provide a coordinated system of monitoring of water management performance and outcomes. We expect that governance can be improved while keeping key features and strengths of the current system, but if performance at the regional level does not improve this question should be revisited.

We propose the establishment of a National Land and Water Commission as a non-statutory body constituted on a co-governance basis and reporting to a core group of Ministers. It would act as a coordinating, leadership and collaborative body, helping to ensure consistency and action, including in relation to clean-up of degraded waters. A principal function would be to develop and oversee the implementation of a National Land and Water Strategy, developed through a collaborative process and building on the work of the Land and Water Forum.

A National Policy Statement is a key instrument in the governance system that we recommend. The Minister for the Environment asked us to consider the Board of Inquiry's recommendations on an NPS for Freshwater. We believe that we need an NPS, and quickly, and that the current draft is a basis to work from. Our report identifies some areas where we agree changes are needed, and we think that the government should consider promptly a set of issues which we agree need further work, and deal with them through collaborative processes that consider a suite of national instruments. (Some think they should be dealt with in the current NPS, others think they should be dealt with in other ways.)

We envisage that the National Land and Water Strategy would have a wider national oversight and integrating function, including identifying opportunities of enhancing the value of water across cultural, economic, environmental and social values, and supporting links between water and other related national issues.

Regional governance must be improved if the current devolved model is to be retained. We propose the addition of government appointees to regional councils to provide skills and attributes that they may lack; the mandatory development of regional water plans, with a national template, and following a collaborative approach; and adequate representation for iwi in water-related committees.

Improved direction must be given to regional councils including through National Policy Statements and National Environmental Standards. More systematic use should be made of the current Chief Executives Forum linking central and regional government Chief Executives to strengthen coordination between regional councils and between them and the centre. Collaborative processes should be used more systematically.

It is essential to institute an active process of monitoring and reporting on both performance and outcomes of water management. We see a key and enhanced role for the Parliamentary Commissioner for the Environment.

Science and Knowledge

High quality science and knowledge, including Mātauranga Māori and the social sciences and economics, are critical to water management, and a vital element in its governance. Good science will strengthen our international brand, and become an innovative source of land management tools and techniques. We believe that our knowledge systems should be based on data consistently collected, archived and publicly available, should be made an integral part of all of our freshwater and land use management (including in the recommended National Land and Water Commission), should be disseminated in an accessible form, and should be underpinned by research strategies which draw on the full range of related disciplines.

Water Services Management

Urban water supply, wastewater treatment and stormwater are an essential dimension of water management in New Zealand and have a major bearing on its outcomes. We think that changes are desirable to improve performance in these areas, along with the application of best practice, adaptive management and efficiency drivers. To make progress in these areas it would be desirable to engage a broader set of stakeholders in urban issues than is represented in our Forum. As a starting point we suggest an investigation to look at the possible benefits of rationalising the way these services are organised, and that subsequently the issues of volumetric metering and direct billing should be worked through collaboratively with stakeholders.

Drainage

We suggest that the legislation on drainage needs to be reviewed to ensure its consistency with the broad view of land and water management in this report, including the protection of wetlands and biodiversity.

Flooding

Floods are among the most frequent and costly natural disasters in New Zealand. In some though not all cases they can be exacerbated or mitigated by land use activities. We suggest that greater national direction in flood management, and perhaps additional extension services, may be desirable.

List of recommendations

Set Limits for Quantity and Quality

1. Central government should define national objectives for the state of our waterbodies and set an overall timeframe within which they will be achieved, through instruments (National Policy Statements and National Environmental Standards) made under the Resource Management Act.
2. Regional councils must give effect to these national objectives at catchment level taking into account the spatial variation in biophysical characteristics of their waterbodies and their current state, and by expressing objectives at a regional level as measurable environmental states, and linking these to standards and limits.
3. Regional councils must engage with communities including iwi about the way their waterbodies are valued, and work collaboratively with relevant land and water users and interested parties throughout the catchment to set specific targets, standards and limits through their Regional Plans, including timeframes for meeting them.
4. Catchment standards and limits must at least meet national level objectives.
5. Central government should establish uniform processes for accounting for spatial variation of waterbodies, defining objectives and standards setting, and implementation by regional councils.
6. Both processes and outcomes should be monitored and regularly reported on.

Achieving Targets

7. Regional councils should employ a range of instruments to ensure that targets and limits they set are met, including voluntary schemes, codes of good management practice (including audited self-management), regulation, and funding. They should do this in collaboration with stakeholders and iwi.
8. Good management practice in land and water use must be encouraged by regulators, industry and others as an essential tool for improving and maintaining water quality, quantity, and water use efficiency.
9. Good management practice must operate within the overall framework of standards and limits. Targets and measures included in good management practice programmes need to be tailored towards achieving specific water outcomes.
10. Regulators and industry should provide incentives, assistance and penalties to improve uptake of good management practice.
11. Good management practice should be continuously improved, including through adaptive management, with wide stakeholder involvement in design and review.
12. Effective riparian management, including stock exclusion where topography allows, should be prioritised by pastoral industries as an important tool which contributes to enhanced water quality. In those areas where reticulated stock water provision is not possible or practical, and natural surface water is the sole source of water for grazing animals, provision for access to water must be allowed.

13. Audited self management should be used by industry and regulators to ensure that outcomes are being met.
14. A robust policy framework which sets the site-specific objectives for good practice in terms of water outcomes is needed.
15. Robust industry standards and audited self management schemes need to be recognised in the development of regulatory approaches to water quality.
16. Central government should provide guidance to regional councils on regulatory design for water quality.
17. Regional councils should ensure that regulatory approaches are as far as possible consistent across catchments and between councils.
18. Provisions for Water Conservation Orders should be amended to achieve an integrated management approach including land use.
19. The proposed National Land and Water Commission should investigate the use of price based measures for improving water quality, identify any law changes required, and provide guidance and assistance to regional councils on their design and the circumstances in which they might be used.
20. A fund should be established that would, operating within an overall strategic framework set by the proposed National Land and Water Commission, enable clean-up of contaminated waterbodies to occur.

Improve Allocation

21. Limits are required to protect instream values. Allocation limits (including setting reliability levels) may be established. Both should use the process set out in recommendations 1–5.
22. Allocation of water should start at the boundaries of the waterbody, surface or groundwater.
23. The approach of first-in first-served does not work in an increasing number of catchments where water is fully allocated or approaching full allocation. Regional councils should set a threshold for each catchment. When the amount of water allocated exceeds or threatens to exceed this threshold a more effective allocation system should be put in place.
24. Scarce water should be allocated as efficiently as possible, and water allocation methods should not pick winners based on land use.
25. The Government should consider three broad options for efficiently allocating scarce water after instream limits have been set:
 - continuing existing consents but using consent expiry as an opportunity to make changes to conditions;
 - using a different administrative system based on efficiency criteria and community considerations;
 - payment, including through the tendering, auction or regular re-tendering of permits.

26. A more flexible system for transferring water permits should be put in place only once over-allocation of water has been managed. Each regional council must develop plans to manage any over-allocated catchment in its region.
27. The government should consider options to allow water permits to be transferred more freely, including:
 - permits being able to be transferred without financial consideration between cooperating members of the same community;
 - permits being able to be freely traded without payment for the permits;
 - permits being able to be freely traded but only after payment for the permits;
 - the subdivisibility of permits;
 - requiring regional councils to define the areas and conditions within which transfers could freely take place, without requiring individual consideration of their site-specific impacts.
28. The government should consider establishing a collaborative process to investigate in further detail the allocation and transfer options, including considering water priority use issues and the transitional implications (including equity issues and the risks to existing infrastructure investments) of any changes to the water allocation framework.
29. The transition to any new system of water allocation should proceed hand in hand with Crown-iwi discussions on iwi rights and interests in water management.
30. National direction should be given to regional councils to provide:
 - a consistent process for developing a scarcity threshold for each catchment;
 - guidance for allocation and transfer methods, and the circumstances in which they should be used;
 - consistency of approach to setting instream limits and to water allocation, while recognising spatial variability.

Rural Water Infrastructure

31. Regional planning on a collaborative basis must occur so that rural infrastructure can be developed in a way that provides a range of social, economic, cultural and environmental benefits.
32. Regional rules should set clearly defined standards and pre-conditions for the processing of consents for rural water projects over a certain size, including the use of a collaborative approach starting early in the project feasibility stage.
33. National instruments should be developed to enable and give priority to large scale consents, regional plans and Water Conservation Orders that have undertaken an initial collaborative approach over proposals that have not undertaken this approach.
34. Both regional councils and holders of consents in cooperative rural infrastructure schemes should be able to withhold water in circumstances where environmental conditions of the consent to take water are not being met.
35. Public funding of rural infrastructure projects should be targeted to early stages of such projects, and linked to the use of collaborative approaches for the proposal design.
36. The permissible duration of water permits for rural water infrastructure should be reviewed.

Changes to Governance

37. A non-statutory National Land and Water Commission should be established on a co-governance basis with iwi.
38. The Commission should develop and oversee the implementation of a National Land and Water Strategy, and advise Ministers on the management of water resources. The role of the Commission is fully set out in paragraph 171 of this report.
39. The Strategy should:
 - identify opportunities for enhancing cultural, economic, environmental and social value in an integrated way from water resources, including water infrastructure development;
 - support links between water resources and other related nationally significant issues and objectives;
 - set out expectations and outcomes capable of informing the development of regional water strategies;
 - set out needs and priorities for data and knowledge about water;
 - recognise the relationship between iwi and the Crown, and iwi expectations for water management.
40. Collaborative approaches should be mandated for the development of any land and water strategy, or regional water plan.
41. National direction for regional councils must be given through national policy statements and national environmental standards, and templates on different aspects of water management. Regional Councils should be assisted to resolve capacity issues including through coordination.
42. Improvements should be made to the process for developing any National Environmental Standard to ensure the process has a more collaborative option.
43. Regional council performance in water and related land use management should be improved through:
 - government appointments to regional council committees or councils;
 - the development of non-statutory regional water strategies;
 - the mandatory development of integrated regional water plans under the Resource Management Act, according to a national template and using a collaborative approach;
 - ensuring that iwi have adequate representation in regional committees dealing with water;
 - the establishment and maintenance of comprehensive water data sets on a basis consistent with national data; and
 - using their existing powers under section 30 of the RMA to control those land uses that impact on water quality.
44. Regional councils should have the option of:
 - notifying a regional water plan under Schedule 1 of the RMA and following that process in full, or
 - after having used a collaborative approach, making a decision on the plan without conducting a hearing as set out in Schedule 1, and having that decision referred directly to the Environment Court if it is challenged by any party.

45. In limited circumstances, with Ministerial approval, moratoria are a possible tool to facilitate strategic planning in areas where it is needed to get better water management outcomes.
46. The Forum of regional council and relevant government agency Chief Executives should be strengthened to improve 'whole of government' direction, provide essential links between central and regional government, and focus on removing obstacles to implementing improved water management.
47. The Parliamentary Commissioner for the Environment should be responsible for a rolling system of two-yearly reporting on the effectiveness of each regional council in achieving water management goals and objectives, and a five yearly review on the effectiveness of the system of land and water management.

National Policy Statement

48. The government should:

- promulgate a National Policy Statement for fresh water quickly. The current draft as recommended by the Board of Inquiry is a basis to work from.
- consider changes in the following areas of the current draft –
 - the references to Tangata Whenua roles and Māori values and interests
 - drafting changes to policy C1 to include reference to "mitigate" in achieving prescribed standards
 - policy E2 to clarify what contamination means in relation to the objectives
 - drafting changes to the transitional measures to correct a perceived vires problem.

- consider promptly a set of issues which need further work. They include -
 - specific measures dealing with use and development
 - recognising the benefits of significant infrastructure
 - making environmental values more specific by adding an objective which protects the values of fishing, swimming and mahinga kai, and
 - providing for allocation efficiency.

- deal with these issues through collaborative processes that consider a suite of national instruments (note: some Forum members think these issues should be addressed in the current NPS; others think they should be dealt with separately).

Science and Knowledge

49. Freshwater science and knowledge (including Mātauranga Māori) is an essential part of governance and should be:
 - based on reliable data consistently collected, archived and publicly available;

- made an integral part of the framework of freshwater and land use management, including its collaborative and strategic processes;
- disseminated in an accessible form to enhance uptake;
- underpinned by a water research strategy and a land resources and use research strategy which draw on the range of relevant disciplines.

Water services management

50. The way water services infrastructure is managed and organised should be investigated to consider the potential benefits of rationalisation. This includes the possibility of a national regulator with oversight of pricing and performance issues.
51. Subsequently, the issue of volumetric metering and direct billing should be worked through collaboratively with stakeholders.

Drainage

52. The government should review legislation relating to drainage to ensure that it is consistent with the need to protect wetlands and biodiversity, and the recommendations contained in this report.

Floods

53. The government should investigate the role of greater national direction in flood management, and whether additional extension services are required.

Water and its management in New Zealand

1. Water is one of New Zealand's major national advantages. It underpins much of our economic development and growth, is part of our heritage and identity, is a means of pleasure and recreation, and supports our unique ecosystems. Water sustains human, plant and animal life. It is essential to the food that we eat.
2. Water is a taonga which is central to all Māori life. Iwi interests in water are all encompassing, but key is their ability to maintain the health and wellbeing of waterways to sustain their tikanga – their way of life and being. As with all natural resources, iwi apply an intergenerational management philosophy.
3. Water is a key economic advantage for New Zealand in an increasingly water constrained world. Managing it well is integral to our future. Water provides New Zealand with hydro electricity which is the main source of renewable energy. Primary production will remain an important part of New Zealand's economic future, and the combination of water availability, climate and geography helps our competitiveness internationally in agriculture, horticulture and forestry. Many processing and manufacturing industries use water as an input.
4. Water is part of our brand. It underpins our international and domestic tourism industry, and the '100% Pure New Zealand' brand is also leveraged by other sectors trading overseas. There is increasing awareness that it is false to divorce our economic from our environmental welfare.
5. Water is valued widely by all New Zealanders, though many of us take its quality and availability for granted. Our rivers and lakes are a source of recreation and enjoyment, and we also value them for ecological, biodiversity and recreational reasons.
6. So there are multiple interests for water: spiritual/traditional/identity interests; recreational/social/personal interests; ecological and environmental interests; and economic interests; and in some respects these interests complement each other and in some they compete.
7. The pressures on water management in New Zealand are not new but they are building as population increases and land use intensifies. We need to have systems in place that can help New Zealanders agree on the outcomes that we want for freshwater. Those systems need to provide for multiple values to be debated, assessed, aligned and managed, and allow us to implement water management regimes that will optimise all of these values.

Land use, soil and water are linked

8. Water must be managed in the context of the hydrological cycle as a whole. Water is taken from natural sources (such as lakes, rivers, aquifers) for use in households, on land, and in industries.
9. Rain finds its way to our waterways over land and soils or through them, carrying sediments, nutrients and contaminants. Therefore, the way we use land and manage soil affects the quality and availability of fresh water.

COMMON SOURCES OF FRESHWATER POLLUTION



(Ministry for the Environment, 2007)

10. Understanding the hydrological cycle and the influences of land use on water is critical to the development of sound water management.
11. The Forum's Terms of Reference do not include coastal and estuarine waters; but New Zealand's freshwater rivers and streams flow into estuaries, hapua (coastal lagoons), and the coastal environment. Coastal and estuarine environments can be altered by a reduction in freshwater flows or through contamination by sediments, nutrients and toxicants.

Taking account of natural variability

12. New Zealand spans latitudes and altitudes from sub-tropical to alpine, and our waterbodies are exposed to a wide range of climates and rainfall patterns. Rock and soil types and natural vegetation cover vary across the country, influencing the natural mineral content and sediment loading of waterbodies.
13. These factors mean that waterbodies do not all share the same properties or natural ecosystems, and they do not respond the same way to human-induced pressure or change, including different land uses. They are 'spatially variable', and in managing them we have to take this variation into account.
14. The catchment (or sub-catchment) is in most cases the best physical unit for integrated management of waterways. Science and management effort are therefore directed towards integrated catchment management initiatives.

