FRESHWATER SYMPOSIUM

Tools for implementing the Freshwater Reforms

Summary Overview

October 15, 2013

Contents

FORWARD

If you were to ask 5 years ago how decisions were being made to manage New Zealand's freshwater resources I think few could have envisaged where we are today. It is a real testament to the members of the Land and Water Forum, central government and the regional councils who recognised the issues we faced, worked diligently to identify new ways to manage our freshwater resources and are now putting those ideas and solutions into action.

We, in the Values, Monitoring and Outcomes Research Programme, have been incredibly privileged to have been a part of this journey. Not only have we been able to engage with those working to find new approaches and solutions, but we have been able to work alongside those councils who have bravely started this journey in new ways to make decisions and those iwi/hapū who have taken steps to articulate and integrate their values into environmental planning.

As part of this journey we have been able to document some of these learnings as well as work to provide new tools and approaches to facilitate how decisions are being made and policy instruments chosen, and how to track and evaluate policy progress.

We developed this Symposium to not only share our learnings but also provide the opportunity for others to engage with and ask questions of those who have already embraced the collaborative decision-making paradigm. For those who were unable to attend the Symposium, I hope this synthesis provides some useful insights to the day and the words of wisdom imparted by those who are part of this new journey.

Suzie Greenhalgh
(Values, Monitoring and Outcomes Research Programme Leader)

Values, Monitoring and Outcomes Research Programme: An overview

Freshwater governance and management in New Zealand is highly dynamic. With the Land and Water Forum recommendations, central government freshwater reforms, and growing resource scarcity there is increasing impetus to change how management decisions on our freshwater resources are made. Our research programme supports this on-going programme of reform, retaining flexibility to meet emerging future needs related to our programme's research.

Some of our programmes highlights to date include:

- Recognition that value and values have multiple meanings and that identified values are often constructed in context, i.e. they may not be pre-existing or stable and thus amenable to elicitation and measurement through traditional consultation or survey techniques. This reinforces the move towards collaborative processes for freshwater planning, providing specific fora in which all parties can build a collective understanding of desired outcomes and how to achieve them.

- Our partnership with Hawke's Bay Regional Council to support the collaborative process on managing freshwater resources in the Greater Heretaunga and Ahururi Estuary in Hawke's Bay (TANK process).

- Our partnerships with Māori organisations to develop principles and frameworks that accommodate the values, tikanga, and mātauranga Māori of different iwi/hapū; and encompassing these into environmental plans and decisions.

- Our involvement in the MfE National Environmental Monitoring and Reporting (NEMaR) project aimed to improve the consistency and dependability of regional water monitoring on which to base national reporting.

- Development of frameworks to help decision-makers identify policy instruments or interventions that are most likely to influence the behaviour of water users (Policy Choice Framework) and track the progress and evaluate the effectiveness of the policies implemented to achieve agreed freshwater outcomes (Performance Reporting Framework).

- Development of a new statistical method to quantify the 'strength-of-evidence' in monitoring data and inclusion of these methods into the Time Trends and Equivalence freeware used by many regional councils.

- Supporting the continued development and use of the RiVAS methodology by regional councils to rank the significance of different water bodies for a range of different values.

- Development of a Policy Brief series to translate our research into recommendations for stakeholders. Current Policy Briefs cover the following topics: principles to underpin decision-making; using mātauranga Māori to inform freshwater management; understanding conflict over values in a regional plan; economic analysis to support freshwater decisions; and several briefs covering different aspects of collaborative processes.

- Through our Regional Council Forum we are working with a group of 6 regional councils (Bay of Plenty, Waikato, Hawke's Bay and Horizons Regional Councils, Tasman District Council and Environment Canterbury) to explore and query the historic and emerging approaches for managing freshwater and the challenges being posed by the freshwater reforms.

For the next phase of the programme, we are re-focusing our research on two main themes. The first, *Values and Outcomes*, looks to:

- evaluate aspects of the existing and emerging collaborative processes to identify which approach(es) may work more (or less) successfully in different contexts

- compare collaborative processes with traditional Resource Management Act (RMA) Schedule 1 processes

- continue to support and draw learnings from the TANK process in Hawke's Bay

- continue our work with iwi/hapū to translate their values and aspirations into targets and limits for inclusion in regional council freshwater management plans, using cultural monitoring to track the effectiveness of these plans

- determine how the RiVAS methodology can further support regional council decisions, particularly for those water bodies where collaborative processes will not be used to decide how to manage that resource

- test and further refine the Policy Choice Framework.

The focus of the second theme, *Monitoring and Reporting*, is to:

- identify key socio-economic indicators to track policy performance

- develop new statistical approaches for making use of 'null values' (or values below the detectable level) in monitoring data

- identify how community monitoring can support collaborative decision-making, and investigate the relationships between community, cultural and scientific monitoring

- test and refine the Performance Reporting Framework to enhance the ability of regional councils to track policy progress and effectiveness.

Our Regional Council Forum continues as an integral pathway for involving regional councils in the programme, with the Policy Brief series playing an important role for translating and disseminating our research findings for key stakeholders.

Outline of the Summary Notes & Agenda

Overview

In the past four years there have been some major changes in freshwater management in New Zealand, with more to come. These include changes to monitoring and reporting on state and trend in aquatic environments, how decisions are made about freshwater resources, the way decisions are implemented and how the performance of those decisions is evaluated.

This symposium provided an opportunity to review and debate the latest information on these changes and their implications for regional and national level freshwater management. It bought together key stakeholders from research, regional council, central government and Māori organisations to share their insights and learnings on how decisions are being made about land and water policy including:

- **How to design and when to use collaborative processes?**

- **Identifying Māori values and how to incorporate them into freshwater planning?**

- **Plan effectiveness: how do we know if it's working?**

This provided an opportunity to learn, explore and debate the myriad of questions and insights from our research and hear from those implementing the changes.

Agenda

Tuesday October 15th 9.00am – 5.00pm	
Royal Society of New Zealand, Wellington	
9:00am start **Session 1**	**Introduction & Welcome** Suzie Greenhalgh (Landcare Research)
Session 2	**Freshwater management – changes & challenges** Kay Harrison (MfE)
Session 3	**Plenary session: Collaborative approaches to fresh water management** Jim Sinner & Natasha Berkett (Cawthron Institute)
10:10am	**Morning tea**
10:40am **Session 4**	**Panel discussion: Collaborative processes** Panellists: Justine Young & Wendy Boyce (WRC) Tim Sharp (HBRC) Barbara Nicholas (ECan) Graham Sevicke-Jones (GRWR)
Session 5a	**Break out session: Collaborative processes**
12:30 pm	**Lunch**
1.00pm **Session 5b**	**Feedback on the collaborative processes session.**
Session 6	**Plenary session: Monitoring and Reporting** Rob Davies-Colley (NIWA) Garth Harmsworth (Landcare Research)
Session 7	**Panel discussion: Monitoring and reporting** Panelists: Jane Kitson (Kitson Consulting) Bill Vant (WRC) Mahuru Robb (University of Waikato student) MfE (TBC) Lian Potter (GWRC) Claire Mortimer (MBIE)
Session 8	**Breakout session: Monitoring and reporting**
Session 9 **5.00pm finish**	**Closing remarks**

Summary

The key points from the Symposium are outlined below with a graphic representation of these points illustrated in Figure 1.

Freshwater Management – changes and challenges

Kay Harrison (MfE)

1. What's new? Conversations are happening about values between people.
2. Ministers saying that we must still have good economic analysis to make decisions.

Plenary Session – Collaborative approaches

Jim Sinner (Cawthron Institute)

3. To realise the potential of collaborative processes requires careful design to, among other things, manage power imbalances.
4. How can we test science in a collaborative process as rigorously as it gets tested in a Schedule 1 process?
5. Leadership is not just making the decision, but is also about empowering people to make the decision.

Panel discussion – Collaborative processes

Tim Sharp (Hawke's Bay Regional Council)

6. Collaboration is hard work but worth it.
7. Collaborative processes often produce champions who go back to their communities to explain how water management works and to help find options for water management. The finding of champions within the community for the process is important for collaborative processes.

Wendy Boyce (Waikato Regional Council): starting point was legislated co-governance

8. Need to manage change on the ground, i.e. behavioural change: regardless of the regulatory framework. Behavioural change is required to address water management issues, so must focus on social complexity alongside technical complexity.
9. Whenever you are stuck on how to do something, throw it out to the stakeholders as this will generate ideas and it promotes transparency.

Justine Young (Waikato Regional Council)

10. New business-as-usual for councils: transferring the role of a small group within a council to a wider group of people to make the decisions.

11. Resourcing is important as is skill development within the council and explaining and coaching council staff through the collaborative process being designed.

Graham Sevicke-Jones (Greater Wellington Regional Council)

12. Collaborative processes are resource hungry and there is a greater need to have the science/information at the front of the process to inform the consequent decision-making processes. This does result in current information needing to be used, rather than having 7–8 years to get data like we have had with the typical RMA Schedule 1 process; although the reality around this is that the data collection becomes reactive rather than properly integrated.
13. It is important to integrate mātauranga Māori knowledge into the information set used by collaborative processes. Māori have generations of knowledge based on long-term observations that could be useful for looking at condition and state of the water bodies.
14. We have existing information that we have analysed previously, but now need to work within the collaborative process to identify the questions Māori have and then reanalyse our data to answer those questions. State of the environment data may not be at the right scale to answer these questions.

Barbara Nicolas (Environment Canterbury)

15. Need a culture change within organisations to effectively support and facilitate collaborative processes. Those processes encompass water management, not just water planning and policy.
16. Keeping decision-makers community based (rather than nationally based) is important as communities are best placed to find creative and innovative solutions to deliver the outcomes the community wants … not national representatives. (Note: there was discussion later in the day that if a site has national significance for one reason or another it may be appropriate to have someone present who represents the national interest.)
17. Distinguish 'stakeholder' collaborative groups (in which members are representatives) from 'community' collaborative groups (where members bring their expertise and experience, but aren't representatives).

Plenary Session – Monitoring and reporting

Rob Davies-Colley (NIWA - National Institute of Water and Atmospheric Research)

18. Provided some principles for good monitoring networks for long-term monitoring networks aimed (primarily) at defining state and change (trend). Trend is very demanding of monitoring consistency and data quality.
    a. No (real) monitoring network can answer all the questions thrown at it, but it should aim to monitor <u>state</u> and <u>change</u>. A monitoring network will usually provide a valuable platform contributing to any special investigations to answer unanticipated questions.

      b.   Best check on data quality is if an independent agency gets the same numbers as you.

Garth Harmsworth (Landcare Research)

19. Provided six steps for better involvement of Māori in freshwater management and highlighted the usefulness of complementary monitoring – cultural, community and science monitoring.

Panel discussion – Monitoring and reporting

Bill Vant (Waikato Regional Council)

20. SoE (state of the environment) monitoring can, but not often, meet the needs of policy decisions (used the example of Lake Taupo science)
21. How is SoE information/data used
      a.   Care required not to 'cry wolf' and over-interpret trends in water quality data (e.g. an apparent 5-year trend in Taupo water quality turned out to be cyclic).
      b.   Care required to not wait until they are 'supremely' confident about a declining trend before bringing to attention of managers – by which time the environment may be degraded. The precautionary principle would say managers 'had' to act when Taupo was identified as 'worsening'.

Lian Potter (Greater Wellington Regional Council)

22. Development of a science strategy and its oversight (internal group, external group and science advisory group) helps focus on the outcomes needed from a monitoring network.
23. Our monitoring networks are not currently meeting our needs. Our job as a regional council is to provide robust designs that meet the uncertainty requirements and answer the questions that may need answered in the future.

Mahuru Robb (University of Waikato)

24. Relationships are key to the success of any action to improve freshwater management, especially in relationships for Māori. Don't come to visit only when you want something.

Shaun Awatere (Landcare Research)

25. Must support both tangible (quantitative) and intangible (qualitative) monitoring. Mātauranga Māori should be embedded all the way through a decision process, e.g. from the Treaty obligations to collaborative governance to local on-the-ground decisions.

Claire Mortimer (Ministry of Business, Innovation and Employment)

26. 'Throwing rock and bird' analogy: recognise that policy occurs within a complex system. There is a need to have a 'learning institution' that monitors implementation and institutional change, and you need to determine what you need to monitor early in the process and if possible get baseline data.

Figure 1. Freshwater Symposium Summary Graphic
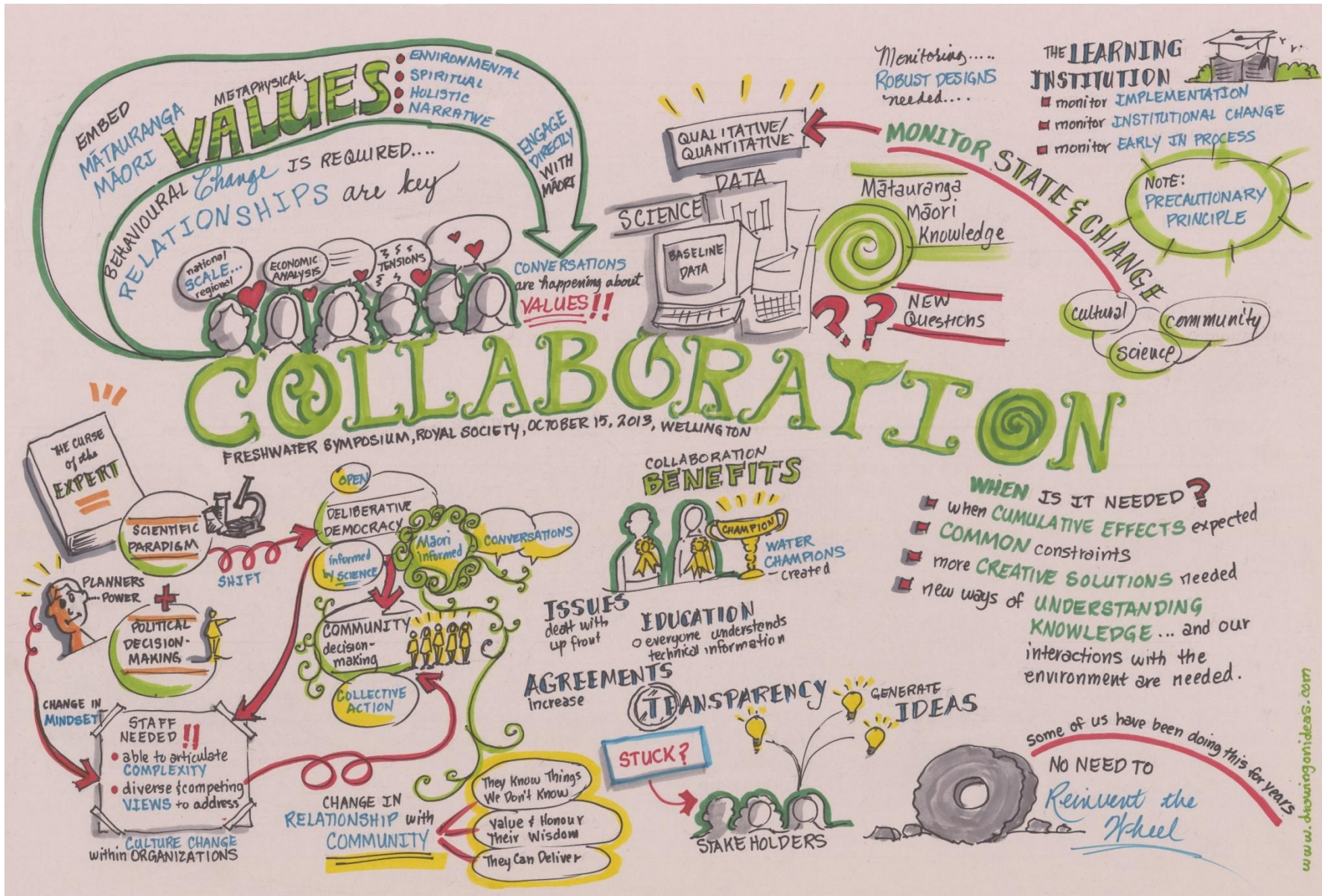
Plenary Session

Collaborative freshwater management: The challenge of a new paradigm

Jim Sinner and Natasha Berkett, Cawthron Institute

As New Zealand embarks on a new way of doing freshwater planning, it is important to consider some fundamental ideas about knowledge and democratic institutions that are being redefined along the way. Understanding these changes will help us to identify some of the challenges we must address to realise the potential of collaborative processes.

Global pressure on resources and institutions

Resources are increasingly scarce in New Zealand, and that means that one person's use of a water body increasingly impacts on other people and their ability to enjoy that same water body. We now have seven billion people on the planet, and global markets enable consumers in China, India, North America, Europe and Africa to buy food and other products from New Zealand.

This growing demand puts pressure on land, water, air and biodiversity in New Zealand as businesses respond to global markets. At the same time, New Zealanders are increasingly expressing their concerns about the environment. In a 2010 survey of New Zealanders, water pollution and water-related issues were rated as the most important environmental issue facing New Zealand (Hughey et al. 2010).

We thus have a contest between competing value sets, which is sometimes described as development vs conservation, although it is of course much more complex than that. This contest of values leads to court cases over proposed plans and resource consents for new or expanded activity involving the use of water.

Our existing institutions, by which we mean not so much organisations as laws and other ways of resolving conflict, were mostly designed – and have evolved – in times of relatively abundant resources. These institutions have proven to be insufficient to deal with increasing scarcity of water, both in terms of water quality and quantity.