Water use and interests

Iwi and water

15. Iwi Māori have a living relationship with freshwater that is founded in the respective cosmologies of each iwi and that has spanned, and will continue to span, the full breadth of cultural, environmental, social and commercial interests. The nature of the relationship between iwi and freshwater forms the basis of iwi rights, interests, values and objectives pertaining to freshwater management. Iwi assert foundation rights to freshwater based on the Treaty, customary, and aboriginal rights and that these rights continue to hold relevance in the wider legal framework of water management. Iwi are keen to see resolutions emerge from their conversations with the Crown that improve the clarity and certainty of iwi rights to freshwater. A robust system recognising iwi in its design is needed.
16. Some common tenets of the relationship between iwi and freshwater are:
 - a. The relationship between iwi Māori and freshwater is founded in whakapapa, which is the foundation for an inalienable relationship between iwi and freshwater that is recorded, celebrated and perpetuated across generations
 - b. Freshwater is recognised by iwi as a taonga of paramount importance
 - c. Kaitiakitanga is the obligation of iwi to be responsible for the well-being of the landscape. This obligation is inter-generational in nature. Kaitiakitanga has been given effect over the generations in many ways and differs amongst iwi and across differing circumstances.
17. Waterbodies frame iwi identity – tribal traditions are transmitted across generations by continuing customary practices with waterbodies and visions for the future of iwi turn on the health and wellbeing of freshwater. The obligation to protect freshwater and to maintain and express the spiritual and ancestral relationship with freshwater so as to leave a worthy inheritance for future generations is fundamental to iwi identity.

Legal framework for water use

18. For most of New Zealand's history following European settlement, rights to use freshwater have followed patterns of pastoral land ownership, via a common law riparian regime, meaning access to freshwater was linked to ownership of lands adjoining riverbanks. Water could be used for most purposes provided the quantity and quality of water available for downstream riparian users was not diminished. Riparian rights holders could sue if their interests were adversely impacted.
19. Common law riparian rights to freshwater were extinguished in 1967 when a consenting regime for allocating rights to use water was introduced under the Water and Soil Conservation Act. Some historic perpetual rights to use water were preserved (e.g. mining rights) but eventually these will also be brought under statutory control (and expire in 2021).
20. The basis to take and use or discharge to water now derives from the Resource Management Act 1991 (RMA). Permits to take and use or discharge to water are time-limited, and do not give rise to automatic rights of renewal. In practice, however, existing

water permit or discharge permit holders enjoy significant protection of their priority over newer entrants.

Goals and principles

21. The Forum has developed principles and goals for water policy.

Goals

22. We want to ensure that water will meet the ongoing cultural, economic, environmental, and social needs of New Zealand by:
- a. protecting and sustaining the life of waterways, and other instream values
 - b. maintaining and improving the quality of freshwater
 - c. improving opportunities to enjoy cultural, amenity, recreational and economic benefits from freshwater
 - d. maintaining and improving drinking water
 - e. ensuring efficiency in the use of water
 - f. ensuring that water is not over-allocated
 - g. sustaining the advantages of water for economic benefit
 - h. restoring, maintaining and protecting the mauri of freshwater resources.

Principles

23. To achieve these outcomes, we believe that sustainable reform must:
- a. be built on an understanding of the hydrological system as a whole, and the relationship between land and water
 - b. reflect the values and interests of both Treaty Partners
 - c. reflect national directions but be based on catchments
 - d. embrace innovative solutions and technologies, and make good use of knowledge
 - e. occur over time – but with clear and measurable goals and timetables
 - f. involve collaboration across all sectors
 - g. reflect evolving societal expectations
 - h. involve continuous improvement and adaptation
 - i. take account of the interests of future generations.

Problems with water and its management

24. New Zealand's freshwater is still good overall, but its quality and availability has been deteriorating. The nature of that deterioration varies between and within catchments.
25. The debate about some economic uses of water has become fractious and difficult to resolve, and our processes for allocating it are under strain in an increasing number of catchments.
26. There are a number of reasons for these issues:
 - a. We have not acknowledged or managed limits
 - b. Lack of engagement with stakeholders and iwi
 - c. Policy, planning and regulation are inconsistent
 - d. Unsatisfactory governance
 - e. Poor use of science and knowledge
 - f. Water services management is disjointed and suffers from underinvestment.

We have not acknowledged or managed limits

27. To manage water well, as with other resources, regulators and users have to understand the boundaries - how much can be taken from a waterbody without damaging its health, and what level of contaminants it can absorb: its assimilative capacity. It is possible to set limits under the RMA, but this has not been the norm. Central government has not until now used national instruments to provide standards and direction (although two are currently in preparation). Only four regional councils have a complete set of operative or proposed water quality limits for surface and groundwater, allocation regimes for surface and groundwater, and flow regimes for surface water across their regions,¹ and there is debate about whether these limits are appropriate or effective. Approaches to setting standards for instream and allocable flows differ between regions; and where limits have been set, they have not always been adhered to. There are few integrated assessments or approaches to point and diffuse source contamination, or integrated approaches to quality and quantity. Without these tools, cumulative effects cannot be managed.
28. **Economic opportunities are lost** – the failure to recognise limits has also resulted in economic opportunities being lost. There are problems with the system of allocating water. Rights to take and use water have been allocated on a first-in first-served basis essentially because there was a belief that there was no shortage of water to allocate. First-in first-served, lack of national direction, a lack of planning and an absence of limits has resulted in a 'water rush' in some catchments as applicants seek more water than they need, or seek to capture available water. It has proven difficult (but not impossible) to reduce entitlements once granted. Full allocation, combined with an inflexible water permit transfer system, reduces the availability for other or future uses. There can be a lack of clarity around reasons for allocation decisions – for example, councils using land use controls to 'pick winners'.

¹ Sinclair Knight Merz, 2010. Regional Council Practice for Setting and Meeting RMA – Based Limits for Freshwater Flows and Quality. Report prepared for the Ministry for the Environment.

29. In the absence of limits, first-in first-served encourages smaller takes and schemes, and shuts off strategic options, and it incentivises water 'hoarding' and over-allocation.
30. There is a variety of constraints that prevent greater flexibility in water use, including because 'take' and 'use' permits are often bundled, limits are not set, consents are not consistently defined, and the temporary or partial transfer of water consents is not empowered. Lengths of consents have also been cited as an inhibitor of infrastructure development. These problems can prevent water being put to its best and most efficient use, and have also affected the provision of rural water infrastructure for storage and reticulation schemes.

Lack of engagement with stakeholders and iwi

31. In large part central and regional governments have not been able to be set limits because it has been difficult to get agreement on what those limits should be, over what time period they should be achieved, and who should meet the cost. A contributing factor to this has been the general difficulty at both a national and local level of engaging stakeholders and iwi fruitfully, although there are encouraging examples of progress where engagement has occurred. In effect, most limits have been determined at the level of consents. Planning and consenting processes are cumbersome and adversarial with contested science, high costs, lengthy processes, litigation, delays and frustrations.
32. The planning and consenting process also suffers from a lack of early (pre-statutory) involvement by all stakeholders. It has been the experience of many Forum members that where genuinely collaborative approaches have been used, the outcome has been more durable and has been reached with less litigation.
33. The result of these problems has been that the management of water has been marked by conflict, litigation cost and uncertainty.

Policy, planning and regulation are inconsistent

34. There is no coherent and consistent policy and planning framework for water management among regional councils, and some councils have been unable or unwilling to plan for water. There is often, both at a national and regional level, a lack of strategic linkage between water management and issues that relate closely to it such as agriculture, energy, biodiversity, biosecurity, landscape and land use. The monitoring and enforcement of rules, consents and conditions by regional councils has also been variable.

Unsatisfactory governance

35. Some regional councils lack governance and technical skills - their resourcing does not necessarily relate to the size of the resource management challenges they face.
36. Nor has the overall governance and management of water been helped by the proliferation of agencies, fragmentation of responsibilities, and complex legislation.
37. Iwi have a Treaty relationship with the Crown, but they do not have a similar relationship with regional councils – to which the Crown has delegated water management, and where many of the decisions affecting their interests are made. There has been a failure to resolve how the nature of the Treaty partnership as it pertains to water should be given effect. There has been no clear direction to local government on their role on behalf of the Crown partner.

Poor use of science and knowledge

38. Freshwater science needs to be underpinned by reliable data consistently collected, archived and disseminated. A lack of consistency in data collection, monitoring and analysis by central and regional bodies reduces our ability to use science well. New Zealand has a strong base of science necessary to manage water but it is not always fully utilised.
39. While we know a lot about New Zealand's freshwater systems, we are not keeping pace with new demands for knowledge. The number of fulltime-equivalent scientists involved in researching freshwater is about one-third below the level of the late-1990s. Investment in environmental research has declined in real terms over that period. Research is required to improve understanding in many areas, including: the resources, dynamics and interactions of surface water and groundwater; the management of diffuse pollution; and the cumulative effects of contaminants.
40. Gaps in bio-physical science are mirrored by gaps in the social sciences and economics that impact on decision-making on water.
41. Mātauranga Māori has not been sufficiently recognised. It is important that it should be as iwi become increasingly involved in the governance and management of New Zealand's freshwater resources.
42. There is no single organisation currently tasked with providing the leadership required to deliver national science and knowledge priorities, and coordinate and optimise the use of resources across science agencies.
43. Despite any uncertainty caused by poor data compatibility and gaps in our knowledge, wise decisions about water resource management must still be made. Current decision-making processes do not deal well with uncertain information; the information we do have is not used to best effect. The capacity to make science and knowledge available to land users is often not as good as it should be.

Water services management is disjointed and suffers from underinvestment

44. There are over 2000 separate water supplies and 350 wastewater treatment facilities in New Zealand. Water supply, wastewater treatment and disposal, stormwater management and flood protection are controlled by some 67 local utility providers and 12 regional regulators (post the formal amalgamation of the Auckland isthmus). Parts of the system suffer from inefficiencies of scope and scale.
45. Water services management is a significant infrastructure issue for New Zealand. Department of Internal Affairs figures for the 2009 – 2018 Long Term Council Community Plans indicate that \$11.46 billion of capital and \$17 billion of operating expenditure will be spent in this time period. The annual capital spending figure has increased by 41% in three years. The scale of this spending indicates the extent to which good infrastructure management is required. A number of separate reports (including from the Parliamentary Commissioner for the Environment and the Office of the Auditor-General) have indicated that management in this area is inconsistent and that a number of smaller territorial local authorities are struggling.

Current situation

46. The issues described above have all contributed to the current situation for water quality and availability.
47. **Water quality** – water quality monitoring by New Zealand’s National River Water Quality Network (NRWQN) shows that by international standards our water quality, taken as a whole, is generally good but declining.² The situation is more serious when lowland river sites, that are not comprehensively covered by the NRWQN but rather, by regional council monitoring, are considered.³ There, nutrient concentrations frequently exceed ANZECC trigger values,⁴ water clarity does not meet Ministry for the Environment guidelines, and faecal bacterial levels often exceed the Ministry of Health guidelines.
48. A number of OECD land-use metrics indicate the mounting pressure on water quality. For instance, between 1990 and 2005 NZ had the highest percentage increase (>800%) in nitrogen fertiliser use of 29 OECD countries, and the second highest increase (>100%) in phosphate fertiliser use.
49. Over the last 20 years New Zealand has made significant progress in cleaning up point sources of pollution, though more needs to be done. At a national level, diffuse discharges (nutrients, sediment and microbes washing into water) now greatly exceed point source pollution.⁵
50. Many urban waterways remain highly polluted from the effects of:
 - a) sewage leaking from broken or overflowing sewer pipes, or being discharged into stormwater systems through faulty connections;
 - b) stormwater run-off from surfaces such as roads; and
 - c) discharges from processing facilities, for example wastewater treatment and industrial plants, either within, or in breach of, consent conditions.
51. Deterioration will continue to be felt into the future as contaminants from today and previous years work their way across and through lands and soils to waterbodies. This and the effects of any over-abstraction mean the impacts from past and present land use practices are yet to become fully manifest in some locations. Poorer water quality impacts on biodiversity, aquatic ecosystems, invasive species and instream uses. Many of New Zealand’s native freshwater aquatic species are threatened by habitat modification. Wetlands and lakes have been particularly affected. For example 64% of monitored lakes in pastoral landscapes are classed as ‘eutrophic’ (enriched) or worse.⁶
52. **Health**⁷ – water contaminated with animal or human faecal material may contain microbes which cause infection such as campylobacter, salmonella, giardia, cryptosporidium, noroviruses and hepatitis E. Although there is no national reporting system for waterborne diseases, annual cases have been estimated at between 18,000 – 34,000.

² Davies-Colley, R., 2009. Land Use and Water Quality in New Zealand – an Overview. *Water*, 162: 32–35.

³ How clean are our rivers? *Water and Atmosphere*, July 2010.

⁴ Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) commonly known as the ANZECC guidelines, provide reference for water quality management in New Zealand.

⁵ Davies-Colley, R., 2009. Land Use and Water Quality in New Zealand – an Overview. *Water*, 162: 32–35.

⁶ Lake water quality in New Zealand 2010, Part 2: Status and trends. Ministry for the Environment.

⁷ Sources: Environmental Science and Research presentations to the Land and Water Forum.

53. The majority of New Zealand's population (70%) receive good quality drinking water; however, the standard of drinking water in smaller communities is less likely to comply with the New Zealand drinking water standards. Some communities remain on permanent notice to boil drinking water because they cannot afford to upgrade reticulated supplies.
54. **Water quantity** – while New Zealand is accustomed to plentiful water supplies, scarcity is becoming a serious issue in many places depending on seasonal and climatic variations. Many catchments are over-allocated, and others are fully allocated, or approaching full allocation. Over-allocation is proving difficult to prevent or reverse although some regions have plans in place to manage it. Changes in weather patterns may worsen conditions in drought-prone regions and increase stresses for stormwater management in wet regions.
55. **Water use efficiency** – because we have been accustomed to abundant water, the current allocation system does not send signals about the opportunity cost of using water, or easily allow it to be allocated to its best use as limits are approached, reached and exceeded. Unreliability of supply tends to lead to inefficient use, and efficiency of use in urban areas is highly variable.
56. **Rural water infrastructure** – the development of irrigation and hydro electric schemes have been particularly litigious, bedevilled by fears that the economic benefits will be accompanied by damage to the environment, and by the hesitant growth of processes to identify outcomes that provide cultural, economic, environmental and social benefits.
57. **Water services infrastructure** – serious challenges in financing water services infrastructure have led in many places to deferred investment and maintenance, leakage and waste. Along with drinking water problems, in some areas there are issues with the management of wastewater and stormwater. Decision-making for major infrastructure projects has generally been slow and costly (although recent changes to the RMA will allow a faster process for major infrastructure projects).

The Iwi experience

58. For iwi, the contemporary discussion of freshwater evokes legacies marked by their exclusion from decision making, delegated authorities that have not included iwi, and painful ecological and cultural losses. Iwi uphold that these legacies are a fundamental part of their conversations with the Crown and create obligations such as the recognition of iwi rights and interests, clean-up of degraded waterways, and 'future-forward' attention to effective governance participation.
59. Iwi consider resolution of governance issues at the level of the Crown-iwi Treaty relationship provides the best likelihood of avoiding regional conflicts and addressing ad-hoc policy making via individual iwi Settlements or iwi litigation. Iwi are positive that governance participation by iwi is an essential component of any step change on freshwater. Governance arrangements should be mindful of existing agreements including the Waikato-Tainui Settlement and the Canterbury Water Management Strategy.
60. Iwi seek outcomes from land and water use that:
 - i. sustain or restore healthy mauri within waterways (a matter of first principle)
 - ii. retain sufficient water to ensure the continuation of customary instream values (indigenous ecology) and uses,
 - iii. retain the capability to satisfy iwi development aspirations, including by ensuring future access to water for commercial business.

61. Iwi have expressed preferences for “smart” development and support for the setting of resource limits. Iwi see economic development as vital for New Zealand but, within the context of a limited resource, subject to the constraints of reducing environmental footprints, and using technologies and innovation to build better production. Smart development may mean strategic reconfigurations of use in ways that deliver economic benefits with environmental benefits (e.g. changing uses from groundwater to surface water to improve flows in lowland streams).
62. The planning timescale is important to iwi. Longer term development planning is a mechanism for intergenerational considerations to be taken into account. Iwi seek formal participation in the setting of strategic development priorities at the national level, including via their direct dialogue relationships with the Crown.
63. Iwi have experienced planning that does not take adequate account of their values and objectives, and planning that creates policy enabling policy frameworks, but does not result in Councils committing to implementation. Some iwi have concluded that the Crown could have fixed problems with water if it had the desire, and support central direction to ensure iwi participation and direct the implementation of plans. Some councils need investments in capability to develop implementation for plans that give effect to iwi values and interests in practical ways.
64. Although the RMA introduced a number of provisions that support and uphold participation and the consideration of iwi interests in freshwater, fundamental issues between the Crown and iwi concerning the rights and interests of iwi have not been resolved. Iwi feel that the nature and extent of their rights and values have not to date been taken into account in allocation.
65. While the RMA contains provisions that recognise roles and responsibilities of iwi, such as kaitiakitanga, in reality water management processes do not support them to exercise and protect their interests actively at whatever level they deem appropriate.