The inadequacy of these institutions is reflected, for example, in the fact that 'first-in, first-served' is seen as no longer an appropriate basis for deciding who should get access to scarce water. A second example is that intensification of our farming systems is occurring faster than councils can respond. When councils impose nutrient limits that exceed the current load, this creates a claw-back situation with no agreed formula for how to allocate the reduced supply. In the case of diffuse pollution from roads and farms, many councils have been reluctant to even acknowledge these as discharges under section 15 of the Resource Management Act 1991 (RMA).

A call upon values

After more than 10 years of reports and policy papers to successive governments on how to fill this institutional need, the National Policy Statement – Freshwater Management (NPSFM) was released in May 2011 (New Zealand Government 2011). The NPSFM directs councils to set limits for water

allocation and water quality. Overall water quality within a region must be maintained or improved, and over-allocation must be remedied. Over-allocation means that community goals set out in a regional plan are not met and water quantity limits have been exceeded.

The NPSFM says that limits are to be set regionally, based on values. The terms 'value', 'values' and other variants occur 24 times in the NPSFM. There is a list of 'important national values' of fresh water, but no indication of how catchment-level values are to be identified, assessed or balanced to arrive at limits. This is left up to regional decision-making processes.

There are some bottom lines, however. The RMA provides broad guidance, e.g. in section 5 ('safe-guarding the life-supporting capacity of air, water, soil and ecosystems'), and sections 70 and 107 prohibit certain adverse effects on water quality. The NPSFM itself requires that there be no overall decline in water quality within a region, and the Minister for the Environment has promised that a National Objectives Framework will provide some guidance and some bottom lines for human and ecosystem health.

But, assuming that the exercise is not just about setting limits at these bottom lines, communities will need to identify, assess and balance values to reach decisions on where the limits should be. How is this to be done?

Over the last two decades or more, at least since enactment of the RMA, resource management in New Zealand has been operating under the paradigm of what has been called 'scientific management'. This paradigm suggests that through use of science and experts, we can compile enough evidence about ecosystems to determine the 'correct' or even 'best' objectives for each freshwater body (Brunner & Steelman 2005). In recent years, we have added values to this equation. Those operating under the scientific management paradigm assumed that this was just another scientific challenge, to identify, measure, and balance values so experts can determine the 'right' management objectives and approaches.

This paradigm has led, for example, to attempts to define objectively 'Water Bodies of National Importance' (Chadderton et al. 2004) and also to a method (RiVAS) to assess significance of rivers for a range of uses and values (Hughey & Baker 2010).

But research over the last decade has made it increasingly clear that value and values are often constructed in context. That is, how people value something depends on when, how and by whom the question is asked.

If I ask you, 'What is the value of this lake, river, wetland?', before you answer, you are likely to want to know, 'Value to whom? For what? And why do you want to know?' And further, 'How will you use my answer?' This is not necessarily because people are being strategic in their answers, e.g. trying to influence a study with policy implications, although they might be. More generally, people look for context because they actually need it to define meaning.

The key point here is that value is not objective and cannot always be determined or measured by experts in ways that are immune from contest in places like council hearings or the Environment Court.

As an example, our case study in Tasman District in 2012 showed that it is not possible to separate the documentation of values from how those values will be prioritised and given effect to in a regional plan (Sinner & Tadaki 2013).

We cannot describe or measure values without reference to how the description or measurement will be used. Categorisation and measurement of values involve framing and value judgments.

A new paradigm

So we have a shift occurring from a scientific management paradigm to a paradigm of deliberative democracy to address complex problems. In this new paradigm, there is no 'right answer' or optimal solution. Science can help to explain how things work but not what is 'best'. Rather than seeing resource management issues as a 'problem to be solved or optimised', we see them as complex systems and 'a situation to be improved'.

This paradigm shift has been influenced, indirectly if not directly, by Jurgen Habermas, one of foremost philosophers of the 20th century. Habermas argued that human interaction and social life require agreed meanings to enable coordinated action, e.g. to agree on policy for freshwater management, through a process he called 'communicative reason'. Knowledge can only be determined based on what people can agree on in 'authentic (open and balanced) dialogue' (Flyvbjerg 1998; Innes & Booher 2010).

The validity of an argument, and knowledge more generally, is defined as consensus reached without the influence of power —

> *…all concerned in principle take part freely and equally, in a cooperative search for truth, where nothing coerces anyone except the force of the better argument (*Habermas, quoted in Flyvbjerg 1998, p. 213*).*

This applies to science and what we accept as facts and knowledge as much as it applies to values. Elected politicians cannot perform this dialogue on behalf of their constituents – people have to speak for themselves, to test their arguments against those of others.

When this authentic dialogue occurs, we can get a basis for collective action. In other words, we can get agreement on how we will address a challenge such as how much water to allocate for abstraction and how to manage land use to protect water quality, aquatic ecosystems and *mauri* (a Māori concept: life principle, special nature, a material symbol of a life principle, source of emotions).

New Zealand's experiment in collaborative planning

Collaborative planning is an approach to deliberative democracy, a different way of practising democracy at a local level based on the Habermasian notion of authentic dialogue (Innes & Booher 2010).

New Zealand is trying collaborative management because there is dissatisfaction with the current way of doing things and the associated outcomes. Councils have not set limits or made plans to

achieve them (especially for water quality) and a range of stakeholders are not comfortable leaving those decisions with elected politicians.

The Land and Water Forum recommended collaborative planning to the Government as a new way to set catchment-level limits. This followed research conducted by Guy Salmon and others based on experiences with collaborative governance in Nordic countries (Salmon et al. 2008).

The Government has accepted this proposition and has proposed to recognise collaborative processes for freshwater management more formally via amendments to the RMA (Ministry for the Environment 2013).

Collaborative planning is much more than consultation; it is delegating decision-making to a group of stakeholders. It requires people to listen to each other and learn to appreciate other values and ways of seeing the world. The central idea of collaborative planning is the Habermasian notion of exploring and constructing values in context to build a vision of the future that everyone can live with, and a consensus on the plan for heading there.

If all parties are fully involved and can reach consensus, then the sponsoring agency, e.g. a regional council, can adopt the consensus agreement without political risk. Conversely, a council decision that deviates from the consensus would be seen as a breach of trust.

Collaborative planning is therefore a way to negotiate a plan of collective action, while recognising that people may have different values and different ways of understanding the world.

That is the theory of collaboration. However, Michel Foucault, another 20th century philosopher, argued that Habermas' ideal conditions are never satisfied, because politics is always distorted by power (Flyvbjerg 1998). Therein lies the fundamental challenge facing New Zealand's venture into collaborative freshwater management. How can we construct dialogue to develop a shared understanding amongst all interested parties, while minimising power imbalances that could lead to outcomes that are not trusted and supported by the wider community?

Sources of uneven power

To address this challenge, the first step is to identify and acknowledge how power imbalances can arise. One of the most obvious is that it is not possible to have everyone in the room — there will be individuals, organisations and discourses that are proportionally under-represented or are not represented at all. It is possible that collaborative planning processes could actually decrease opportunities for public participation, especially if they are linked to restrictions of appeal rights.

Another potential source of uneven power is where sponsoring councils are aligned with politically powerful groups. This is most likely to happen where agency management and elected representatives predominantly share the world view of those politically powerful groups. Council staff that organise and direct a collaborative planning process can influence who gets included in a stakeholder group, meeting agendas, and how agreements are recorded and translated into policy outcomes, to name just a few examples of how councils can influence these processes.

A third way in which power imbalances might develop is around a well-recognised human trait, which is 'group think'. Studies have shown that a person who has correct factual information about a

situation will often not volunteer that information in a group setting if everyone else is united in offering alternative but inaccurate information (Mauboussin 2009). It takes brave people to resist group think and, in a collaborative planning process, it takes good facilitation to ensure individual viewpoints are heard.

Fourthly, power imbalance can arise around the presentation and use of science. In the current planning process under RMA Schedule 1, submitters engage their technical experts to conference with the technical experts of councils at pre-hearing meetings, and to present information at hearings. This conferencing and questioning at hearings allows for a rigorous, robust debate of the scientific facts, in other words the evidence base for decisions.

Under a collaborative planning process, scientific analysis is likely to be provided by the sponsoring council. We are not aware of any non-council participants engaging scientists to provide technical information for a collaborative planning process in New Zealand up to this point. There may be examples where this has occurred, but council-provided science appears to be the norm. This means that scientific debate between the technical experts is not likely to happen until a plan change is notified – i.e. after the collaborative consensus decisions have been determined. Considering alternative science arguments at this stage, assuming the mechanism will still exist for this to happen after the RMA is amended, would seem to be both inefficient and ineffective in terms of process outcomes. Indeed, it undermines the entire collaborative process. So ways are needed to provide opportunities to test scientific analysis during the collaborative dialogue process.

Not business as usual

Enabling constructive dialogue through collaborative planning processes is likely to require a shift in mind-set, especially for council staff and elected representatives. There will need to be recognition that making decisions is not the only way to lead, i.e. you can be a leader or sponsor of a process but allow others in the process to make the decisions. This is another paradigm shift for regional councils: giving up some of the control of planning processes and empowering people who have not traditionally had decision-making power. Councils will be more or less comfortable with this, depending on their internal culture.