What we need to do

66. Many of the problems in current water management will take time to resolve, although others will be quicker. This is for a number of reasons – diffuse source discharges already in the soil can in some cases take many years to reach water; new systems take time to implement; and there are a number of transition issues that will need time to resolve and put in place.
67. Starting now, we need to put in place a water management system that works significantly better, that is durable and that is capable of driving changes for the future. This may take time to build, and some of the benefits will not be seen by the current generation - but now is the time to start. Putting off decisions will only make them harder in the future.
68. The changes we make need to maximise the range of cultural, economic, environmental and social values possible from water. We do not start from a blank sheet – appropriate tools are already available under the RMA and there are a number of examples of good practice. Many of the tools available to us, however, including in legislation, have not been used.
69. We need to use the RMA and the tools it provides to greatest effect, together with a national strategic approach, and using collaborative approaches to engage water and land users, and communities, including iwi, in the management of our water resources.
70. This change needs to be widely supported by New Zealand industries, business, communities, and civil society, and by iwi. Iwi believe that there are no waterbodies that should be left to degrade or that cannot be fixed, and that an intergenerational perspective should be taken to cleaning up degraded waterbodies.

Set limits for quantity and quality

71. It is in all our interests to maintain and improve the quality of freshwater in New Zealand, including instream values. To do so, we need limits and standards and targets⁸ in line with national needs, values and objectives, which are applied taking account of the needs and values and objectives of communities.
72. Limits and standards for fresh water provide certainty and inform resource users and regulatory authorities if and when a waterbody has been fully allocated, either for extractive purposes, or in terms of its assimilative capacity. Without them there is no guard against over-allocation, which causes equity issues for existing users and uncertainty for both environmental outcomes and economic use.

⁸ A standard is an established norm or requirement. In an environmental sense it is the point that is set to ensure an objective is met. There are three main types – standards, limits and targets. **Standards** are commonly used to describe a threshold, and are often used in point source situations as well as in water allocation. **Limits** are defined as the capacity for use of a resource, and most often used in allocation situations, often as a rate or load. **Targets** are a standard or limit that must be met at a specified time in the future. These are used where there is an over allocation of a resource, referring to water allocation or assimilative capacity. They are only used in “claw back” situations.

73. Setting limits will mean that we need to address existing degradation in some areas but will enable more resource use in other areas. Setting standards is a significant tool in addressing cumulative effects, particularly of diffuse source discharges.
74. In setting standards and limits for freshwater, we need national objectives, a spatial framework to take account of the differences in the biophysical characteristics of our waterbodies and their current state, and collaborative processes which involve local stakeholders at the catchment level.
75. We therefore propose the adoption of a standards framework which:
- a. stems from a strategic view of water for New Zealand
 - b. defines national objectives for the environmental state of our waterbodies and the overall timeframes within which to achieve them through National Policy Statement (NPS) and National Environmental Standards (NES's) made under the RMA
 - c. requires regions to give effect to this national framework at regional to catchment (or sub-catchment) level taking into account the spatial variation in biophysical characteristics of their waterbodies and their current state, by expressing objectives at a regional level as measurable environmental states, and by linking these to standards and limits
 - d. within that framework, requires regions to engage communities, including iwi, about the ways in which their waterbodies are valued, and to work collaboratively with relevant land and water users and interested parties to set catchment-specific targets, standards and limits
 - e. maintains regional councils' control of the use of land for the purpose of the maintenance and enhancement of the quality of water in waterbodies and the maintenance of the quantity of water in waterbodies and coastal water.
76. The framework should address:
- a. point source discharges, including from urban, industrial and rural sources
 - b. diffuse discharges, both urban and rural
 - c. flows.
77. There are three important components of standard setting:
- a. making **value judgements** and expressing these as **objectives**; and then
 - b. applying these objectives through the use of **spatial frameworks**; and then
 - c. defining the objectives as standards, limits and targets using science and other forms of knowledge.
78. The first step in setting standards is establishing an “acceptable” environmental state and expressing this as an objective. The choice of acceptable environmental state is a value judgement. The value judgement should involve consideration of economic, environmental, social and cultural values as well as requirements and other limitations set out in legislation or other policy instruments. It allows, for example, choices to be made about managing the ‘current footprint’ of land use activity causing contaminants. The value judgement can be assisted by scientific, social, Mātauranga Māori and economic knowledge.
79. The setting of standards, limits, and targets requires the definition of a spatial framework of management units. The definition of management units involves grouping waterbodies that can be considered in the same way based on their values (recreation, ecological, cultural, and economic etc), their physical character and response to resource use, and their existing state. This is one of the keys to standard setting.

80. The setting of standards, limits and targets requires a cascade of objective setting from national to catchment level, and with increasing detail.
81. National instruments, such as an NPS or (NES's), focus on matters of national importance. These instruments need to identify national values and define national objectives to protect these values. The cascade of objectives and greater levels of detail, down to an appropriate level, allow regional plans to give effect to national instruments. This can be at a regional, catchment, or sub-catchment level.
82. Local objectives for each catchment are identified by the community to protect and enhance values which are important to them. Value judgments are made between competing values, and objectives set accordingly. Standards, limits and targets can then be set to meet the desired objectives. This occurs at a Regional Plan level. The use of collaborative approaches at a regional level will facilitate outcomes that try to enhance all values to the greatest possible extent. There needs to be a clear understanding by all parties of the implications of decisions, and how they will be implemented.
83. Any objectives set at a catchment level will need to be set in such a way as to ensure that the national objectives are met.
84. The setting of limits and targets in over-allocated situations is important. Targets identify the desired end point and the time frame within which it must be achieved. Setting interim limits, at the existing resource use, so that further over-allocation does not continue, is also important.

The Ngāi Tahu Cultural Health Index: assessing the health of streams and waterways

Based on cultural values and knowledge, the Cultural Health Index (CHI) provides a means by which iwi can communicate with water managers in a way that can be understood and integrated into resource management processes. It is a method to develop Māori stream health indicators for important values such as mauri and mahinga kai (food gathering) developed by linking Western scientific methods and cultural knowledge about stream health. The iwi/hapū combine three assessments – status of the site, mahinga kai values and stream health – to give an overall CHI score for each river site. It should be noted that the use of such assessments will vary from iwi to iwi and will not be appropriate in all circumstances.

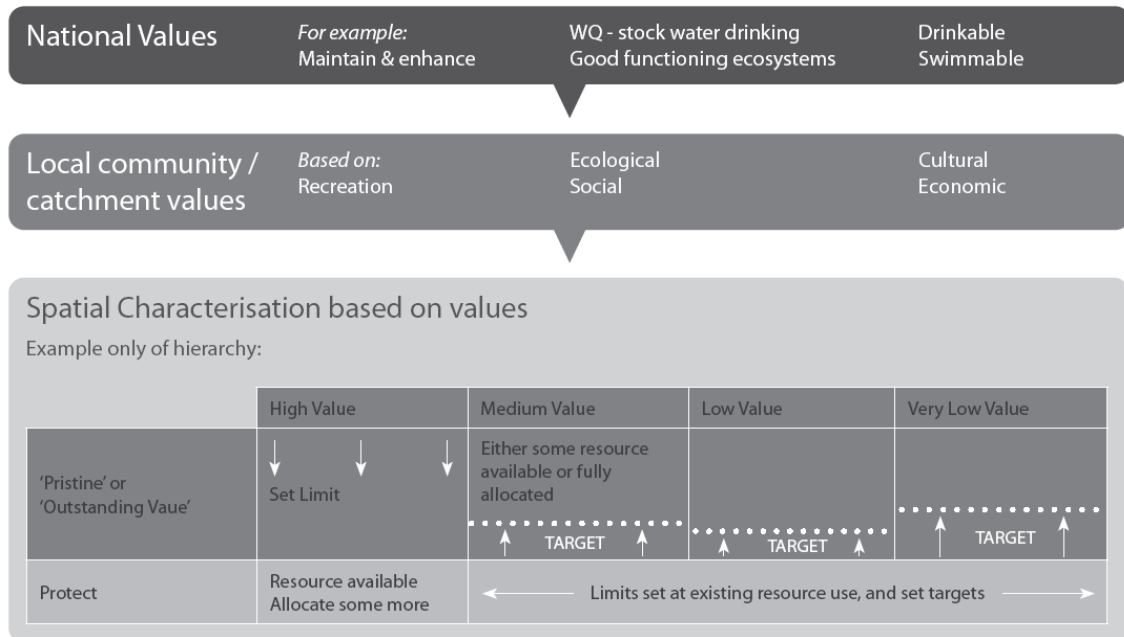
Tangata whenua will have the CHI score as well as all the data collected at the site, including an inventory of mahinga kai species. By analysing the individual scores for each of the factors that make up the index, they will be able to diagnose issues, decide on priorities and devise remedial actions necessary to the restoration or enhancement of the cultural values of the site. The CHI will allow them to monitor changes and improvements over time.

The CHI can be used as a tool to address questions such as:

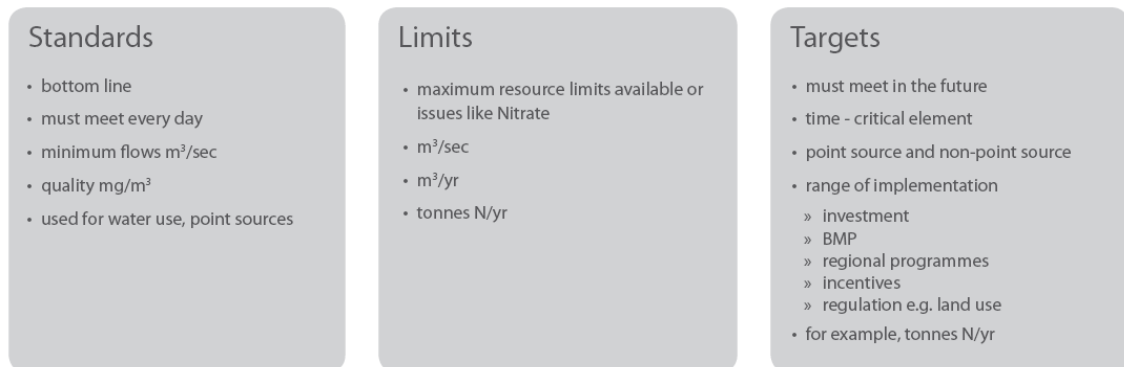
- How healthy are the streams and rivers in our rohe?
- How can we make the council aware of sites that are most significant to us?
- We know that the river is degraded. How can we work out what we can do together with water managers to restore and enhance the health of the river?

85. This standards setting process is illustrated below.

SETTING WATER QUALITY STANDARDS / LIMITS



WHAT THE STANDARDS ARE



86. **A National Environmental Standard** will be required to establish uniform processes for setting standards as described above. This NES needs regional councils to set standards, describe the process for defining spatial frameworks, the nature of the objectives, limits, targets and standards, and how they will be implemented.
87. Limits should be clear enough to achieve certainty but need to be adaptable in the face of new information, and technology developments.
88. Transitional provisions are required in any interim period. It will take time to change Regional Plans to implement a standards framework. Transitional provisions need to be part of an overall package, to allow a smooth transition. Use of national instruments, such as an NES or moratoria, may be required.
89. It is important that transitional provisions recognize that “one size does not fit all”, and they are focused on those areas where waiting until new Regional Plan provisions are in place will result in significant adverse environmental effects.

90. A standards framework of this kind will be able to provide:

- a) clarity for environmental outcomes;
- b) an intergenerational focus on water resources;
- c) a basis for managing cumulative effects;
- d) clarity about future resource availability and conditions of resource use;
- e) the ability to effectively manage activities that affect water quality other than point source discharges, such as land use, water takes, dams, diversions and works in riverbeds;
- f) the ability to measure whether objectives are attained and thus proper monitoring of the effectiveness of plan provisions;
- g) a basis for prioritising water enhancement and for the associated expenditure of public funds;
- h) for the engagement of the community;
- i) a basis for land-use planning.

Recommendations

Central government should define national objectives for the state of our water bodies and set an overall timeframe within which they will be achieved, through instruments (National Policy Statements and National Environmental Standards) made under the Resource Management Act.

Regional councils must give effect to these national objectives at catchment level taking into account the spatial variation in biophysical characteristics of their water bodies and their current state, and by expressing objectives at a regional level as measurable environmental states, and linking these to standards and limits.

Regional councils must engage with communities including iwi about the way their water bodies are valued, and work collaboratively with relevant land and water users and interested parties throughout the catchment to set specific targets, standards and limits through their Regional Plans, including timeframes for meeting them.

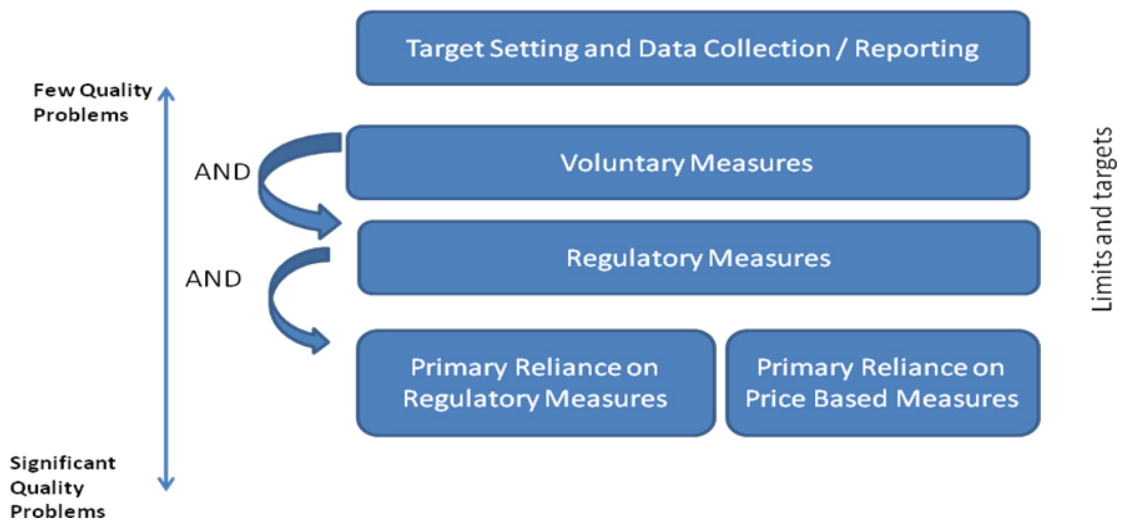
Catchment standards and limits must at least meet national level objectives.

Central government should establish uniform processes for accounting for spatial variation of water bodies, defining objectives and standards setting, and implementation by regional councils.

Both processes and outcomes should be monitored and regularly reported on.

Achieving targets

91. Before limits are set, and during the period when they are being developed, there is a need to consider how they will be achieved. At a high level the 'toolbox' that is available to industry, the community and regulators to achieve limits and targets is not large – there are a handful of interventions available. When each is used will depend on a variety of factors – including how large the problem is, the nature of the catchment and contaminant(s), timing issues, the difficulty of implementation, and the relationship of the problem to other forms of intervention. What is important is that there is as much clarity as possible about how each approach helps in meeting the target.



92. Regional councils should collaborate with stakeholders and iwi to determine which intervention(s) will be used to meet targets and limits for waterbodies in their region.

Good Management Practice, Audited Self Management, and adaptive management

93. One major way of achieving standards and targets will be through the good management practice of individual land users.
94. Sector-led good management practice (GMP) places responsibility for delivering outcomes on to the industries or sectors whose participants' actions affect particular water outcomes, and is more likely to lead to innovation. As a tool, GMP is useful for rural and urban production systems and water services management.
95. Where a water quality or quantity issue is identified, industry should be encouraged to implement GMP programmes that respond. GMP targets and measures have been developed that respond to a variety of rural and urban water issues, including contaminant discharges and water use efficiency.

Water quality in the Aorere and Rai catchments

In 2005, there was conflict in Golden Bay's Aorere community over water quality. Operating in an environment with high rainfall and rapid run-off, dairy farming was believed to be affecting mussel farming in the bay. Mussel farming had almost become unviable due to restrictions on the number of harvesting days resulting from poor water quality. With the help of the New Zealand Landcare Trust, local dairy farmers began to deal proactively with the issue.

A team of farmers applied for Sustainable Farming Fund (SFF) funding in 2006 to run a three-year project in the catchment. SFF funding of \$218 000 was granted, alongside funding from Landcare Trust, Tasman District Council and a lot of in-kind work by farmers themselves. The project used local science, farm-scale nutrient management plans and farmer leadership as the tools to improve water quality.

Local dairy farmer Sue Brown says, "It's about dairy farmers taking ownership of our environmental performance, seeing it as an integral part of future business success, not a compliance issue."

Four years on, the community has seen huge on-farm investments in dairy effluent management and a significant increase in mussel harvesting days. Better relationships between the two sectors of the community were symbolised at a mussel chowder lunch which celebrated the best of the catchment – milk and mussels.

This project finished in 2009, but SFF funding has recently been granted to take the Aorere approach to the neighbouring Rai Catchment.

GMP operates within limits and targets

96. GMP operates within the overall framework of standards and limits. Sector GMP targets and measures may need to be agreed at a national level to determine collectively what actions need to be taken, taking into account an achievable pace of change, business viability, and recognised costs and benefits. Regional and catchment level conversations may also be needed to set site-specific GMP targets and measures. A robust policy framework is required in order to set these site-specific objectives so that water quality outcomes can be met.

There should be improved alignments between GMP and regulatory compliance

97. The best solutions to water issues may involve a combination of voluntary measures by industry and regulatory measures. Consideration should be given to opportunities for improving integration between regulatory compliance and industry-led GMP, but this should be done in full collaboration with industry representatives to ensure that the market and competitive advantages of GMP are not compromised.

ZESPRI and virtual water

The total water embodied in a product can be referred to as the “virtual water” content. Virtual water metrics are based on volume of water used per unit of product (i.e. m³/kg). The metric can be divided to refer to water as “Green” (e.g. rain on land that does not run off or recharge groundwater), “Blue” (surface and ground water) and “Grey” (freshwater required for assimilating the polluting load based on agreed water quality standards). ZESPRI® is actively involved in research on these metrics, as are other major exporters.

Internationally, tools such as the “virtual water footprint” are important. They provide information to customers about goods or services, and can be used to generate market advantage or measure environmental performance. Virtual water metrics can also measure water efficiency at the regional or local level.

We should aim to effectively communicate water use using these tools to trading partners and regulators. To achieve this access to robust and standard data is required. Our local, regional and central government agencies have an opportunity to capture, store and report information in a standard manner for cost effective and accessible international reporting as well as local use.

Public credibility is important

98. Regulators and the public need confidence that GMP programmes are effectively contributing to solving water problems. Regional monitoring of water outcomes will be needed. Support for using GMP in regulatory compliance will be more likely where water quality and quantity are heading in the right direction, and where the targets and measures set by GMP are being met.
99. If existing GMP programmes are to be used as the basis for responding to some water issues, gaps and shortfalls in the targets and measures included in the GMP programmes will need to be addressed and measures tailored towards specific water needs. This may include establishing minimum programme attributes as qualifying thresholds for their use in regulatory compliance, credible independent audit, and stakeholder involvement in GMP development and review.
100. Effective riparian management, including stock exclusion where topography allows, should be prioritised by pastoral industries as an important tool which contributes to enhanced water quality. In those areas where reticulated stock water provision is not possible or practical, and natural surface water is the sole source of water for grazing animals, provision for access to water must be allowed.

There needs to be whole-of-industry uptake

101. Developing and promoting GMP requires industry leadership and considerable investment in research and development. Whole-of-industry solutions are needed to ensure GMP is comprehensive and all parties are engaged in raising environmental performance. Investing in extension programmes is critical to the success of GMP.

102. Encouragement needs to be given to industry good organisations and early adopters with the potential for leadership on GMP development and uptake in their industry. A framework of stronger incentives to acknowledge and reward excellent performers needs greater emphasis. Consideration should be given to developing preferential compliance pathways for industries and businesses with excellent GMP performance. A strategy for dealing with those that are slow to take up GMP is also needed.

Audited self management is a key tool

103. Used in conjunction with GMP, audited self management (ASM) is an established audit system designed to verify adherence to GMP requirements, particularly where certification leads to market benefits.

104. Used with regulatory compliance, ASM schemes transfer day-to-day resource management responsibilities to users under agreed terms, and subject to transparent audit. Commonly, an auditor approved by the regulator (a regional council) is engaged to undertake a compliance audit, which is then accepted by the regulator as proof of regulatory compliance by the consent holder.

105. As an example, for irrigation schemes using ASM within regulatory compliance, the scheme governance entity holds the resource consent and overall responsibility for complying with the conditions of consent. Scheme obligations are anchored by a contract between the scheme and the regulator, which details how the consent is to be monitored using ASM. Schemes may be approved as self-auditors, or engage independent auditors. The scheme enforces internal scheme compliance through a contractual relationship with its individual users. Compliance and enforcement powers will be retained by the regulator – for example, to audit ASM data upon request. ASM is the tool to be used to measure outputs; however Regional Councils need to be sure that desired outcomes are being achieved.

106. To work effectively within regulatory compliance, ASM requires:

- a) robust and accessible data (e.g. water use would require metering)
- b) clearly defined roles, responsibilities and consequences
- c) accessible and transparent governance
- d) open and regular communication between parties.

Third Party Audited Self Management – the New Zealand Forest Sector

Over half of New Zealand's Plantation Forests are ecocertified under the Forest Stewardship Council (FSC) international scheme for endorsing good forest management for sustainable land use. Participating forest owners are audited annually against a set of internationally agreed principles and criteria (a standard agreed between a broad group of stakeholders. Independent third party auditors contract teams of local experts, and neighbours and directly affected stakeholders are approached or interviewed.

The auditors are empowered to issue Minor or Major Corrective Action Requests (CARs) when performance falls short, with certification revoked if Corrective Actions are not implemented in short order. Audit summary reports and details of any CARs are posted on the internet.

Two local FSC Initiatives are currently underway in New Zealand:

- the South Otago branch of the New Zealand Farm Forestry Association is working on developing a FSC Small or Low Intensity Managed Forest Initiative for farm woodlot owners.
- A Standards development group, comprising four chambers (environmental, economic, iwi and social), is working in a collaborative process with an independent facilitator to produce an FSC National Standard to accommodate New Zealand's specific forestry issues & circumstances. Once field tested and ratified, all FSC certified forestry operations in New Zealand will be audited against the agreed New Zealand FSC National Standard. This is expected to accelerate the growing forest area that is independently certified.

Participation in the FSC is entirely voluntary but the scheme is important to international markets, and is backed by the large international NGOs, the World Wildlife Fund and Greenpeace International.

Adaptive management helps the response to unknown environmental effects

107. Adaptive management is an iterative process marked by discussion and cooperation between users and stakeholders, to create a basis for ongoing decision making on the detailed management of a resource or scheme. It can operate as part of a consent condition, but doesn't have to. Adaptive management can be one way of introducing flexibility into consent conditions or plan rules. For example, it is a method to agree on actions that work on a seasonal timescale or respond to dynamic ecological changes, technology improvements, and practice changes.

108. As with GMP, adaptive management operates within a context of limits put in place, and community engagement. Commonly, a panel of local and technical experts, including users, work together to continually evolve and improve the management plan for the resource or scheme. Adaptive management includes a component of knowledge building through 'learning by doing' – testing the results of actions which must be able to be reversed or changed if not found to be effective.

109. Adaptive management cannot always be used as a technique for meeting resource consent conditions and its success depends on the ability to measure, model and attribute change. A variety of interests need to be involved in adaptive management discussions,

which would typically include people with local experience (including iwi and resource users) and technical experts.

110. Adaptive management should not be a 'cure' for resource consent applications with poor science, but it can help deal with scientific uncertainty by allowing easier reversal of actions. It is not, however, a justification for allowing unfounded or unproven development proposals.

Good management practice - recent action

Forestry

Over eighty percent of New Zealand's plantation forests are owned or managed by members of the Forest Owners Association (NZ FOA), with the remaining area in small ownership. In 2007, NZ FOA developed its "Environmental Code of Practice" which was then endorsed by the NZ Farm Forestry Association and Forest Industry Contractors Association. NZ FOA recommends that all its members and Farm Foresters adhere to the rules and good practice guidance in the Code.

The Environmental Code is a practical means of helping forest planners, contractors and operators to consistently accomplish good environmental performance (including water and sediment control), consistent with good health and safety, financial performance and community and regulatory expectations. The Code is a key reference tool to those parties involved in managing forests by providing information on environmental values, how such values should be assimilated into operational planning, other references and resources.

Horticulture

NZGAP (New Zealand Good Agricultural Practice) promotes tools and codes of practice for the management of nutrients and sediment from agricultural activities. Nutrient management programmes must be undertaken where a regional plan references NZGAP. Nitrogen management has progressed significantly over the past two years, while irrigation efficiency projects are underway in partnership with regional councils in a number of regions.

Dairy

The dairy sector is committed to an Audited Self Management approach to the achievement of sustainable water management. Initial targets for improved water management were set through the 2003 Dairying and Clean Streams Accord, including targets for stock exclusion from streams, rivers and lakes, fencing of regionally significant wetlands and systems for managing nutrient inputs and outputs. Virtually all dairy farmers now have nutrient budgets to inform fertiliser use. The dairy sector is now collaborating with stakeholders to proactively negotiate specific targets for action on nutrient levels in particularly nutrient-sensitive catchments.

A Farm Dairy Effluent Design Code of Practice and Design Standards has been completed to support good management practice in effluent management systems. Good management practice on effluent is encouraged in Fonterra by their "Effluent Improvement Programme" with milk pay-out deductions of \$1500 / \$3000 during the 2010 season and the provision of one-on-one advice to any supplier requiring it.

Irrigation

In partnership with the regulator, a number of irrigation schemes have implemented or are in the process of implementing comprehensive Audited Self Management programs to ensure cost-effective and sustainable water management. Codes of practice, standards, training resources and NZQA linked qualifications have been developed and implemented for design, installation

and maintenance of irrigation systems. These tools provide irrigators with a simple pathway to achieve GMP in irrigation.

Fertiliser

As part of the Primary Sector Water Partnership, the fertiliser industry is responsible for meeting its commitments to ensuring the sustainable use of freshwater resources in the primary sector. These commitments include:

- by 2013, 80 percent of nutrients applied to land nationally are managed through quality assured nutrient budgets and nutrient management plans
- by 2016, 1.7 million ha of intensively farmed land will have implemented nutrient management plans, in the context of their wider farm management planning, to achieve improved environmental outcomes

Good management practice - future looking

Forestry

The forestry sector has begun a collaborative standards development process for plantation forests, in accordance with processes mandated by the FSC. The standards will consider economic management, and long term employment and set rules for environmental management and recreational use. Once field tested and ratified, all FSC certified forestry operations in New Zealand will be audited against the agreed New Zealand FSC National Standard.

Beef and Lamb farming

To determine how the sheep and beef sector might best contribute to the maintenance and care of water resources in their communities, Beef + Lamb New Zealand will be carrying out research on the relationship between sheep and beef farming, water resources and rural economic development across New Zealand.

In addition Beef + Lamb will be initiating a water footprinting project to be used as a tool for the analysis of how water resources may most efficiently be utilised within sheep and beef farming systems.

Horticulture

Collaborative partnerships are being developed with a number of regional councils, tangata whenua and Non Governmental Organisations to develop a range of crop production tools, and to improve irrigation efficiency. Work continues to develop soil management tools for the Horizons region and continued refinement of soil management approaches developed through the existing Franklin Sustainability project.

Showing improved environmental performance is a way of proving higher value for crops, with Zespri and the pipfruit sectors now involved in developing virtual water footprints for export crops. Crop calculator programmes, which seek to minimise nutrient input while maintaining optimal yields, are in varying stages of use, development and refinement.

Dairy

Expectations of on-going improvements in environmental performance are high. The sector will reinforce new communications efforts to drive achievement of the targets in the Dairying and Clean Streams Accord, and proposes to work with Regional Councils to investigate regulatory instruments for universal stock exclusion from waterways should voluntary measures be insufficient. The dairy sector continues to advocate for the "Taranaki model" of encouraging riparian planting in other dairying regions, whereby the regional council prepares riparian management plans and provides native plants at cost price to implement the plan. The dairy

sector will work with regional councils to prioritise universal stock exclusion including investigating regulatory instruments.

Fonterra recently introduced the “Every Farm Every Year” independent appraisal of its suppliers’ effluent infrastructure and plans to implement Effluent Improvement Plans for those who need them. Sanctions for failing to comply with such a plan will include non-pick-up of milk.

Another new initiative is the “Supply Fonterra” proposal. While it still under development, and has yet to be fully assessed or socialized with suppliers, it would provide “merit” payments to encourage the adoption of expected management practices on farm across the full suite of on-farm water issues (i.e. effluent management, nutrient management and water efficiency).

Irrigation

The irrigation industry is committed to the development and implementation of catchment/zonal based ‘irrigator user groups’ as an essential first step to sustainable water management. These groups will partner with both regulators and local communities, to implement Audited Self Management programs that operate to performance benchmarks. A support package to better enable the formation of irrigator user groups, develop and implement benchmarking systems and the uptake of Audited Self Management programs is currently underway.

A holistic GMP package, covering design, installation, operation and maintenance of irrigation will be complete by 2012. This will ensure the industry has the tools it needs to meet the environmental challenges ahead. The package includes Codes of Practice, Standards, Training Resources, NZQA linked Qualifications and a Quality Assurance (certification and accreditation) program. Common Key Performance Indicators run across all disciplines, allowing irrigators to benchmark performance. Ultimately this GMP package will be integrated into the Audited Self Management programs thus ensuring simple pathways for irrigators achieve sustainable water management.

Fertiliser

The fertiliser industry is working to help meet Dairy Sector commitments, which include:

- 50 percent of dairy farms implementing a Nutrient Management Plan by 2012, and
- 100 percent by 2016

The fertiliser industry has also developed a training programme for fertiliser advisors (which includes Massey University short courses) that takes between 18 months and two years of in-house training to complete. Key components of the training programme cover all aspects of nutrient budgets and nutrient management plans (NMP’s).

The meeting of these commitments represents a multi-million dollar investment for the fertiliser industry. However, a key criticism in the delivery of NMP’s to date has been the inability to link the outcomes from NMP’s to any water quality targets or limits as in most instances they have not been established.

Overall, the fertiliser industry is ahead of target on these performance measures.

Regulation

111. Regulatory approaches are useful in helping achieve water quality limits. They work well for point source discharges and can also be used for diffuse contaminants. Given the

inherent difficulty of tracing the source of these contaminants, such regulations would tend to be applied by proxy through regulation of land use in some form.

112. To be successful, regulations must be well designed and implemented, easily and consistently enforced, and be backed up by enforcement. Where possible, regulations should be harmonised with robust industry standards and ASM schemes. This is not only so that industry is not faced with two inconsistent forms of control (market imposed and domestic regulation), but also so that innovation in industry practice and design is enabled to achieve aligned targets. Central government has a role to play by providing guidance on regulatory design.
113. While spatial variation is a significant driver behind the type of regulatory approach that might be considered, regional councils need to ensure that regulations are as consistent as they can be for water users across a range of catchments or councils. This will reduce compliance costs for water users, and make compliance easier.
114. Water Conservation Orders (WCOs) are a national regulatory tool to achieve water quality outcomes. WCOs seek to protect outstanding waterbodies but are restricted to instream influences, and are not able to take an integrated management approach to influences on water quality, including from land use. Provisions for WCOs should be amended to achieve an integrated management approach.

Price based measures

115. Price based or economic instruments can incentivise desired behaviours or create disincentives through price and market mechanisms. They can involve charges, subsidies, and cap and trade systems.
116. Price based measures for water quality are based on assessing the extent to which the waterbody can assimilate a certain quantity of contaminant. For example, nutrient trading/cap and trade type approaches work by creating a maximum allowable emission of contaminants and enabling participants to trade their right to emit. Cap and trade systems incentivise those who can reduce their contaminant output most easily to do so, which reduces the costs to all participants of a reduction in the overall amount of a contaminant. The theory behind such systems is that clever design ensures that early adapters or existing efficient participants can gain benefit by selling or trading credits, while less efficient participants have incentives to improve their efficiency to reduce the costs they face.
117. In general, the use of price-based measures can reduce economic costs, and are most likely to lead to allocative and dynamic efficiency. However, they can be complex to design, market behaviours can lead to unexpected outcomes, they can be difficult for participants to understand, and may require a high level of auditing.
118. While a nutrient trading scheme is in operation around Lake Taupo, New Zealand has little experience with the use of such instruments. The government has a part to play in facilitating the use of price based instruments where it is appropriate to do so. There is a need for further investigation by the proposed National Land and Water Commission of the use of such schemes, including the nature of their use in different catchments. The government should provide regional councils with guidance and assistance on matters such as the circumstances in which market instruments best work, and market design templates.