So will councils embrace the collaborative planning model? Factors that might contribute to reluctance include uncertainty of outcomes and the fear of losing control of the process. What if the participants in the process agree on recommendations that the council is not comfortable with?

Councils might also be reluctant because of perceived cost and time requirements. At this stage there is little comparative data on the cost and time required for collaborative planning vs traditional planning processes. Proponents argue that it will cost less in the long run, or will produce more durable outcomes, but the costs might be 'front-loaded' without an assurance that savings will occur later.

Some stakeholders might also be reluctant to embrace collaborative management. There is the possibility that, through power imbalances and group think, environmental outcomes after collaboration could be worse than under the current planning process, if the values of participants are tilted towards jobs and development. The converse also is true (of course); economic and social outcomes could be worse if the values of participants are tilted towards the environment.

Another challenge with collaborative planning processes is that freshwater management is essentially a 'wicked problem', i.e. there are dozens of interrelated complex issues to address. It is difficult for a room full of people, each with their respective viewpoints and interests, to stay within the predefined scope of the process. This is a boundary problem, i.e. what's in and what isn't? Define the problem too broadly and the complexity will overwhelm the process. Define it too narrowly and stakeholders will be disempowered and the options will be too limited for diverse stakeholders to construct an outcome that has something for everyone.

Finally, there is still no clear guidance on how to actually 'do' collaborative planning. Without adequate design, failures are likely to occur. There may be situations where recommendations cannot be agreed upon, and some processes may 'blow apart', creating as much or more controversy as existed before a collaborative process began. The possibility of failure is risky for politicians, who are generally conservative and mindful of election cycles.

Conclusions

Having considered some examples of the ways power imbalances can impact on constructive dialogue and some of the challenges of collaborative management, it becomes clear that design is all-important to achieve successful outcomes.

The promise and the potential for constructive dialogue to deliver freshwater management that is trusted and supported by the communities is most likely to be realised if the following criteria are met.

- The sponsoring council is fully committed to the process and the process is well-resourced.
- The roles of participants, including those of the council, are well understood.
- The scope of the process is well-defined.
- Participants are recruited carefully in order to engage a diverse range of views.
- Skilled facilitation ensures that all perspectives get a fair hearing and that scientific analysis and other forms of information are tested.

References

Brunner RD, Steelman TA 2005. Beyond scientific management. In Brunner RD, Steelman TA, Coe-Juell L, Cromley CM, Edwards CM, Tucker DW eds Adaptive Governance: Integrating science, policy and decision making. New York, Columbia University Press.

Chadderton WL, Brown DJ, Stephens RT 2004. Identifying freshwater ecosystems of national importance for biodiversity: Criteria, methods, and candidate list of nationally important rivers. Discussion document. Wellington, Department of Conservation.

Flyvbjerg B 1998. Habermas and Foucault: thinkers for civil society? British Journal of Sociology 49: 210–233.

Hughey KFD, Baker MA eds 2010. The River Values Assessment System: Volume 1: Overview of the method, guidelines for use and application to recreational values. LEaP Report No.24A. Lincoln University, New Zealand.

Hughey KFD, Kerr G, Cullen R 2010. Public perceptions of New Zealand's environment: 2010. Christchurch, EOS Ecology.

Innes JE, Booher DE 2010. Planning with complexity: An introduction to collaborative rationality for public policy. London and New York, Routledge.

Mauboussin MJ 2009. Think twice: harnessing the power of counterintuition. Boston, Harvard Business School Press.

Ministry for the Environment 2013. Freshwater reform 2013 and beyond. Wellington, MfE.

New Zealand Government 2011. National policy statement on freshwater management.
www.mfe.govt.nz/rma/central/nps/freshwater-management.html (accessed 20 December 2012).

Salmon G, Zilliacus K, Scherzer J, Barlund H-M 2008. Collaborative governance on environmental policies affecting rural landowners: comparing Nordic and New Zealand practices. Paper presented at the Yale University/UNITAR Conference on Environmental Governance.

Sinner J, Tadaki MY 2013. Understanding conflict over freshwater values in a regional plan. Policy Brief. Manaaki Whenua Landcare Research.
http://www.landcareresearch.co.nz/__data/assets/pdf_file/0006/64842/freshwater_values_policy_brief.pdf

Māori values for freshwater planning

Garth Harmsworth (Te Arawa, Ngāti Tūwharetoa, Ngāti Raukawa) and Shaun Awatere (Ngāti Porou), Landcare Research

Garth Harmsworth spoke about freshwater issues from a Māori perspective, the situation and the challenges. He then provided a tikanga-based model and practical steps for increased dialogue, collaboration, co-planning and co-management of fresh water. He provided six recommended steps – and gave examples of each – for better involvement of Māori in freshwater planning and management.

> *Māori and local authorities have made huge strides in developing and fostering positive working relationships, particularly since the RMA 1991. However, despite 20 years of progress there still remains a high degree of frustration over the limited representation of Māori perspectives and knowledge in land use planning and policy formulation.* (Awatere et al. 2013)

Significant issues for Māori around water management – examples

Comments after Pita Sharples' speech on water at the National Iwi leaders summit (2009):

- 'Māori are increasingly keen to explore their **rights to fresh water**. These rights may exist as a consequence of custom and customary use, under the common law doctrine of aboriginal title, or under Article Two of the Treaty of Waitangi …'
- 'The message that is coming consistently from Māori is that, to date, **the legal framework for managing water has not provided an adequate role for Māori'.**
- **'Māori want a stronger voice in freshwater management and a role in decision-making as befits a Treaty partner.'**
- 'Māori can bring a unique contribution to freshwater management through the ethic of **kaitiakitanga**. The contribution that tangata whenua can make towards sustainably managing our water resources will be of benefit to all New Zealanders.'
- **'Water is at the heart of Māori well-being.'**

The situation and challenges

- Iwi/hapū achieving a fuller legal expression of their rights and interests to fresh water
- Improving water governance with particular regard to the role of iwi – new governance models, e.g. co-management (*to give better effect to the Treaty partnership with respect to water*)
- Defining what principles would represent best-practice freshwater decision-making from an iwi/hapū perspective
- Understanding and articulating Māori values
- Mātauranga Māori and Western science in parallel to inform management and decision-making
- A need to build Māori capability and capacity

- Actions on the ground

Key steps for freshwater management

Garth provided **six recommended key steps for freshwater management** – and gave examples of each – for better involvement of Māori in freshwater planning and management:

1. **Mana Whakahaere: A Treaty-based planning framework is used for engagement and policy development**
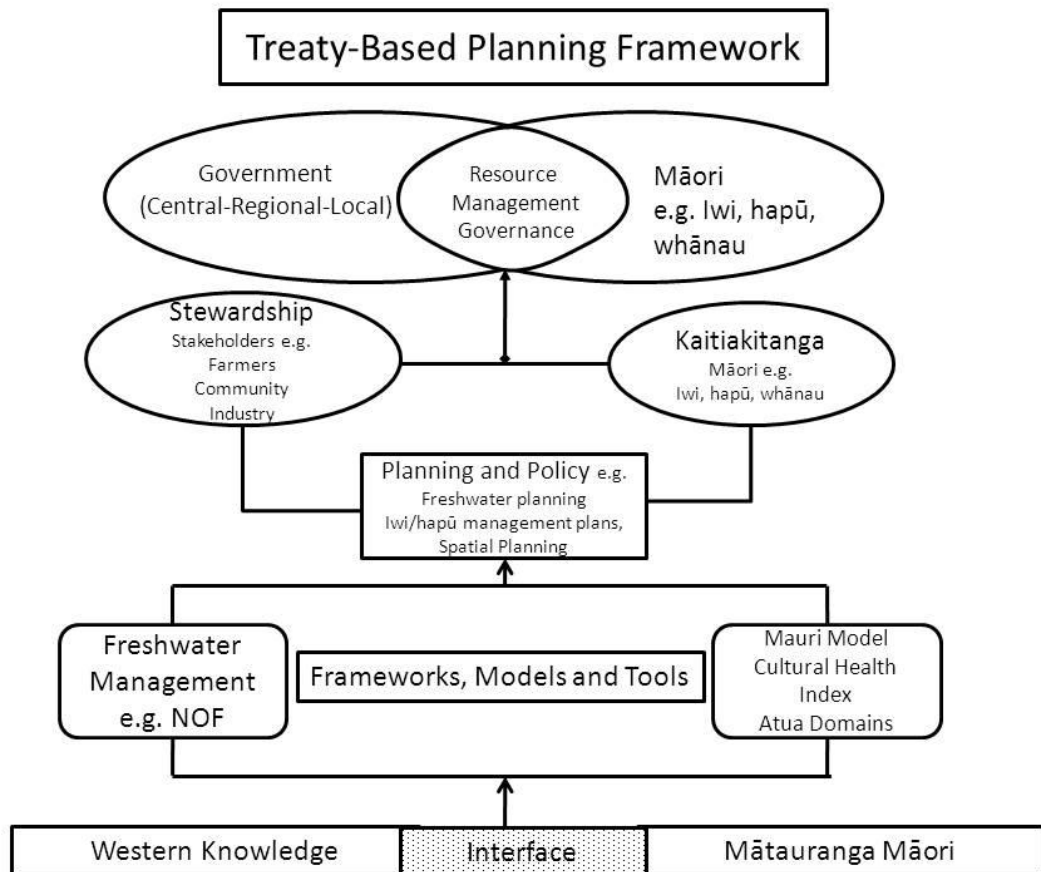
2. Whakamāramatia ngā Pou Herenga: Tāngata whenua values and interests are defined and reflected in engagement processes

A table of internal core Māori values (guide behaviour) – customs, ethics, principles, decision-making

Whakapapa (ancestry, lineage, rights)	**Whānaungatanga** (relationships, family connections)
Tikanga (custom, tradition, protocols, values)	**Kotahitanga** (unity, consensus, participation)
Rangatiratanga (sovereignty, empowerment, autonomy, management, decision-making)	**Mana, mana whenua, mana moana, mana atua, mana whakahaere, mana tangata, whakamana** (based on whakapapa represents authority, power, control, status, leadership)
Manaakitanga (caring for, looking after, hosting)	**Kaitiakitanga** (environmental guardianship)
Tohungatanga (the retention and use of knowledge to benefit the tribe or business)	**Tau utu utu** (reciprocity, giving back what you take)
Wairuatanga (spiritual well-being, taking into consideration the spiritual dimension)	

A table of external Māori values – expressed in the landscape, lakes, rivers (~location specific), etc.

Wāhi tapu (sacred sites), e.g. urupā (burial grounds), sacred shrines (tuahu), wai whakaika (ritual or ceremonial sites), ana (caves)	**Wāhi taonga** (treasured sites), e.g. marae, kainga (settlements), pā (old fortified villages), forest
Wāhi tupuna (ancestral sites) – waka landing and anchorage sites (e.g. unga waka, tauranga waka), old battlegrounds, ara (tracks), rock outcrops, wāhi tohu (indicators), etc.	**Mahinga kai** – resource sites (traditional food source/collection areas), wāhi raranga – plant sources for weaving
Taonga: flora and fauna, taonga species (**plants, trees, animals, birds, fish, etc**.), habitats (e.g. wetlands), rongoa (medicines), etc.	**Te Reo** – place names
Landmarks: mountains, peaks, hills, lakes, rivers, coastal, geothermal areas, etc.	**Rock and mineral** source and trade areas (e.g. pounamu/nephrite/greenstone)
Important **archaeological sites**: artefact finds (e.g. adzes, carvings-whakairo, rock art, middens-ovens, waka/canoe remains etc.	**Metaphysical** (e.g. Taniwha), Atua domains

A table of general classification of water (relationship to tapu and noa)

Wai ora	Water in its purist form, e.g. rainwater
Wai puna	Spring water
Wai whakaika	Ritual waters, pools, ceremonial
Wai māori	Freshwater water, water for normal consumption
Wai mate	Water that has lost mauri, is degraded, and no longer able to sustain life
Wai kino	Water that is dangerous, such as rapids
Wai tai	Seawater, saltwater, the surf or the tide

3. **Whakamāramatia ngā Huānga: Outcomes are defined at the beginning of the engagement process**

Examples of visions outcomes for the Waikato River:
- *Tooku awa koiora me oona pikonga he kura tangihia o te maataamuri*
  The river of life, each curve more beautiful than the last (Waikato –Tainui)
- 'Our vision is for a future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and well-being of the Waikato River, and all it embraces for generations to come' (GEC)
- 'Restore the mauri of the river'

4. **Whakamāramatia ngā Uaratanga: Goals and objectives are established**

Examples of Te Uri o Hau (TUOH) goals:
- Mauri of water and air is restored and protected
- Promotion of natural water flow
- Protection and restoration of biodiversity
- Promotion of co-governance arrangements with TUOH
- No discharges to waterways and coastal–marine ecosystems
- Integrated management of Kaipara and Mangawhai harbours is led by TUOH ngā hapū

Examples of Te Uri o Hau goals achieved to date:
- IKHMG Plant 2 million trees: IKHMG's goal is to plant 2 million native plants around the Kaipara Harbour by 2015
- IKHMG Farm Flagship sites: There are 5 flagship farm sites set up around the North and South Kaipara Harbour, IKHMG are also looking at 2 industrial sites; Fonterra and Topuni timber mill and 1 more farm flagship site. These sites were chosen as they were in high priority areas

- TUOH education trail and marae biodiversity project: This project is coordinated by Mikaera Miru and involved tupuna marae working with schools to educate tamariki in their kaitiaki role

5. **Whakamāramatia ngā Aroturukitanga: Monitoring approaches are developed and implemented**

Examples of issues to be considered when developing monitoring approaches:
- Is the outcome/goal(s) achievable in some time frame?
- How do we measure progress towards (or away from) from a vision/outcome /aspirations/goals?
- How do we know we are making progress? What incremental steps? What are the trends?
- We could use Māori monitoring approaches, tools, indicators.

Some examples of monitoring methods and tools:
- Cultural Health Index (CHI) (Tipa & Teirney 2003, 2006)
- Cultural indicators of wetlands (Harmsworth 1999, 2002)
- State of Takiwa 'toolbox' (iwi environmental monitoring and reporting tool), see www.ngaitahu.iwi.nz
- Adaptation of the Cultural Health Index (CHI) by Tiakina te Taiao for their own use and application in the upper South Island (Te Tau Ihu) (Young et al. 2008; Harmsworth et al. 2011)
- CHI for estuarine environments (Tiakina Te Taiao – Walker 2009)
- Development of coastal and marine health index (presently underway)
- Development of cultural indicators for lakes (underway by Ngāi Tahu)
- The Mauri Model (Morgan 2007, 2006, 2008)
- Significance assessment method for tangata whenua river values (Tipa 2010)
- KEIAR framework (Waikato case study) (Dixon & Ataria 2011)
- An Internet-based iwi resource management planning tool (Kaitiaki Tools) (NIWA 2009)
- Iwi Estuarine Monitoring Toolkit (Ngā Waihotanga Iho) (Rickard & Swales 2009a,b)

Examples of indicators:
Tangaroa
- Water clarity
- Water flow
- Water quality
- Shape and form of river, riverbank condition, sediment
- Insects
- Fish

Tāne Mahuta
- Riparian vegetation
- Catchment vegetation

- Bird life (species)
- Ngahere/Taonga
- Pests

Haumia tiketike
- Mahinga kai
- Rongoa

Tūmatauenga
- Human activity, use of river
- Access
- Cultural sites

Tāwhirimātea
- Smell

Mauri/Wairua
- Feeling, taste, well-being

In future, environmental monitoring programmes could be classed into three main types that are complementary:

Māori-knowledge based	Community–scientific based	Scientific based
Māori indicators – - In depth Māori understanding and knowledge of particular environments. - Understanding of Māori values, goals, and aspirations required.	*Community-based indicators –* - Requiring low levels of technical input and skill but scientifically robust and part-value based - Cost-effective, relatively simple and short duration.	*Scientific indicators –* - Requiring higher levels of technical input and skill, robust sampling strategies, analysis and interpretation - May be time-consuming
Examples - Taonga lists - Key sensitive taonga indicators - Te Mauri/ wairua - Knowledge on uses and preparation of taonga - Land-uses, point discharges, modification,	**Examples** - Hydrology - Soils/Nutrients - Intactness of wetland - Connectivity/Buffering or Fragmentation - Introduced plants - Animal damage - Modifications to catchment hydrology - Water quality within	**Examples** - Chemistry, water quality, nutrients - Hydrology - Water table modelling - Botanical mapping, classification of plants - pH - Bacterial counts

	catchment	- Giardia
impacting on cultural values and uses - Key pest species	- Other land-use threats - Key undesirable species - % catchment in introduced vegetation - Animal access	- Cryptosporidium - GIS applications - Satellite imagery - Studies of fish, macroinvertebrates, macrophytes

6. Whakamāramatia ngā mahi: actions on the ground that demonstrate kaitiakitanga and progress iwi/hapū towards their goals/objectives/aspirations through tangible projects

Garth gave an overview of two new developments (Awatea Basin and the Lincoln Land Developments subdivision) that have incorporated naturalised stormwater management reflecting cultural values into their designs. The naturalised stormwater waterway will use soil adsorption, sedimentation and detention basins, wet ponds, swales and wetlands to treat and manage stormwater runoff before it enters our rivers and waterways.