Nutrient trading – the Lake Taupo Nitrogen Market

Lake Taupo has increasing algal growth and decreasing water clarity due to nitrogen leaching from the surrounding catchment. To address this, new regional plan rules (Variation 5) cap the amount of nitrogen leaching into Lake Taupo with the aim of reducing nitrogen reaching the lake by 20 percent by 2020.

Landowners in the catchment now need to either comply with the new rules, or apply for resource consent for their land use activities if they will leach nitrogen above the permitted or authorised discharge levels. They can then sell or buy, lease out or lease extra nitrogen as available or required.

The market is underway, with some properties taking advantage of the scheme by refining their farming practices to reduce nitrogen discharges and thereby selling their surplus allowance (currently selling at around \$300–400/kg). Government and councils are also funding activities to reduce nitrogen inputs to the lake, such as buying nitrogen allowances as one way of reducing nitrogen inputs.

Investment

119. While ‘polluter pays’ is a general and well understood principle, publicly funded clean-up efforts can be justified where historic behaviour has made a major contribution to the problem, or land retirement or habitat restoration is a part of the proposed solution. Examples include Lake Rotorua, Lake Taupo and the Waikato River.
120. Investment can come from a variety of sources. Improvements in point source discharges for urban waste water have largely been funded by rates, while significant waterbody clean-up efforts have also been funded publicly through rates and by central government. There are many examples of private sector investment towards water quality outcomes.
121. Improving the water quality to an acceptable standard is likely to be an inter-generational journey for some waterbodies. There is a need to establish both a strategic plan for this improvement (discussed later in the report) and a fund that would enable clean-up to be tackled.

Community action – Waituna Lagoon, Southland

An example of a small community group with stakeholder involvement, the Waituna Landcare Group started in June 2001 as a result of local concerns about the effect changing and intensive land use was having on the catchment and on Waituna Lagoon (part of a 3500ha Ramsar International Wetland Reserve). The group undertakes monthly testing of the contributing streams and the lagoon to identify problem hotspots for action. It is about to establish a native plant nursery to make plants available to landowners in the catchment for riparian plantings.

Recommendations

Regional councils should employ a range of instruments to ensure that targets and limits they set are met, including voluntary schemes, codes of good management practice (including audited self-management), regulation, and funding. They should do this in collaboration with stakeholders and iwi.

Good management practice in land and water use must be encouraged by regulators, industry and others as an essential tool for improving and maintaining water quality, quantity, and water use efficiency.

Good management practice must operate within the overall framework of standards and limits. Targets and measures included in good management practice programmes need to be tailored towards achieving specific water outcomes.

Regulators and industry should provide incentives, assistance and penalties to improve uptake of good management practice.

Good management practice should be continuously improved, including through adaptive management, with wide stakeholder involvement in design and review.

Effective riparian management, including stock exclusion where topography allows, should be prioritised by pastoral industries as an important tool which contributes to enhanced water quality. In those areas where reticulated stock water provision is not possible or practical, and natural surface water is the sole source of water for grazing animals, provision for access to water must be allowed.

Audited self management should be used by industry and regulators to ensure that outcomes are being met.

A robust policy framework which sets the site-specific objectives for good practice in terms of water outcomes is needed.

Robust industry standards and audited self management schemes need to be recognised in the development of regulatory approaches to water quality.

Central government should provide guidance to regional councils on regulatory design for water quality.

Regional councils should ensure that regulatory approaches are as far as possible consistent across catchments and between councils.

Provisions for Water Conservation Orders should be amended to achieve an integrated management approach including land use.

The proposed National Land and Water Commission should investigate the use of price based measures for improving water quality, identify any law changes required, and provide guidance and assistance to regional councils on their design and the circumstances in which they might be used.

A fund should be established that would, operating within an overall strategic framework set by the proposed National Land and Water Commission, enable clean-up of contaminated waterbodies to occur.

Improve allocation

122. We need more efficient and effective means of allocating water to manage demand, reduce contamination and maximise the value of water for the economy. We need allocation methods that can deal better with scarcity and competition between users of water, and promote efficient use of resources.
123. The need for more efficient allocation is proportional to the scarcity of available water in a catchment. Choices of allocation methods also need to be practical responses to circumstances, and optimal methods may vary for different catchments.

How much water is available to be allocated

124. The first step in allocation is to set clear limits that establish instream flows (for surface water) and water levels (for groundwater), and clear limits that establish the total allocable amount of available water.
125. We need limits to protect instream values. Instream limits should include the setting of a minimum ecological flow, defined in line with aquatic ecosystem requirements. Instream limits may include an allocation for instream uses – an environmental flow. The limits-setting process is described earlier in this report.
126. There are challenges to allocation due to changing flows as a result of changing weather patterns and natural variability. Managing this variability in limits setting could be assisted by the use of a variety of consent lengths or consents with different degrees of reliability. Actions taken to achieve limits may change, but the end result needs to be certainty about what is needed to achieve desired instream values and what may therefore be available for extractive allocation. The Government should provide direction to regional councils to provide a consistency of approach to setting instream limits, while recognising spatial variability.
127. This certainty could be added to with greater clarity about priorities between various takes and uses where they compete for allocable water. Further consideration should be given to this, and include:
- a. how allowable and permitted takes are accounted for, particularly when setting limits for total allocable quantum;
 - b. deciding on questions of relative priorities between types of use, for example:
 - i. priority for municipal drinking water over other extractive takes
 - ii. whether there should be priority for the renewable energy sector
 - iii. peri-urban situations where existing productive uses come under pressure as a result of town expansion, and where there is unequal treatment between similar water users in and outside urban/town supply boundaries.

A more efficient allocation scheme

128. The current first-in first-served system does not need to change in catchments where there is an abundance of water and little prospect of that situation changing. There should, however, be a mechanism for moving to a different allocation scheme, in the form of a threshold of pending scarcity or proportion of total allocation being reached.

129. Thresholds should be set as a matter of some urgency for catchments with or approaching scarcity. We need a nationally consistent formula to be followed for setting scarcity thresholds that recognise spatial variation, i.e. different numerical thresholds to be set for particular catchments or sub-catchments. This could be done at the same time as the setting of limits for flows and water levels.

130. Reaching the threshold set for a catchment should trigger a review of existing limits, and require further allocation from the waterbody to be decided under a more efficient allocation scheme.

Upper Taieri community water management, Otago – collaborating on allocation

This New Zealand Landcare Trust project (funded by the Sustainable Farming Fund) aims to produce a model for community self-management of water resources in a high demand area. Over 150 water users and stakeholders from local farming interests, Councils, the Department of Conservation, Fish and Game (and hopefully iwi and other stakeholder representation as the project progresses) are involved, many of whom face the expiry of their current water permits (mining rights) in 2021.

The community has banded together and stepped back to ask how best to manage water resources for the whole of the community. They will contract expert facilitation, project management and technical assistance, and the project has established a multi-stakeholder catchment management group. The project aims to develop an operational system for water allocation which promotes better relationships, improved monitoring, smoother RMA processes, fairer whole-of-community outcomes, improved environmental outcomes, and more efficient use of water. Some sub-catchment groups are close to reaching agreements about water allocation for resource consent applications.

Options for allocation

131. We think it would be helpful to develop principles to guide allocation once limits have been set. These principles should include:

- a. allocation of water should seek to achieve the best possible degree of efficiency of resource use across technical, allocative, and dynamic efficiency
- b. national direction is required to guide allocation, and should encourage consistency between regions
- c. allocation of water should start at the boundaries of the waterbody, surface or groundwater – that is, not rainfall on land. Allocation will still need to manage for land use effects on water availability and on water quality, in concert, at the catchment level
- d. water allocation methods should not pick winners based on land use, e.g. constraining forestry to enhance water supplies for other productive sectors
- e. water use efficiency criteria should apply to all users, not just those under a new regime.

132. There are three broad options that the Government should consider for allocating water in a more efficient manner when deciding on new applications or applications for renewal of existing water permits. These options are:

- a. continuing existing consents, while using consent expiry as an opportunity to make changes to conditions (for example, relating to the technical efficiency of water use), consent duration etc.

This option protects the position of water users who have made investments based on an expectation that access to water is likely to be continued, including after expiry of current permits.

- b. a different administrative system. This would involve granting consents according to rules set out in a regional plan, based on criteria including efficiency and community considerations (for example possibly providing some preference for existing consent holders).

This option makes it easier to control the speed of adjustment to a new allocation system, but is likely to result in higher transaction costs. Assessing who to allocate water to will not be able to be done perfectly. If the consent is tied to particular land uses, it will reduce dynamic efficiency.

The use of a common expiry date for some or all of the consents is likely to be required in an administrative allocation system so that the relative costs and benefits of each application could be considered across a range of possible users. Issues of equity between permit holders whose permits are of different durations need to be considered when transitioning to any use of common expiry dates. Regional councils may also have difficulties meeting statutory timeframes for processing applications if using common expiry dates across large numbers of consents.

- c. Payment for water permits, for example through tendering, auction, or regular re-tendering of permits. This would establish a payment and value for the water, recognising its relative scarcity and the extent to which different users might be prepared to pay for it. Such an allocation system could, over time, be configured in different ways (for example, shorter or longer consent lengths and larger or smaller consent amounts) to create different market types.

It might be a significant source of revenue and would provide clear signals for technical and allocative efficiency. This method would reduce certainty for consent holders (including owners of long-lived sunk assets) and could see price volatility.

133. Consideration needs to be given to the extent to which amendments to the RMA would be required to give effect to any of these options.

134. There are sector-related issues in considering any allocation framework which need to be addressed in its design. For example, water allocated to non-consumptive use, such as some hydro generation schemes, may need to be treated differently from water allocated to consumptive uses. A related issue is how limits would be set on flows in waterbodies with hydro generation infrastructure, when flows have already been set as part of resource consent conditions issued for the infrastructure.

Flexible transfer of water permits

135. Once allocated, there are a number of advantages that could result from increased flexibility around transferring water permits between users. It can help to:

- a. facilitate water being able to move to its best use over time, encouraging allocative and dynamic efficiency
- b. allow communities of water users to transfer water between each other so that seasonal, crop, and use variations can be managed
- c. provide a mechanism for new users to gain access to water

- d. provide a tool to resolve competition between users of water without creating winners and losers.

136. We need a framework to help better transfer of water permits. Setting limits and managing over-allocation are necessary prerequisites for more flexible transfer as there is a need to ensure that greater flexibility does not result in all over-allocated water being used. Greater flexibility to transfer water permits can however help to resolve over-allocation, as it could allow community or multi-user agreements to manage over-allocation without over-use of water. The sequencing of this is important.

137. After that, the framework should include the following elements:

- a. regional councils should be required to define, through their regional plans, those areas and/or specified conditions within which transfers could take place without any need for an approval process for their site-specific effects;
- b. a separation of permits to take water from responsibilities for site specific effects;
- c. enabling sub-divisibility of permits – for example, partial or temporary transfers.

138. We have identified three main options for transfer of water permits. These are:

- a. transfer without financial consideration. This recognises water as a community asset that should be able to be transferred between cooperating members of the same community. This occurs now, as different consent holders make water available to other consent holders to recognise seasonal fluctuations, crop demands etc, in the knowledge that water would be made available to them when they need it. However, the absence of financial payment may be difficult to verify, and new users may also find it more difficult to access water via permit transfers.
- b. trading without payment for the original permit. This would not rule out cooperative transfer arrangements but would allow the value of water to different users, at different times, to be recognised. Water trading already exists to some extent (for example, through share exchanges in cooperative irrigation schemes) but the changes outlined above would facilitate it to a greater extent. Even if permissible, trading of water permits is not likely to take place everywhere.
- c. trading after payment for the original permit. Again, this would not rule out cooperative transfer arrangements but would realise a return for the use of a public asset.

Transition

139. Changes to the system for allocating water mean that the distribution of benefits will change, and it is not always possible to assess in advance which groups will be the winners and losers. There will be concerns that any change might favour some groups over others – for example, established users, or new users, or larger interests. Water users will need good information about how methods will work (particularly market methods) and clear indications about how changes will affect existing water permits.

140. Any move to more use of market methods for water allocation needs to be carefully managed. Much of the benefit of market methods will depend on levels of scarcity and the size and characteristics of any potential markets. Limits for both water quality and quantity should be in place.

141. Depending on the allocation and transfer mechanisms adopted, there may be ways to provide incentives to consent holders to transition to more efficient allocation, including enhanced certainty and reliability.

Over-allocation must be managed

142. Each regional council must have a plan to tackle over-allocation in catchments within its region. There should be a process that, over time, seeks to manage over-allocation by applying the following menu of actions:

- a) conversations with the community of users about opportunities for voluntary relinquishment, adaptive management or cooperative sharing to manage the over-allocation down
- b) clawback of unused water as consents expire
- c) proportional reductions for existing permits or similar arrangements (that may include exclusion of some uses and being unable to satisfy future use aspirants)
- d) purchase of allocations
- e) transfers to more effectively match allocation to individual user needs, for example, to allow water at particular times, for different crops, or within seasons
- f) use of infrastructure to provide water storage, enabling reliable water to be supplied at times of higher seasonal need.

Crown-iwi discussions

143. Iwi and the Crown are engaging in conversations about Treaty and customary rights and interests in water management. Māori land owners are also amongst the group of new or aspiring users of water for land development.

144. The timeframe and outcomes for Crown-iwi discussions on water are as yet unknown. We think that any transition to more effective allocation should proceed hand-in-hand with these discussions, to avoid the risk that it will need to be revisited later, with disruptive consequences.

Equity and sunk investment

145. Many current water consent holders have made significant investments based on the length of the consent that they have, and their expectation that, on its expiry, their investment will continue to be recognised as one of the factors that might lead to the re-issue of the consent. An abrupt change to this expectation risks infrastructure assets, property values (and farm equity) being affected, and an uncertain investment climate.

146. There will be similar concerns that allowing a more flexible trading regime for water consents might result in windfall gains for existing permit holders who have obtained an allocation without resource payment, which they can transfer or trade. One option for addressing this could be to require new applications and applications for transfer of existing water permits to be decided under a priced allocation system.

An integrated outcome

147. The Government needs to consider the options that have been identified for allocation and transfer in an integrated way and in further detail. This consideration must also work through the range of transitional issues. A collaborative process should be considered, given the wide variety of interested parties in this area.

148. When a direction has been decided, it will be important for the Government to give national direction to regional councils on the allocation and transfer methods, and the circumstances in which they should be used.

Recommendations

Limits are required to protect instream values. Allocation limits (including setting reliability levels) may be established. Both should use the process set out in recommendations 1–5.

Allocation of water should start at the boundaries of the waterbody, surface or groundwater.

The approach of first-in first-served does not work in an increasing number of catchments where water is fully allocated or approaching full allocation. Regional councils should set a threshold for each catchment. When the amount of water allocated exceeds or threatens to exceed this threshold a more effective allocation system should be put in place.

Scarce water should be allocated as efficiently as possible, and water allocation methods should not pick winners based on land use.

The Government should consider three broad options for efficiently allocating scarce water after instream limits have been set:

- a. continuing existing consents but using consent expiry as an opportunity to make changes to conditions;
- b. using a different administrative system based on efficiency criteria and community considerations;
- c. payment, including through the tendering, auction or regular re-tendering of permits.

A more flexible system for transferring water permits should be put in place only once over-allocation of water has been managed. Each regional council must develop plans to manage any over-allocated catchment in its region.

The government should consider options to allow water permits to be transferred more freely, including:

- a. permits being able to be transferred without financial consideration between cooperating members of the same community;
- b. permits being able to be freely traded without payment for the permits;
- c. permits being able to be freely traded but only after payment for the permits;
- d. the subdivisibility of permits;
- e. requiring regional councils to define the areas and conditions within which transfers could freely take place, without requiring individual consideration of their site-specific impacts.

The government should consider establishing a collaborative process to investigate in further detail the allocation and transfer options, including considering water priority use issues and the transitional implications (including equity issues and the risks to existing infrastructure investments) of any changes to the water allocation framework.

The transition to any new system of water allocation should proceed hand in hand with Crown-iwi discussions on iwi rights and interests in water management.

National direction should be given to regional councils to provide:

- a. a consistent process for developing a scarcity threshold for each catchment;

- b. guidance for allocation and transfer methods, and the circumstances in which they should be used;
- c. consistency of approach to setting instream limits and to water allocation, while recognising spatial variability.

Rural water infrastructure

149. Improved rural water infrastructure can provide a range of possible advantages for both the economy and the environment. It has an important part to play in New Zealand's economic development, and is an important part of New Zealand's energy needs through hydro-electricity.

150. Because such infrastructure is long-lived, it needs to be done well the first time, and therefore needs to be thought of strategically. Developed in the right place and with the right incentives, it can facilitate economic growth, produce energy savings, reduce contamination of waterbodies, and allow the replenishment of aquifers and the restoration of streams.

151. Importantly, rural water infrastructure can facilitate reliable water supply, which can:

- a) remove the risk of periodic water shortage and crop failure, allowing 'just in time' management and encouraging water use efficiency
- b) allow greater crop and land use diversity
- c) provide more reliable and consistent delivery to processing facilities and export markets;
- d) reduce pressure on river flows and the amount of water per hectare required to be irrigated due to greater efficiency.

152. There are also disadvantages to be avoided or mitigated, including damage to the continuity of rivers and their ecologies, and increased rates of contamination resulting from the intensification of land use.

153. We think it is possible to find a way forward for rural infrastructure which avoids the expensive stalemates and destructive outcomes that have characterised much of the debate and development of dams and irrigation schemes.

Planning and consenting

154. We believe that a pre-requisite for change is that the planning, decision-making and consenting process for rural water infrastructure needs to improve. There needs to be a strategic framework for rural water infrastructure, developed on a collaborative basis, that seeks to develop 'win-win' outcomes. Strategic planning should provide a strategic overview of an area or region, optimising cultural, economic, environmental and social objectives, and establishing what configuration of resources is best. Some regional councils have already adopted this approach, which should recognise not only large scale developments, but also provide a framework for smaller developments where that is appropriate. National instruments are needed to ensure that this approach is followed consistently across regions.

155. A coherent national and regional planning framework should make the consenting process easier but here too changes are needed. Incentives need to be built into consenting processes that give clear signals to proponents of large water schemes about the collaborative behaviour and capabilities that are required, and favour consent applicants who collaborate with each other, and with the wider community, including iwi. Regional rules should be used to set clearly defined standards and pre-conditions for the acceptance of consents for rural water projects over a certain size, including the use of a collaborative approach commenced early in the project feasibility stage. This process should demonstrably consider a wide range of values. Consent applications consistent with the regional water plan and rules should receive priority for consent consideration.
156. National instruments will need to be developed to enable, and give preference to, applications that have gone through a collaborative process to reduce the risk of them being overtaken while under development. Such processes should contemplate both resource use and protection, where appropriate. As part of this, a definition of community-led programmes which incorporates all interests and at all scales is required.
157. The use of a collaborative approach during planning and consenting is likely to reduce risks, and frontload costs for applications, but reduce overall costs and time due to less contention and litigation in the later stages of the project.

‘Water for the Waimea’ – water augmentation/storage dam

The Waimea Water Augmentation Committee manages an extensive process of research and collaborative planning with strong community involvement seeking to resolve longstanding issues with reliable water supplies, while reducing community conflict. The process included feasibility investigations for water storage, and seeks to manage over-allocation and water shortages cooperatively.

In its Stage 1 investigations the committee looked at 11 possible dam sites, along with piping water from outside the area, before settling on the Lee Valley as the most feasible option. The proposed dam would catch water during high rainfall and release that water back into the river in dry periods. This would enhance the natural flow of water in the Lee and Waimea rivers during periods of drought and recharge the underground aquifers across the plains. The water from those aquifers is used to supply the urban and industrial water supply for Richmond and also supplies water for irrigation on the plains. The dam would also have hydroelectricity generation capacity.

A recent survey showed a very clear mandate from the community to progress this project to the next stage, which is developing a model for ownership, governance and investment. The responses also showed that people are starting to understand how critical the water issue is for all Tasman residents.

Water as a lever to get compliance

158. Reliable water is critical to many users. At the same time, the impacts of rural water infrastructure – specifically large irrigation schemes – on water quality is a sensitive issue. We believe this can be managed through our proposals on water quality – and that the ability to turn off or reduce water is a powerful way to improve environmental compliance.

159.Regulators should be able to withhold water if environmental conditions set in consents are not met. This approach should be able to be scaled and time flexible. Consents for cooperative schemes should also provide for the consent holder to be able to withhold water from scheme participants to encourage compliance and good management practice. ASM provides a good mechanism for the regulator to use the information arising out of industry self-regulation to monitor compliance.

Financing

160.There may be a good case for public contribution to rural water infrastructure development where good proposal design could improve legacy environmental issues or provide services to the community such as water supply or flood protection. But there is no magic bullet for financing rural water infrastructure projects that should sustain themselves on their own expected rate of return. We do, however, expect that changes to strategy and consenting processes for rural water infrastructure projects should improve the investment climate through minimising process risks, and enable capital for construction to be sourced more easily.

161.As a general principle, public funding of rural infrastructure projects, including from the Sustainable Farming Fund and Community Irrigation Fund, is best targeted at early stages, aligned with strategic planning, and linked to the use of a collaborative process for proposal design. The development of a consistent method for assessing financial feasibility of rural water infrastructure would also assist proponents.

Duration of consents

162.Regional councils issue water consents for a wide range of durations, up to 35 years. For some infrastructure sectors for which the operational life of a sunk asset exceeds 35 years, shorter consent periods can affect investment certainty. Examples include hydro electric schemes and irrigation schemes.

163.A case has been made for extending the duration of consents which the government might like to consider. The following factors seem to be important:

- a. the extent to which consent length actually constrains efficient investment
- b. the extent to which review provisions and adaptive management during the term of a consent can play a part in responding to changes that might arise during the consent
- c. whether changes to consent length are likely to create substantive changes to the value afforded by a consent
- d. whether this should apply to rural infrastructure projects or to all water consents.

164.However, extending the duration of consents raises legacy concerns for iwi and some stakeholders and may limit choices for future generations.

Recommendations

Regional planning on a collaborative basis must occur so that rural infrastructure can be developed in a way that provides a range of social, economic, cultural and environmental benefits.

Regional rules should set clearly defined standards and pre-conditions for the processing of consents for rural water projects over a certain size, including the use of a collaborative approach starting early in the project feasibility stage.

National instruments should be developed to enable and give priority to large scale consents, regional plans and Water Conservation Orders that have undertaken an initial collaborative approach over proposals that have not undertaken this approach.

Both regional councils and holders of consents in cooperative rural infrastructure schemes should be able to withhold water in circumstances where environmental conditions of the consent to take water are not being met.

Public funding of rural infrastructure projects should be targeted to early stages of such projects, and linked to the use of collaborative approaches for the proposal design.

The permissible duration of water permits for rural water infrastructure should be reviewed.

Changes to governance

165. Improved governance structures and processes are needed to:

- a) enable iwi to give effect to the Treaty relationship with the Crown regarding water (and related land use), and to complement existing Treaty settlements
- b) ensure that management of water is pursued from an intergenerational perspective
- c) provide for national direction and coordination
 - i. through a non-statutory national strategy
 - ii. through value-setting in national objectives and policies
 - iii. in data collection, reporting and compliance consistency
 - iv. through the design of market-based instruments and other interventions
 - v. in systematic target-setting and monitoring of regional council performance
 - vi. on collaborative mechanisms
- d) identify degraded waters in need of restoration
- e) provide oversight of a national fund to be created by Government for the restoration of degraded waters
- f) oversee and plan the management of water resources, and land resources which impact on water, in a way that sustains the life-supporting capacity of water and its ability to meet the needs of future generations whilst enabling people and communities to achieve their economic, social, cultural and environmental well-being
- g) facilitate the establishment of essential infrastructure
- h) enable efficient use and opportunities arising from access to water
- i) recognise that resource management has to be tailored to the spatial, geographical and community value differences in New Zealand's catchments

- j) have the technical (including scientific and other knowledge) and financial capacity at both the national and regional level to achieve integrated management of surface water, groundwater and related land use
- k) have legitimacy and be efficient, effective, transparent and accountable (including to stakeholders and iwi)
- l) recognise that iwi have interests across cultural, economic, environmental and social spheres.

166. There is need for an improvement in governance while keeping key features and strengths of the current system. The new governance arrangements must be transparent and efficient. The solution described for governance needs to be seen within the broader context of the other changes being recommended by the Land and Water Forum.

National Level Governance

167. A primary driver of the suggested changes is to have a much greater level of national guidance and direction about the outcomes to be achieved from water management. A new planning and institutional framework is proposed.

National Land and Water Commission

168. The National Land and Water Commission would be a non-statutory body constituted on a co-governance basis that would report to a core group of Ministers. Commissioners would be appointed by Ministers via a transparent process and would have experience and knowledge of land and water issues to reflect the range of cultural, economic, environmental and social perspectives on water management. It would also have scientific expertise in its membership.

169. The Commission should be serviced by the Ministry for the Environment and other government agencies as required.

170. The Commission would act as a coordinating, leadership and collaborative body, helping ensure consistency and action. Its mission would be to advise Ministers on the management of water resources, and land resources which impact on water, with a view to sustaining the life-supporting capacity of water and its ability to meet the needs of future generations, whilst enabling people and communities to achieve their economic, social, cultural and environmental well-being.

171. It would:

- a) recognise the iwi Treaty relationship with the Crown, including providing an avenue for iwi to express their Treaty partner aspirations
- b) continue to foster collaborative relationships between the various sectors and interests concerned with water
- c) advise on ways to improve the efficiency and effectiveness of the national water management system
- d) develop and oversee the implementation of a National Land and Water Strategy
- e) promote best use and practice in water management
- f) identify degraded waters for priority restoration
- g) identify opportunities and constraints to water storage and reticulation
- h) liaise with regional councils about the need for and potential role of restoration funding in each region, including priorities for that funding
- i) advise the Ministry for the Environment (which would administer a Water Restoration Fund) on priorities for spending from that fund

- j) facilitate, promote the development of, and monitor non-statutory regional water strategies and plans
- k) work with the Ministry for the Environment, the Environmental Protection Authority and regional councils to ensure that financial and technical skills could be made available to under-resourced regions
- l) liaise with the Ministry for the Environment, the Environmental Protection Authority and other relevant government agencies over water management and receive regular reports from the Chief Executives' Forum (see below).

172. The Commission would stand outside the formal Resource Management Act regime although it would provide advisory input on relevant RMA matters.

National Policy Statement on Freshwater

173. A National Policy Statement establishes a framework of national objectives and policies for water for implementation through the Resource Management Act. A National Policy Statement is a key instrument generated by the recommended governance system. The Ministry for the Environment has responsibility for drafting National Policy Statements which are then subject to a public process before consideration by the Minister for the Environment.

174. The Minister for the Environment asked us to consider the Board of Inquiry's recommendations on a NPS for Freshwater, and its ability to deliver the outcomes the Forum is recommending. We think we do need a NPS, and quickly. The current NPS (as recommended by the Board of Inquiry) is a basis to work from. We agree however that changes need to be made to it in the following areas:

- i. the references to iwi values, roles and objectives
- ii. drafting changes to policy C1 to include references to "mitigate" in achieving prescribed standards
- iii. policy E2 to clarify what contamination means in relation to the objectives
- iv. drafting changes to the transitional measures to correct a perceived vices problem.

175. It is also agreed that there are some issues that need further work. These include:

- a) specific measures dealing with use and development
- b) recognising the benefits of significant infrastructure
- c) making environmental values more specific by adding an objective which protects swimming, fishing and mahinga kai
- d) providing for allocation efficiency.

176. Some think that these issues requiring further work should be addressed in the current NPS. Others think they should be dealt with separately.

177. In either case, they should be dealt with promptly and through a collaborative process. A suite of national instruments should be considered.

178. Confirmation of our agreements on governance recommendations is dependent on the Minister promulgating national guidance including an effective NPS.

National Land and Water Strategy

179. The proposed National Land and Water Strategy would address the range of non-statutory means of implementation. It would provide a wider national oversight and integrating function. It would focus in particular on:

- a) identifying opportunities for enhancing cultural, economic, environmental and social value in an integrated way from water resources, including water infrastructure development
- b) providing leadership in establishing and supporting links between water resources and other related nationally significant issues and objectives – for example, energy policy and security, biodiversity, biosecurity, economic development and land use
- c) setting out expectations and outcomes capable of informing the development of regional water strategies
- d) setting out expectations and priorities for data and knowledge about water
- e) recognising the relationship between iwi and the Crown, and iwi expectations for water management.

180. The strategy should be developed through a collaborative process, building on the work done by the Land and Water Forum.

Ministry for the Environment and Environmental Protection Authority

181. Central government responsibilities for managing Resource Management Act and related functions need to be appropriately located. The options include the Ministry for the Environment and the Environmental Protection Authority.

182. The Ministry for the Environment will remain the primary policy adviser to the Minister for the Environment, including being the agency responsible for the Resource Management Act, and the development of National Policy Statements.

183. The Environmental Protection Authority will continue to be responsible for call-ins of resource consent applications under the RMA.

184. Other functions that need to be allocated either to the Ministry for the Environment or to the Environmental Protection Authority include:

- a) providing technical input into the preparation of national and regional planning instruments
- b) ensuring compliance with Resource Management Act national instruments, if necessary by Environment Court interventions
- c) preparing National Environmental Standards
- d) providing direction and oversight of any water trading or administrative allocation system
- e) providing technical and financial support (including extension expertise and training) to regional councils
- f) bringing together data about freshwater systems in a coherent and systematic way to inform strategy-making, and performance reviews of outcomes and compliance.

185. The Government should consider the goals set out above when it determines which agency should carry out particular functions.

186. NES's are a directive tool, providing a mechanism for consistent rules or processes to be set as national regulations that all councils must enforce.

187. The process for developing NES's should be amended to provide for two process options – a quick track and a collaborative option. The quick track would be used for urgent or straightforward NES development, with the Ministry for the Environment working closely but quickly with a small number of affected parties. The collaborative option would

involve a greater degree of collaboration including opportunities for submissions, scientific input and independent scrutiny, and opportunities to comment on draft regulations. Criteria would need to be developed to determine the circumstances in which the quick track was used, but it should be the norm.

Regional Governance

188. In addition to the changes proposed to improve governance at a national level, changes are also proposed at the regional level. Retaining the regional council model, with the strengthening outlined below, is dependent on much greater national direction and support to achieve the desired outcomes.

189. The following mechanisms are required to improve regional council performance:

- a) the addition of government appointments to the regional council committees designated with responsibility for water management decisions, or to the councils themselves on matters relating to water management. These appointees would strengthen the links between regional councils and central government agencies; fill in gaps in skills and perspectives; and strengthen the capacity of councils to provide leadership on the complex issues of intergenerational responsibility and legacy environmental remediation
- b) the development of non-RMA regional water strategies, using collaborative processes, with the objective of getting stakeholder agreement. Regional strategies would not be mandatory, but the regions in which they should be developed would be determined nationally. Regional strategies would inform regional plans made under the RMA (and their review)
- c) mandatory development of RMA regional water plans according to a national template and using a collaborative approach
- d) ensuring that iwi have adequate representation in regional committees dealing with water
- e) the establishment and maintenance of comprehensive water data sets on a basis consistent with national data. This is needed to improve overall monitoring of water management outcomes, and for making good decisions
- f) in order to manage limits, in particular for diffuse contaminants, regional councils need to make use of their existing powers under section 30 of the RMA to control land uses that impact on water quality.

190. The plan-making process needs to be improved. Regional councils should be obliged to prepare plans using a collaborative approach that ensures good community participation.

191. Regional councils should retain the option of notifying the plan, calling for submissions and cross-submissions and conducting a hearing before making a decision – the status quo set out in Schedule 1 of the RMA. Alternatively they should have the option of making a decision on the plan without conducting a hearing (relying on the earlier collaborative process to ensure community voices are heard) and then having that decision referred directly to the Environment Court. This would be a quicker process.