- Traditionally, stormwater has been discharged directly from pipes, concrete channels, boxed drains and pumping stations into the waterways, often carrying contaminants and other pollutants.
- The naturalised waterways recognise that the natural environment is highly sensitive to the effects of land-use activity. Sealed surfaces, as an example, result in a greater risk of flooding and reduce surface water filtering into groundwater, placing our aquifers at risk.

Garth highlighted the usefulness of iwi-led assessment approaches for monitoring the health of water, as part of freshwater management, and presented cultural and environmental monitoring within the context of the six recommended steps. Garth then demonstrated the links between cultural-, community- and science-based monitoring to what he called complementary monitoring and provided a table showing the parallel streams.

Conclusions

Garth finished the talk by highlighting what still needs to be addressed from a Māori viewpoint, for example:

- **Indigenous rights, Māori customary rights, property rights** – iwi/hapū achieving a fuller legal expression of their rights and interests to fresh water; clarification of ownership (tino rangatiratanga, mana motuhake, whakamana) – land, waterways, coastal
- **Governance of water management** – improving governance *to give better effect to the Treaty partnership with respect to water* – new governance arrangements/models, e.g. co-management
- **Best-practice freshwater decision-making** – defining what principles would represent best-practice freshwater decision-making from an iwi/hapū perspective, collaborative processes
- **Understanding and articulating Māori values:** mātauranga Māori and Western science in parallel to inform management and decision-making
- **Building capacity** for iwi/hapū, and Crown agencies/councils/industry, etc.

- **Actions on the ground** – collaborative projects (partnerships), community projects e.g. sustaining enhancing Māori values, restoration and enhancement projects, enhancing mahinga kai, kaimoana, use of cultural and environmental monitoring, indicators, etc.
- **Māori-led research** – mātauranga Māori alongside Western science, improved access to science research findings
- **Outcomes: Sustaining/enhancing resources/species/habitats through kaitiakitanga – cultural protection of habitats, taonga, sites** – protection and enhancement of the freshwater environment, cultural sites, sustaining and protecting habitat and species, ecosystems, taonga, mahinga kai, etc.

References

Awatere S, et al. 2013. Kaitiakitanga o ngā ngahere pōhatu: Kaitiakitanga of urban settlements. In: Jojola T, Natcher D, Walker R eds Reclaiming Indigenous planning. Montreal, McGill-Queen's University Press. Pp. 236–259.

Dixon L, Ataria J 2011. Development of a framework for kaitiaki environmental impact assessment and reporting: a process to identify issues of cultural connection to landscape-use and cultural values within a Māori community. Landcare Research report.

Harmsworth GR 1999. Coordinated monitoring of New Zealand wetlands: building iwi partnerships. Landcare Research Contract Report LC9899/085 prepared for UNEP/GRID Christchurch and Ministry for the Environment, Wellington. An MfE SMF funded project. 50 p.

Harmsworth GR 2002b. Māori environmental performance indicators for wetland condition and trend. In: Clarkson BD, Ward J eds Proceedings of the National Phase 2 Wetlands Workshop, 2–3 May 2002, Wellington. Workshop as part of the Phase 2, 2000–2002 Coordinated Monitoring of New Zealand Wetlands MfE SMF project.

Harmsworth GR, Young RG, Walker D, Clapcott JE, James T 2011. Linkages between cultural and scientific indicators of river and stream health. New Zealand Journal of Marine and Freshwater Research 45: 423–436.

Morgan TKKB 2006. Decision-support tools and the indigenous paradigm. Engineering Sustainability 159(ES4): 169–177.

Morgan TKKB 2007. Translating values and concepts into a decision making framework: application of the Mauri Model for integrated performance indicator assessment. National Workshop, 5–7 September 2007. Roundtable on sustainable forests: a partnership for the future. Madison, WI, Forest Products Laboratory.

Morgan TKKB 2008. The value of a Hapū perspective to municipal water management practice: mauri and its potential contribution to sustainability decision making in Aotearoa New Zealand. PhD thesis, The University of Auckland. 308 p.

NIWA 2009. Kaitiaki Tools – a web-based tool for Māori resource managers to identify impacts of land-use changes and effluent discharges on mahinga kai resources and other Māori values (unpubl.).

Rickard D, Swales A 2009a. Nga Waihotanga Iho – The Estuary Monitoring Toolkit for Iwi. Coastal News Issue 40 (March 2009): 1–3. (Popular publication of the New Zealand Coastal Society: A Technical Group of IPENZ)

Rickard D, Swales A 2009b. Field trials of Ngā Waihotanga Iho. Water and Atmosphere 17(1): 9.

Sharples P 2009. Opening address Iwi Māori National Summit on Freshwater Management. 10 December 2009. http://www.beehive.govt.nz/speech/iwi+m%C4%81ori+national+summit+freshwater+management (accessed April 2011)

Tipa G 2010. Consideration of a significance assessment method for tangata whenua river values: Murihiku a case study. 51 p.

Tipa G, Teirney L 2003. A cultural health index for streams and waterways: indicators for recognising and expressing Maori values. ME475. Wellington, Ministry for the Environment. Available www.mfe.govt.nz

Tipa G, Teirney L 2006. Using the Cultural Health Index: How to assess the health of streams and waterways. ME 711. Wellington, Ministry for the Environment.

Walker DP 2009. Iwi estuarine indicators for Nelson. Prepared for Nelson City Council, Tiakina te Taiao occasional report, FRST Envirolink report 628-NLCC 31 ID 628. 22 p. http://www.envirolink.govt.nz/Envirolink-reports/

Young RG, Harmsworth GR, Walker D, James T 2008. Linkages between cultural and scientific indicators of river and stream health. Report prepared for stakeholders of the Motueka Integrated Catchment Management Programme. 39 p. http://icm.landcareresearch.co.nz/knowledgebase/publications/public/Cultural_indicators_report2.pdf .

Water monitoring and reporting: Overview of the Freshwater Values Monitoring Outcomes Research Programme – Research Aim 2)

Rob Davies-Colley, NIWA

Why monitor (and report on) water? Cause you can't manage what you don't measure'

It is worth taking a moment to consider why we need to monitor water. At a very basic level there is the 'You can't manage what you don't measure' mantra. We want to manage water (better) so we have to measure it. That's actually quite useful so far as it goes. Of course there are heaps of flow-on questions on what to measure, and when, and where, and how.

The key reasons for state of the environment (SoE) monitoring – of all environmental domains, not just water, are:

1. To define the state of the environment (STATE)
2. To track change in the state of the environment over time (TREND)

These are often referred to as 'state and trend'. (Trend can be mathematically defined and has the units %/yr.)

Note that TREND is much harder to measure than STATE – because the former implies very consistent and accurate measurement over time. If you change ANYTHING about how you monitor, even very subtlety, you risk ruining the ability to detect trends.

Now, although those are undoubtedly the main reasons for SoE monitoring – and reporting on that monitoring – there are many other things that good monitoring data can address or help address. Here are some of them – taken from a report we did in the National Environmental Monitoring and Reporting (NEMaR) project (of which more shortly).

- **Identifying drivers of change.** We might well want to distinguish changes due to global drivers (e.g. global warming) vs catchment-level change. For that we usually need sites in reference catchments where nothing is changing *except* globally.
- **Science.** More generally we want to understand how our waters 'work' – and monitoring data can certainly help with that, although usually other measurements and special investigations and experiments may be needed too.
- **Modelling.** If we achieve a reasonable level of scientific understanding we can develop models – abstractions of reality – that might sometimes be useful for testing understanding or predicting changes – occasionally even useful for management. Modelling and monitoring should be seen as two sides of the same coin: Modelling needs monitoring data to anchor it to reality, but monitoring also needs modelling – e.g. to fill in the gaps spatially and to make sense of data.
- **Policy.** And we might find monitoring data useful to see if our policies are 'working' – and the ultimate test of that is 'is the water getting better?' (so back up to state and trend!)

The National Environmental Monitoring and Reporting (NEMaR) project

Aimed at achieving consistent and dependable monitoring… for national reporting…

I need to talk about the NEMaR project because this started very soon after our research work was planned in Year 1, and took over much of the work we would have otherwise done. So in the VMO programme we concentrated on *adding value* to NEMaR and publishing some research work on monitoring and reporting…

The NEMaR project was a major effort that counts as cofounding to VMO programme on the monitoring and reporting side. A major aim of NEMaR was to achieve 'consistent and dependable' regional water monitoring as a basis for national reporting. 'Consistent' meant that regional councils and other monitoring agencies need to do things the same way (for national reporting); 'dependable' means their monitoring needs to generate accurate numbers… NEMaR also investigated the feasibility of a combined index for reporting at national level, but that's a bit beyond-scope for today.

The actual NEMaR process included workshops with expert panels of regional council staff and Crown Research Institutes and university advisors.

Quite a large number of reports to the Ministry of the Environment were completed in the NEMaR project, and I believe these were going to be made available on the Ministry's website – as an ongoing resource for regional councils in particular. (At time of press they weren't posted.)

I've outlined the major achievements of NEMaR below.

- Much work was done on **indicators** for reporting. Indicators are the attributes that address VALUES associated with waters.

- In strong relationship to work on indicators, at least to start with, we **defined variables** for consistent measurement (for rivers, variables are identical to National River Water Quality Network (NRWQN).
- **Monthly timing** was recommended for both lakes and rivers (same time-of-day) – not rolling sites or quarterly or other approaches that various councils have used in the past.
- **Protocols were outlined** in broad scope. (For rivers these were mostly the same as NRWQN with small differences.)
- And the **site network was reviewed** – There are about 900 sites over New Zealand, but with some major regional differences in terms of density, and whether integrated over hydrological/water quality/biology. Also, the coverage of environmental categories is somewhat unrepresentative, and in particular, there are insufficient reference sites (reference sites in near pristine conditions are needed to (1) define targets for rehabilitation and (2) distinguish global pressures from catchment changes).

An important finding was that the NEMaR process confirmed the NRWQN as regards variables (identical except for proposed addition of fish) and protocols (very similar), monthly monitoring and monitoring protocols. That is, the NRWQN is a *model* for NEMaR.

> *Rob's water monitoring principle No. 2!*
>
> T**he best check on data quality is if an independent agency gets the same numbers as you!**
>
> The best check on the quality (the Q in QA) of your data is if an independent agency gets the same numbers.
>
> (In NEMaR we recommended as a guideline that perhaps 5% of data points should be independently duplicated.)
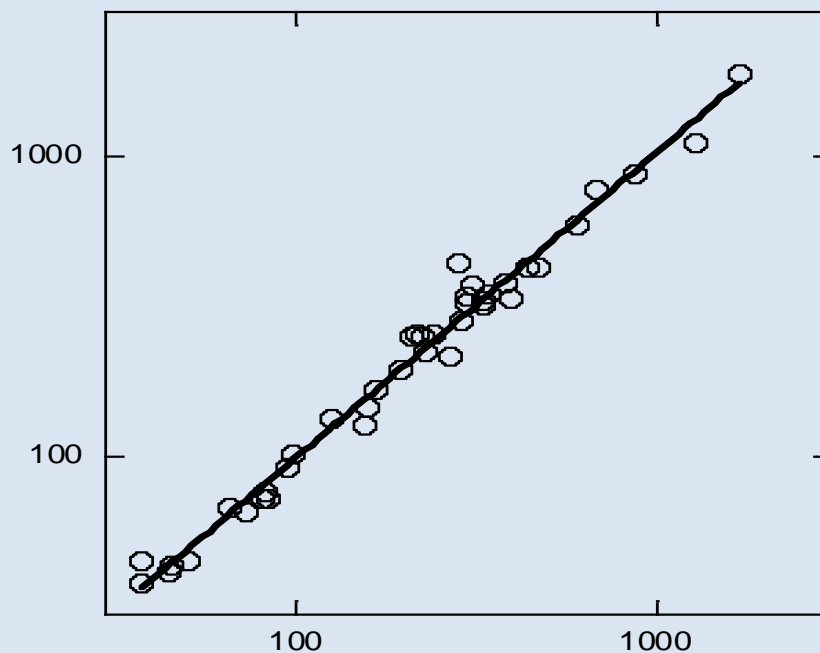
FIGURE. Plot of paired total nitrogen measurements by two independent agencies.

Now, if your data agreed with another agency as well as illustrated here (for total nitrogen), you would be very happy. The data fit bang on the 1:1 line of perfect agreement – with less than 10% RMS error over quite a wide range, and only one (apparent) outlier.

If your data *don't* agree with the other guy's, then you can start thinking about why, and tracking down the source of the discrepancy and what to do about it. That is beyond-scope for today.

VMO monitoring achievements, years 1–3

Here is a list of some of the major outputs and achievements from our main VMO-funded project. Copies of some of the articles mentioned are available on the VMO publications website (http://www.landcareresearch.co.nz/science/portfolios/enhancing-policy-effectiveness/vmo/publications), or alternatively please email me for an electronic copy (r.davies-colley@niwa.co.nz.)

- We published a review article on the NRWQN – which, as I mentioned, is all the more important given that the NRWQN is now recognised as a 'model' for NEMaR. (Davies-Colley et al. 2011*)
- I wrote a chapter for a forthcoming book on ecosystem services, overviewing river water quality in New Zealand. (Davies-Colley 2013*)
- Deborah Ballantine, who was a key researcher in this programme before she left NIWA, completed two articles on technical aspects of water quality monitoring – one on pollution loads in the (dairy-polluted) Sherry River (which has just come out in *New Zealand Journal of Marine and Freshwater Research*; Ballantine & Davies-Colley 2013*), and a second on trends

at 77 NRWQN river sites (to be published in the journal *Environmental Monitoring and Assessment*) (Ballantine et al.).

- Graham McBride recently finished a statistical article for *Environmental Monitoring and Assessment* entitled 'Assessing environmentally significant effects: A better weight-of-evidence than a single P value?' This classifies weight of evidence based on a sophisticated use of statistical confidence parameters – and looks likely to be very influential. (McBride et al. 2013)

- Related to that we have upgraded the TimeTrend webtool for supporting workup of environmental monitoring data. (www.niwa.co.nz/our-science/freshwater/tools/time-trends)

- And we have made several conference presentations on the above-published areas of work and some others. For example, I presented an overview of research needs in water quality monitoring and reporting at the 2012 NZFSS conference in Dunedin.

- Richard Storey prepared a Bayesian Belief Network (a kind of numerical model of the interaction between different attributes of a system such as a major water resource) to underpin a pilot study on community collaboration in water planning in Hawke's Bay.

(*) Publications available on e-request

Some principles of good long-term water monitoring
From the work we've done so far, and also the NEMaR project, have come some principles for good long-term water monitoring. These were summarised in the review article on the NRWQN)

- **State objectives** clearly.
- **Design things well.** Learn from others (avoid their mistakes!).
- Be **parsimonious** ('miserly') as regards choice of variables etc. Just measure those attributes that are cost-effective for routine. Don't be too ambitious: many long-term monitoring efforts collapse owing to shifting funding priorities.
- Measure attributes related closely to **values** around water … or other domain (I refer you to the FW reforms … see Ministry for the Environment website.)
- **Report!** Frequent and relevant **outputs** (publish data summaries)
- **QA** – data accuracy (many tasks, but particularly *independent duplication*)(10% of budget)
- **Consistent operation (over time)** (A national audit and advisory programme is needed.)
- **Integration** (of hydro/WQ/bio monitoring. Water quality and biology must be underpinned by hydrology. Technical difficulties with biomonitoring at the same sites as hydrology, water quality and sediment suggests that rigid integration may not be desirable.

Principles are as given in Davies-Colley et al. (2011) review of the NRWQN;
Similar to those of Lindenmeyer & Likens (2010) 'Effective Ecological monitoring', CSIRO

Water monitoring research needs in New Zealand

Here is my personal view of the research challenges for monitoring and reporting on water in New Zealand. Hopefully with some feedback from people at the Symposium, we will be able to turn this list into an action plan for the VMO research programme.

- **Statistical tool development** – tools for turning data on water into information.
  - There are technical issues around the **handling of 'censored' data** (these are data that are reported by labs as '< detection limit' rather than as a best-estimate number. In NEMaR we recommended that practice be avoided by regional councils specifying no < DLs in their contracts with laboratories, but there is resistance to abandoning what has been a standard practice.
  - Another area needing research is the development of statistical methods for **efficient identification of drivers of change** in water quality.

- **Quality assurance (QA) of water monitoring data.** QA is a major area of unfinished business arising from the NEMaR project.
  - In that project we recommended a **national QA programme** in which a team of advisors would visit each regional council on a revolving basis and accompany field staff to duplicate their measurements for assessment of concordance. They would also review council duplicate measurements at NIWA 'benchmark' sites.
  - There are several **other technical issues** in QA of water monitoring that would usefully be researched. This includes **pollution load** estimation (which is hard to do well because it implies flood monitoring and modelling) and **continuous recording** – sensors, especially optical sensors, for a wide range of attributes. (The NEMS project has made considerable progress on **continuous** monitoring, but there is much work still to do – especially on water quality variables using optical sensors.)

- **Community monitoring.** This is a major issue, and seems all the more important because community monitoring seems like a logical extension of community collaboration in water planning. Community groups, notably including iwi, seem likely to want to be involved in the whole policy cycle so that they know and can own the fate of 'their' water. We see this as a win-win for regional councils *and* community groups – the council providing encouragement and technical support to the community group and the community group acting as eyes in the field to extend the council's monitoring coverage.
  - **The concordance** (agreement - or otherwise) of volunteer data versus professional data obtained by regional councils or NIWA is a major issue. Perception is that volunteer data can never achieve the dependability (accuracy if you like) of professional data. I think that is an untested assumption. But even if it were true, surely there is huge potential for improvement of community monitoring over time. Also for extension of regional council monitoring with community involvement?
  - There would seem to be a need for **resources** for councils to encourage and support community monitoring – for example, community members could usefully take flood samples when fluxes of pollutants are very high.