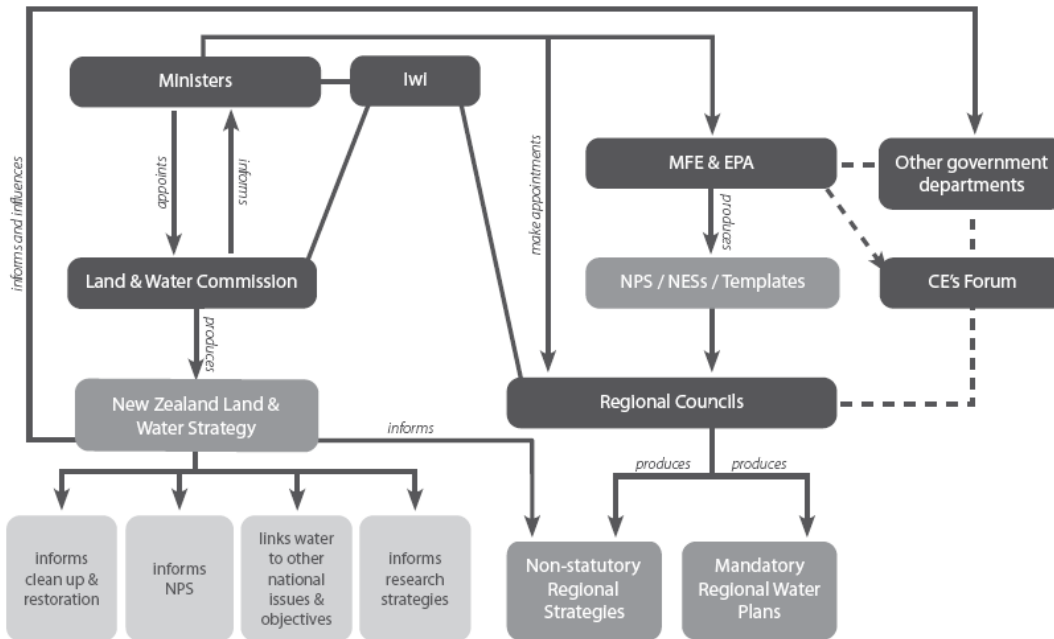
192. Under both options any party would still be entitled to refer any aspect of the plan to the Environment Court.

193. Moratoria may be able to be used in rare circumstances, with Ministerial approval, in order to provide time for collaborative planning to occur that would lead to improved outcomes. The conditions under which moratoria could be used include being temporary,

the certainty of delivering the outcomes in the time period of the moratorium, and having a clear exit strategy.

194. In developing the recommended governance framework, the Land and Water Forum has gone for a “strengthened status quo” at the regional level. If the strengthening does not work and regional councils fail to lift their performance significantly, then the Forum recommends a further look at regional governance options.

GOVERNANCE STRUCTURES



Collaboration

195. Our experience over the last year has demonstrated the value of a collaborative approach to water issues. A collaborative approach to water management helps people work towards resolutions, identify innovative solutions, or agree compromises together. Collaboration is important because its alternative is interest-based conflict that can be litigious, costly and lead to outcomes that satisfy none of the parties. A collaborative approach is a way of providing a holistic, cheaper, quicker and more inclusive outcome.

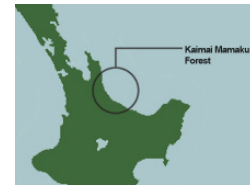
196. There is ample opportunity in the RMA for participation to be through collaborative approaches, but they can also occur outside the RMA through communities working together to get positive outcomes.

197. Collaborative approaches will not be a panacea to all water management issues. They can be resource intensive, need to operate on a high level of goodwill, and need to be managed carefully. There are a number of pre-requisites to a collaborative approach:

- a) leadership and facilitation
- b) open-mindedness by participants
- c) for regulatory processes, a final decision-maker
- d) a set timeframe
- e) capacity and resource
- f) inclusiveness.

Collaboration at work

The Kaimai Ranges disperse water into two significant waterbodies, the Tauranga Harbour and the Waihou River (which drains into the Firth of Thames). The catchments and the natural resources within them provide for the economic, social and cultural well being of the people in the region.



The Kaimai catchments will benefit from a community-driven approach to managing its natural resources following the signing of a partnership agreement by the Department of Conservation, Environment Bay of Plenty and Environment Waikato. This initiative will be done in collaboration with Forest and Bird and the Landcare Trust.

Among others, Zespri is supporting restoration projects within the catchment by protecting riparian plantings, controlling weed species and sponsoring the Otanewainuku Kiwi Trust.

Through the Land and Water Forum links have been established to continue developing this local initiative. Forest and Bird and Zespri are now considering further work on this initiative.

Forest and Bird has also been working with the Department of Conservation, Environment Bay of Plenty and Environment Waikato on a coordinated approach to pest control in the catchment forests of the Kaimai – Mamakau ranges.

Combining these two initiatives has the potential to provide significant community involvement in a 'whole of catchment' approach to land and water management.

198. Collaborative approaches also require transparency in the sense that, when they are complete, people who have not been directly involved need to understand the thoughts and processes which have led to their outcomes.

199. Collaborative approaches should be used across a range of processes in water management: during the development of national and regional strategies and regional plans; through limit and priority setting; and in relation to the role of different instruments to get water management outcomes. This will improve shared knowledge and understanding by increasing opportunities for communication between scientists, managers, iwi, industry, and community experts.

The Canterbury Water Management Strategy – collaborative management

Canterbury's precious water resources have over the past 20 years become increasingly under pressure from water abstraction, pollution, land-use intensification and change, and biodiversity decline. In addition, resource management decisions frequently end up in court.

Environment Canterbury, overseen by the Canterbury Mayoral Forum, is leading development of a comprehensive water management strategy for the region. The strategy has been developed over the past six years through an extensive collaborative process.

A Regional Committee and Water Management Zone Committees are being established to implement the strategy and work towards its targets which include ecosystem health, kaitiakitanga, drinking water, recreational and amenity opportunities, irrigated land area and energy security and efficiency. Zone committee members will work collaboratively and with the community to develop solutions to their water issues. A fundamental concept underlying the strategy is that water use development should only proceed in association with improvements in efficiency, and environmental restoration and repair.

200. Iwi have expressed support for collaborative processes, though these must be established within the Treaty framework and recognise obligations to both Treaty partners. Administrative mechanisms that enable greater collaboration, and thus potentially lower levels of governance, should be practical and cost-effective so iwi participation in those processes can be efficient.

Bog Burn, pilot Dairy catchment

Bog Burn is one of five predominantly dairy farming catchments that are being monitored on behalf of the New Zealand dairy industry. Long term monitoring of water quality and flow, soil health and farm management practices benchmarks the state of resource and establishes the links between land management activities and water quality.

Collaboration determines best management practices and priorities. Initially a stakeholder workshop identified the key stream values. Subsequent research used a combination of published information, local data, and expert knowledge to develop this into a Bayesian Belief Network (BBN), which was used to predict the effects on the key values of various measures (singly and in combination) under simplified conditions.

The BBN predicted riparian fencing and planting had the greatest single-action benefit for trout in Bog Burn, whereas deferred dairy shed effluent irrigation had the best predicted single-action benefit for contact recreation in another stream, the Oreti. Optimising phosphorus fertiliser use was predicted to have the greatest single benefit for farm economic returns, whereas converting 2.5% of the land to wetlands to treat field-tile drainage had the greatest cost.

The top five mitigations in terms of their overall benefit for the three key values were predicted to be optimising phosphorus fertiliser use, stream fencing and planting, deferred dairy effluent irrigation and/or low rate effluent irrigation, and winter herd shelters.

Chief Executives' Forum

201.To further strengthen co-ordination and governance, a beefed up Chief Executives' Forum, consisting of Chief Executives from regional councils and relevant central government agencies, is also proposed.

202.The Chief Executives' Forum would be likely to operate across a range of resource management functions, not just water.

203.It would:

- a) co-ordinate the RMA activities of regional councils and between regions and central agencies
- b) identify resourcing gaps and develop appropriate responses
- c) identify the need for common templates
- d) establish benchmarks for performance and identify under-performance
- e) identify circumstances where there is a need for improved 'whole of government' national direction and linked-up policy
- f) focus and consider the need for national solutions and tool development (including NPSs, NESs and non statutory guidelines) to assist regional implementation and bring consistency where appropriate
- g) provide a vehicle for consultation with stakeholder groups
- h) ensure obligations to iwi are met.

204.The Chief Executives' Forum would liaise with the Commission. It would have focussed terms of reference and clear performance indicators in order to achieve good connectivity and joined-up government. It would be one way of ensuring that regional councils remained focussed on key tasks.

205. The Chief Executives' Forum would not be a formal organisation nor have its own staff resources but would be serviced by a small secretariat within the Ministry for the Environment (MfE).

Monitoring and Reporting

206. As outlined above, there should be an active process of monitoring and performance reporting for all of the entities involved in water management which would be overseen by the New Zealand Land and Water Commission.

207. The Parliamentary Commissioner for the Environment (PCE), who reports to Parliament and is wholly independent from any involvement in management or governance, should have the responsibility for two key functions:

- (a) a rolling system of two-yearly reports on the effectiveness of each regional council or unitary authority in achieving national and regional goals and objectives for water
- (b) a five-yearly review and report on the effectiveness of the entire system of land and water management.

208. It is acknowledged that the PCE may not have all the technical expertise available to conduct these reviews without support. We envisage that the PCE would be empowered to call on such support and require the provision of information held by other agencies, especially the EPA and MfE, as is necessary. The PCE would nonetheless require additional resourcing.

209. The PCE would take overall responsibility for the reviews.

Recommendations

A non-statutory National Land and Water Commission should be established on a co-governance basis with iwi.

The Commission should develop and oversee the implementation of a National Land and Water Strategy, and advise Ministers on the management of water resources. The role of the Commission is fully set out in paragraph 171 of this report.

The Strategy should:

- identify opportunities for enhancing cultural, economic, environmental and social value in an integrated way from water resources, including water infrastructure development;
- support links between water resources and other related nationally significant issues and objectives;
- set out expectations and outcomes capable of informing the development of regional water strategies;
- set out needs and priorities for data and knowledge about water;
- recognise the relationship between iwi and the Crown, and iwi expectations for water management.

Collaborative approaches should be mandated for the development of any land and water strategy, or regional water plan.

National direction for regional councils must be given through national policy statements and national environmental standards, templates on different aspects of water management. Regional Councils should be assisted to resolve capacity issues including through coordination. Improvements should be made to the process for developing any National Environmental Standard to ensure the process has a more collaborative option.

Regional council performance in water and related land use management should be improved through:

- government appointments to regional council committees or councils;
- the development of non-statutory regional water strategies;
- the mandatory development of integrated regional water plans under the Resource Management Act, according to a national template and using a collaborative approach;
- ensuring that iwi have adequate representation in regional committees dealing with water;
- the establishment and maintenance of comprehensive water data sets on a basis consistent with national data; and
- using their existing powers under section 30 of the RMA to control those land uses that impact on water quality.

Regional councils should have the option of:

- notifying a regional water plan under Schedule 1 of the RMA and following that process in full, or
- after having used a collaborative approach, making a decision on the plan without conducting a hearing as set out in Schedule 1, and having that decision referred directly to the Environment Court if it is challenged by any party.

In limited circumstances, with Ministerial approval, moratoria are a possible tool to facilitate strategic planning in areas where it is needed to get better water management outcomes.

The Forum of regional council and relevant government agency Chief Executives should be strengthened to improve 'whole of government' direction, provide essential links between central and regional government, and focus on removing obstacles to implementing improved water management.

The Parliamentary Commissioner for the Environment should be responsible for a rolling system of two-yearly reporting on the effectiveness of each regional council in achieving water management goals and objectives, and a five yearly review on the effectiveness of the system of land and water management.

The government should:

- promulgate a National Policy Statement for fresh water quickly. The current draft as recommended by the Board of Inquiry is a basis to work from.
- consider changes in the following areas of the current draft –
 - the references to Tangata Whenua roles and Māori values and interests
 - drafting changes to policy C1 to include reference to "mitigate" in achieving prescribed standards
 - policy E2 to clarify what contamination means in relation to the objectives

- drafting changes to the transitional measures to correct a perceived vires problem.
- consider promptly a set of issues which need further work. They include -
 - specific measures dealing with use and development
 - recognising the benefits of significant infrastructure
 - making environmental values more specific by adding an objective which protects the values of fishing, swimming and mahinga kai, and
 - providing for allocation efficiency.
- deal with these issues through collaborative processes that consider a suite of national instruments (note: some Forum members think these issues should be addressed in the current NPS; others think they should be dealt with separately).

Science and knowledge

210. Effective water management can only be achieved with quality science and knowledge.

Good scientific information combined with knowledge from Mātauranga Māori, and from the social sciences, including economics, is necessary for stakeholders to understand freshwater systems, assess human interventions (including ameliorative ones), design tools, analyse solutions, and understand consequences, including economic ones. Regulators, managers and the wider community need accessible information on freshwater. The public availability of scientific information and expertise is a key element in any collaborative process relating to water. Disseminating information in an accessible form to stakeholders will encourage uptake and use of existing knowledge.

211. The investment in freshwater research has declined in the last decade. This decline needs to be addressed to encourage new scientists to produce the new information and knowledge needed for water management in the future. Management agencies, including regional councils, need to have a critical mass of accessible expertise in the freshwater sciences and related social science.

212. Science is needed for any national strategy on land and water, and in the design of national instruments, such as NPSs and NESs. Equally, it will help develop approaches to water allocation limits, and the control of contaminants to reduce our impacts on fresh water. This will strengthen our international brand, add to our reputation as an innovative source of land management tools and techniques, and assist our economic development.

213. The adversarial processes around consenting, which are a feature of the current water management system, have tended to hinder scientific collaboration. While a degree of contestability in science advice is useful, the data on which it is based should be considered to the greatest possible extent as a public good. Scientific analysis of the state of our waterbodies, as well as solutions to water-related problems, should be made widely accessible and should be based on interdisciplinary collaboration, particularly bearing in mind the links between water management and land management.

214. Leadership is needed in the development of a collaborative approach across key stakeholders that will ensure the optimal use of scientific resources and capabilities nationally.

215. Freshwater science and knowledge needs to be an integral part of the National Land and Water Strategy. To this end, freshwater and land resource science and knowledge must be underpinned by a regularly updated Water Research Strategy and an associated Land Resources and Use Research Strategy that are formulated and agreed in consultation with science providers, stakeholders and iwi.

Recommendations

Freshwater science and knowledge (including Mātauranga Māori) is an essential part of governance and should be:

- based on reliable data consistently collected, archived and publicly available;
- made an integral part of the framework of freshwater and land use management, including its collaborative and strategic processes;
- disseminated in an accessible form to enhance uptake;
- underpinned by a water research strategy and a land resources and use research strategy which draw on the range of relevant disciplines.

Water services management

216. Previous sections of this report apply equally to both urban and rural settings. Collaborative processes are needed to identify values, and set limits and targets for quality and flows in urban waterbodies. These limits and progress toward targets must be rigorously monitored and enforced. Good practice, adaptive management, and efficiency drivers can and must also be applied to urban water supply, wastewater treatment and stormwater.

217. In addition, further changes are desirable to improve water services management in order to contribute to a step-change in the outcomes for water management in New Zealand. Three key changes are:

- a) **Rationalise** the existing council-linked water utilities (both urban and rural) into a small number of large, publicly-owned utilities to provide water supply, wastewater and associated management services. The resulting economies of scale and the larger base of the businesses would address failures in asset management, environmental management and investment.
- b) **Governance reform:** Public ownership of water utilities remains fundamental. However, public water entities could benefit from governance focused on their performance and not oriented to other priorities. The rationalisation into larger entities would also mean that council oversight of pricing and service provision would need to be replaced by a national regulator focused on those issues. This is consistent with international best practice. Oversight of drinking water quality and environmental compliance could continue under similar arrangements as at present.
- c) **A new charging system:** Efficiency and environmental gains will result from requiring water utilities to meter and charge users for their services on a volume-related basis.

Developing definitions of reasonable domestic take and setting up national templates for demand management plans should be part of this system. The gains possible from this include:

- i. more efficient use of water, as a price signal for supply is added to the range of other measures that can be used to encourage water efficiency. Those councils that apply a volumetric charge to water tend to have much lower water use than councils that do not
- ii. more efficient use of water means that there will be meaningful deferrals to the need for future infrastructure and its development cost
- iii. the experience in Auckland is that there are considerable energy savings possible as less water (and wastewater) needs to be pumped.

218. We acknowledge, however, that a broader set of stakeholders have an interest in these matters than is represented in the Land and Water Forum. We therefore recommend the government investigate improved water services management and provision of services as a priority, and revisit the recommendations of relevant reports and enquiries over the past decade.⁹ This government initiative should include:

- a) investigating the establishment of a limited number of catchment based water specific entities with a focus on the integrated management of drinking water, stormwater and wastewater. Ideally each would combine urban and rural areas and include a reasonably sized metropolitan centre to enable the benefits of scale to take effect. These entities should have appropriate investment disciplines in place to ensure optimal investment of capital
- b) establishing a collaborative process involving wider interests to investigate and make recommendations on a widely acceptable system for water services governance, charging arrangements and regulation.

⁹ Including: Ageing Pipes and Murky Waters: Urban water system issues for the 21st Century (Office of the Parliamentary Commissioner for the Environment. June 2000); Funding Local Government - Report of the Local Government Rates Inquiry (August 2007); Matters arising from the 2006-16 Long Term Council Community Plans (Office of the Auditor-General, June 2007); The Auditor-General's observations on the quality of Performance Reporting (Office of the Auditor-General. June 2008); Local Authorities: Planning to meet the forecast demand for drinking water (Office of the Auditor-General. February 2010).

Recommendations

The way water services infrastructure is managed and organized should be investigated to consider the potential benefits of rationalisation. This includes the possibility of a national regulator with oversight of pricing and performance issues.

Subsequently, the issue of volumetric metering and direct billing should be worked through collaboratively with stakeholders.

Drainage

219. Drainage has played an important role in providing productive land and in helping with flood control. Drainage has also reduced wetlands and biodiversity (including indigenous fisheries). We are concerned that there are incentives provided by legislation relating to drainage that are inconsistent with other goals related to the preservation of wetlands and biodiversity.

Recommendation

The government should review legislation relating to drainage to ensure that it is consistent with the need to protect wetlands and biodiversity, and the recommendations contained in this report.

Floods

220. New Zealand's rugged topography often increases the effects of weather systems, as moist air forced up and over mountainous terrain condenses to produce additional rainfall. Each year we experience small but highly destructive floods in sometimes tiny catchments, often accompanied by loss of life, and every decade or two we experience widespread flooding over a whole region, such as the most recent example in the Bay of Plenty. Floods are among the most frequent and costly natural disaster in New Zealand. Between 1980 and 2009 the Insurance Council of New Zealand reported adjusted flood costs of \$672 million. The total economic impact to the Manawatu region of the 2004 storm that included flood damage was estimated at \$300 million.

221. While many floods are unrelated to land use activities there are instances where flooding has been exacerbated by catchment and land-use modification.

222. Floods have a number of impacts: loss of life; loss of property; slope erosion; sedimentation; destruction of productive agricultural land, crops and livestock; loss of soils; and severe and disruptive damage to infrastructure and river control structures. The economic and social costs can extend for some time following the event itself. Major floods are usually accompanied by substantial central government emergency funding to

repair damage, when some damage was avoidable and predicted. An example would be the inappropriate development of floodplains.

223. While not all the impacts of floods can be managed, the severity of the impacts can be managed more effectively through co-ordinated planning and through applying a higher priority to land and water management as a first step in avoiding or mitigating the risk of flooding.

Recommendation

The government should investigate the role of greater national direction in flood management, and whether additional extension services are required.

Appendices

Summary of Terms of Reference

1. Background

It has become increasingly difficult to establish a consensus in New Zealand about what constitutes sustainable land use and its implications for freshwater. This difficulty hampers our economic development and damages our environment. It also creates antagonisms between different groups in our society.

With this in mind, the Minister for the Environment and the Minister of Agriculture and Forestry have asked the Land and Water Forum (the Forum) to undertake a project into how water is managed in New Zealand, titled A Fresh Look at Fresh Water. The Forum will use a collaborative governance process to carry out the project. Membership of the Forum comprises stakeholders outside of the government with a major interest in fresh water.

The Forum was established in 2008, initially under the name the Sustainable Land Use Forum. The renamed Land and Water Forum represents a wider grouping of stakeholders including iwi, agricultural, industrial, urban, and environmental organisations with interests in water management.

Local and central government representatives will be involved in the project process as ‘active observers.’

2. Objectives & Scope

The Land and Water Forum is to:

- Conduct a stakeholder-led collaborative governance process to recommend reform of New Zealand’s fresh water management
- Using a consensus process, identify shared outcomes and goals for fresh water
- In relation to the outcomes and goals, identify options to achieve them
- Produce a written report which recommends shared outcomes, goals and long-term strategies for freshwater in New Zealand.

3. Public Consultation

As part of the process, a public consultation may be conducted on outcomes, goals and potential options.

If so, its timing (which may take place after 30 June 2010) and its nature and budget will be negotiated and agreed between the Land and Water Forum and the Ministers of Environment and Agriculture.

To this end, appropriate reserves will be held by the Ministry for the purpose of public consultation, if and when Ministers agree to this.

Letter from the Minister for the Environment on the draft National Policy Statement for Freshwater



Office of Hon Dr Nick Smith

MP for Nelson
Minister for the Environment
Minister for Climate Change Issues
Minister for ACC

8 FEB 2010

Alastair Bisley,
Chair, Land and Water Forum
Level 8, CMC Building, 89 Courtenay Place, Te Aro,
Wellington 6011

Dear Alastair

I enclosed a copy of the report from the Board of Inquiry into the proposed National Policy Statement for Freshwater Management.

You will have noted that National's pre-election policy was for this work to be put on hold until conclusion of Land and Water Forum process. This proved to not to be possible as it could have been misconstrued as interference in the independent process of the Board. Instead, I decided to allow the process to conclude but hold off any final decisions on it until the Land and Water Forum reports back to Government.

I am not looking to make any national level decisions on fresh water until the Land and Water Forum reports back. I am providing the Board's report to the Land and Water Forum, Iwi Leaders and Officials. The Board's report and recommendations provide useful material for further debate and discussion.

I see the National Policy Statement as one matter that the Land and Water Forum may consider in your report to me in June. I want you to consider in finalising your report how an National Policy Statement of this kind would fit into any frameworks you are considering.

As you are also aware Hon Rodney Hide and I appointed a Review Group last year to undertake a performance review of Environment Canterbury. That Review Group has now reported their findings to us, which I have also attached for your information. Please note that this report is under strict embargo until **10:00am Friday 19 February 2010**.

This report proposes significant changes to the governance arrangements for water in Canterbury and also recommends urgent intervention by Government. The Government has yet to make decisions on how to respond to this report but is mindful of the need not to make long term policy changes until the Land and Water Forum has reported back.

Yours sincerely

Hon Dr Nick Smith
Minister for the Environment

Glossary

Abstracted water	Water removed from a waterbody, typically for consumptive use.
Adaptive management	A structured, iterative process of decision-making in the face of uncertainty, with an aim to reducing uncertainty over time via system monitoring.
Allocation	The volume of water that may be taken from fresh water sources by resource consent holders.
Allocative efficiency	(see Efficiency).
Aquifer	An underground deposit of water-bearing sand, gravel or rock capable of yielding supplies of water.
Assimilative capacity	The capacity of a waterbody to assimilate a discharge of a contaminant at a location to a concentration within a defined acceptable level.
Catchment	The total area draining into a river, reservoir, or other body of water.
Collaboration/ collaborative approach/collaborative process	Working with a wide range of interested parties in each aspect of a decision-making process, including the development of alternatives and the preferred solution(s). Collaboration provides a greater level of input on the design of the approach and the options and solutions identified than consultation and many other forms of public and sector engagement. Collaboration can occur within communities and within a regulatory framework. In a regulatory framework, advice and recommendations will be used by the decision-maker to the greatest extent possible.
Contaminant	Biological (e.g. bacterial and viral pathogens) and chemical (e.g. toxicants) introductions capable of producing an adverse effect in a biological system.
Cumulative	Resulting from successive additions at different times or in different ways.
Diffuse discharges	Pollutants sourced from widespread or dispersed sources (e.g. from pasture runoff of animal wastes, fertiliser and sediments, as well as runoff of pollutants from paved surfaces in urban areas). Also called non-point source discharges.
Dynamic efficiency	(see Efficiency).

Ecological flow	(see In-stream flow).
Ecosystem	A system formed by all plants, animals, and micro-organisms in a particular area interacting with the non-living physical environment as a functional unit.
Efficient use of water / efficiency	<p>Generally considered to have 3 concepts:</p> <ul style="list-style-type: none"> • Technical efficiency – The amount (say, %) of water beneficially used in relation to that taken. It relates to the performance of a water use system, including avoiding water wastage. • Allocative efficiency/Economic efficiency – Relates to water uses resulting in the optimum outcome for both the environment and community. Water is allocated to the use which has the highest value to society. • Dynamic efficiency – Relates to the use of water adjusting over time, in order to maintain or achieve allocative efficiency.
Freshwater	naturally occurring water on the Earth’s surface in bogs, wetlands, ponds, lakes, rivers and streams, and underground as groundwater in aquifers and underground streams.
Good management practice (GMP)	an umbrella term to describe industry-led programmes promoting practice changes to improve industry performance against water related objectives.
Groundwater	Water located underground in rock crevices and in the pores of geologic material. It supplies springs and wells. [see ‘aquifer’].
Hydrology/hydrological	the science dealing with the occurrence, circulation, distribution, and properties of the waters of the earth and its atmosphere.
In-stream flow	relates to the intrinsic environment of the river, lake or aquifer (e.g. ecology, recreation, cultural, aesthetic, natural character). The flow regime required to be maintained in a river to support environmental, social and cultural values associated with the water resource.
Integrated catchment management	a process through which people can develop a vision, agree shared values and behaviours, make informed decisions and act together to manage the natural resources of their catchment. Decisions are made at the catchment level by considering the effects on all of the resources and people within the catchment, by integrating science and governance.

Intensification of land use	make strong more concentrated use of land, such as obtaining more productivity from land or concentrating more activity onto an area of land.
Iwi	tribe.
Kaitiakitanga	the exercise of guardianship.
Limit	to define the capacity for use of the resource. E.g. maximum water take, discharge rates and contaminant loads, minimum discharge quality, restrictions on dam operations and restrictions on land uses. Examples of “environmental limits” include receiving water quality standards and minimum river environmental flows.
Mātauranga Māori	Māori knowledge originating from Māori practices, observations, science, ancestors, including the Māori world view and perspectives, creativity and cultural practices.
National Environmental Standard (NES)	regulations to protect the environment and human health developed under the Resource Management Act 1991. These are binding on local authorities.
National Policy Statement (NPS) for Freshwater Management	instrument available under the Resource Management Act 1991 to help local government decide how competing benefits and local costs should be balanced in freshwater management.
Nutrient	chemicals needed by plants and animals for growth.
Nutrient trading	a contaminant trading method comprising a system of credits that can be bought and sold. The number of credits is based on how much pollution is permitted to be discharged into the environment.
Opportunity cost	the forgone benefits from the next best alternative use of a resource.
Over-allocation	a situation where either: values associated with current resource use cannot be sustained to a minimum standard if all resource consents are fully exercised; and/or, the total volumetric or peak rate allocation from a water resource exceeds that considered appropriate, if all consents are fully utilised.
Point source discharge	discharge of contaminants into a waterbody from a single fixed point, such as a pipe or drain (e.g. from the likes of sewerage, factory and dairy shed outfalls). (see Diffuse discharge).

Riparian planting	planting the banks of rivers and streams to reduce erosion and pollutant run-off to the waterway.
RMA	Resource Management Act 1991.
Rule	a rule in a regional plan, as prescribed under the RMA (e.g. sections 68, 69 and 70).
Rural water infrastructure	includes dams, bores, and irrigation schemes.
Sediment/sedimentation	unconsolidated mineral and organic particulate material in the waterbody.
Spatial	of, relating to, involving, or having the nature of space, for example, areas which are able to be mapped.
Spatial variability	occurs when a quantity that is measured at different spatial locations exhibits values that differ across the locations.
Standard	an established norm or requirement. It is usually in a formal document that establishes uniform technical criteria, methods, processes and practices. A standard has regulatory force, if defined in a regulatory instrument.
Stormwater	water that originates from rainfall.
Taonga	treasured possessions, both tangible and intangible.
Target	a biological indicator (e.g. species abundance) or physical or chemical indicator (e.g. concentration, temperature). They often represent objectives that need to be met to achieve the desired level of ecosystem protection.
Technical efficiency	(see Efficiency).
Values	values of waterbodies include uses by people (e.g. drinking water, irrigation, hydro-generation, recreation) and intrinsic values (e.g. ecology, cultural, aesthetic, natural character).
Value judgement	a decision that determines the desired balance between competing values, involving basic issues of fairness, reasonableness, justice, or morality.
Wastewater	water that has been adversely affected in quality by direct use in an anthropogenic process that is then returned to the environment. E.g. liquid waste discharged by domestic residences, commercial properties, industry and agriculture.
Waterbody	excludes geothermal water.

Small Group Members

Beef + Lamb New Zealand Limited (Ben O'Brien), DairyNZ (Simon Tucker), Ecologic (Guy Salmon), Environmental Defence Society (Gary Taylor), Federated Farmers (Lachlan McKenzie), Fish and Game New Zealand (Bryce Johnson), Fonterra (John Hutchings), Horticulture New Zealand (Chris Keenan), Irrigation New Zealand (Andrew Curtis), Meridian Energy (Hamish Cuthbert), Mighty River Power (Bruce Waters), New Zealand Forest Owners Association (Peter Weir), Forest and Bird (Kevin Hackwell), Te Arawa Lakes Trust (Roku Mihinui), Te Runanga o Ngāi Tahu (David Perenara-O'Connell), Tourism Industry Association (Geoff Ensor), Tuwharetoa Māori Trust Board (Dean Stebbing), Waikato-Tainui (Julian Williams), Water New Zealand (Peter Whitehouse), Whanganui River Māori Trust Board (Nancy Tuaine), Whitewater New Zealand (Hugh Canard).

Active Observers to the Small Group - Auckland Regional Council (Alastair Smaill), Environment Canterbury (Ken Taylor), Environment Waikato (Tony Petch), Ministry for the Environment (Guy Beatson), Ministry of Agriculture and Forestry (Paul Stocks/ Mike Jebson), Tasman District Council (Richard Kempthorne).

Also, National Institute of Water and Atmospheric Research (Dr Clive Howard-Williams), Federated Farmers (Brigid Buckley), Fish and Game (Neil Deans)

Plenary Organisations

Aqualinc Research Ltd, Ballance Agri-Nutrients, Beef + Lamb New Zealand Limited, Carter Holt Harvey Ltd, Contact Energy, DairyNZ, ECO, Ecologic, Environmental Defence Society, Federated Farmers, Federated Mountain Clubs of New Zealand, Fert Research, Fish and Game New Zealand, Fonterra, Forest and Bird, Foundation for Arable Research, Genesis Energy, Horticulture New Zealand, Ihutai Trust, Institution of Professional Engineers New Zealand, Irrigation New Zealand, NZ Landcare Trust, Lincoln University, Massey University, Meridian Energy, Mighty River Power, Ministry of Research, Science and Technology, MWH, National Institute of Water and Atmospheric Research, New Zealand Business Council for Sustainable Development, New Zealand Farm Forestry Association, New Zealand Forest Owners Association, New Zealand Institute of Forestry, New Zealand Winegrowers, Opus International Consultants Ltd, PGG Wrightson, Straterra Inc, Tasman District Council, Te Arawa Lakes Trust, Te Runanga o Ngāi Tahu, Tourism Industry Association, Treasury, Tuwharetoa Māori Trust Board, Waikato-Tainui, Watercare Services Ltd, Water New Zealand, Water Rights Trust, Whanganui River Māori Trust Board, Whitewater New Zealand, Wood Processors Association of New Zealand, Zespri.

Chair, Land and Water Forum – Alastair Bisley

Land and Water Trust and Secretariat

Trustees of the Land and Water Trust - Alastair Bisley, (Chair Land and Water Forum), Simon Tucker (Dairy NZ), Kevin Hackwell (Forest and Bird) and Dean Stebbing (Tuwharetoa Māori Trust Board).

Secretariat - Alastair Patrick (Project Manager), Kerry King (Project Administrator), Hana Crengle (Senior Analyst) and Jo Beaglehole (Senior Analyst).

Thanks

Thanks to Water New Zealand for the provision of accounting and payroll services, and to Federated Farmers, Meridian Energy and the Ministry for the Environment for providing the use of meeting rooms and video conference facilities. Thanks also to the Auckland Regional Council for its assistance in facilitating planning advice for the Forum.

Thanks to Colin James, Glen Lauder, Andrew Sweet, John Scott, and Greg Hill for their assistance, guidance and analysis during the course of the work of the Small Group of the Land and Water Forum.