- We are planning to upgrade and extend the *Stream Health Monitoring and Assessment Kit* **(SHMAK kit)** – which has been around for more than a decade and has had a fair bit of uptake, but is showing its age. For example it would be very powerful to extend monitoring 'coverage' to include bacterial indicators of water suitability for swimming or shellfish gathering.

Freshwater reform – 2013 and beyond

Kay Harrison – then Director of Water, Ministry for the Environment

The future of freshwater

Fresh water has many values and uses for New Zealanders. It is our greatest asset (after people!) and it underpins our wealth and our well-being. It is so fundamental to our primary industries and tourism that it can be regarded as a key component of New Zealand's economic infrastructure.

It is a taonga of intrinsic value to all New Zealanders (with significant cultural and spiritual value for many of us) and it is also part of our identity. Unfortunately, we are not using fresh water as efficiently or as thoughtfully as we should be. Opportunities exist to use it more sustainably.

There are opportunities to grow the economy. But we can only do this by using our fresh water sustainably. The issues we are seeing with water quality in this country are more than 140 years in the making. However, we need to stop the decline and improve freshwater quality. Solutions to these complex issues will not always be found or achieved quickly. We need to start from what we do have and what we do know – and then build from it. This will mean empowering community choices and decisions. No matter where you place yourself on the spectrum of interests in our freshwater resources, we all want a system that is capable of driving economic growth without compromising the integrity of the environment – which is central to our clean, green brand and our unique lifestyle and culture. In short: achieving economic growth within environmental limits.

The journey

Unfortunately the debate around water has focused on the competing pressures that divide us while ignoring the values and aspirations that most of us share.

Since 2009, Government has taken a three-pronged approach to freshwater management:

- Comprehensive work programme led by officials
- Engagement with the Freshwater Iwi Leaders Group (ILG)
- Land and Water Forum (LAWF)

The New Start for Fresh Water strategy, which in 2011 initiated:

- National Policy Statement for Freshwater Management
- Fresh Start for Fresh Water Clean-up Fund
- Irrigation Acceleration Fund

The role of LAWF and ILG:

In 2009 the Government asked the Land and Water Forum to agree on what we need to do to manage water better in New Zealand.

The unique thing about the Land and Water Forum is that it is a group of people and organisations with very diverse interests in water – from farmers and fishers to power generators and environmentalists. This group has spent the last four years discussing the problems we face with fresh water and has produced three reports and more than 150 recommendations on how we can manage water better. We think there is a real appetite for an end to the litigiousness and debates over water, and the collaborative approach of the Land and Water Forum has been a useful model.

Their recommendations, and the advice and constructive relationship the Government has with the Iwi Leaders Group, have greatly influenced the thinking and direction of these reforms.

Message is to get on with it:

We are also hearing a clear message from the many people involved in managing and using water that it is time to stop talking and get on with the job of creating a better system.

We know that changes will have consequences for existing activities. We are determined to make improvements, but these must come within realistic time frames so that we do not adversely affect legitimate activities. This is about creating good practice and an environment that fosters genuine collaboration to create lasting solutions that have wide buy-in by different interests.

Foundational steps – Government's proposals

We are proposing reforms that start with foundational steps this year, and then continue over several years so we get water quality improvements and build an efficient system within a generation. We're on this journey together and it will be a generation of reforms to ensure sustainable management of our fresh water.

A new way of working together

We are creating a new way of working together to manage our freshwater resource.
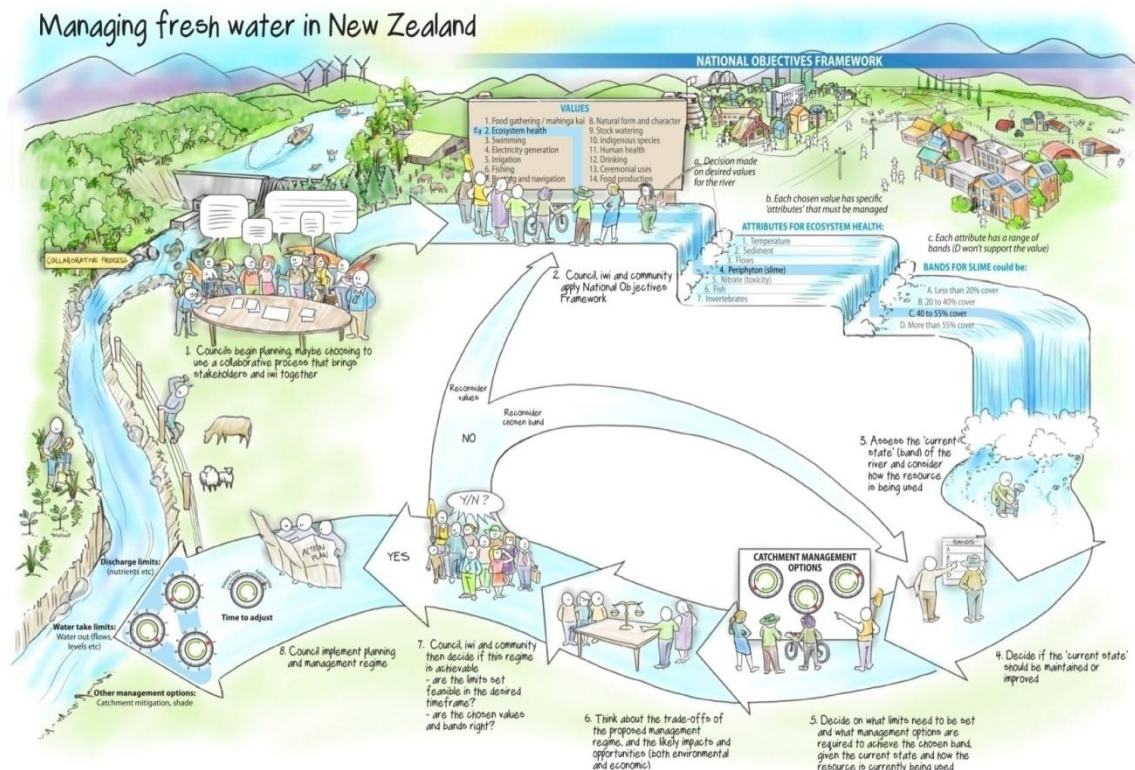
The above picture, as a whole, illustrates the interconnectedness of the proposals for planning, setting limits and managing within those limits.

It shows the iterative and adaptive nature of the process we are proposing, as well as the *elements* of the reforms:

- Plan together
- Identify what aspects of the water need to be managed for particular values and what the quality of the river or lake is.
- Work out what – if anything – needs to be done to make the water suitable for those values and then set the appropriate limits
- It's really important to think through the management limits or settings – perhaps the cost is too high? – or
- Decide that everything is pretty much right with the settings and manage within the limits that are set.

We need to consider all these elements as a package. Some elements we can start work on now. They form the foundational steps for initiatives that we will introduce in later reforms.

Proposed alternative – collaborative planning process

We are looking at a number of issues and approaches around using collaborative planning processes as an alternative to current practice. This includes looking at:

- Why collaboration?
- Emerging practice – Canterbury, Waikato, and Greater Wellington regional councils
- Overseas experience in resolving 'wicked' problems
- Local solutions for local issues

National framework for setting objectives and limits

Our second key proposal for progressing this year is the creation of a National Objectives Framework.

This will support councils setting objectives and limits as they are required to do under the National Policy Statement for Freshwater Management, introduced in 2011.

Community decides values and uses for its fresh water

Communities will decide what they want their local river or lake to be used for and this will be written into the regional plan.

Standard measures for freshwater quality and quantity

The National Objectives Framework provides a standard list of values, metrics and bands for water quality attributes that need to be set if a water body is to meet the values or uses your community wants for its river or lake.

The framework provides a common currency for talking about the science around water quality.

An example

I'll give an example where your community decides that it wants a river – or a stretch of river – to be used for fishing. The framework tells you what attributes of water quality need to be managed if the water is to be suitable for this purpose. In the case of fishing the attributes you would need to manage include flow, slime, temperature, nitrate toxicity and so on. There are four bands from A to D for each attribute and these represent a range of environmental states.

A reference group, including technical experts and sector groups, is working on populating these bands with numeric or other measures for each attribute. This work is still underway and we don't want to focus on those numbers just yet. However, if the attribute falls within Band D it will not be suitable for fishing. This means you have to manage your land and water use so the water quality attribute improves. This is where the iterative process of assessment, adjustment or choices comes into play. It may be that improving the water quality comes at too high a cost and the community will reconsider whether fishing is a desirable activity for this particular river.

National bottom lines

The National Objectives Framework is about communities making decisions around the values and use they want for their region, but the Government will set two national 'bottom lines' to ensure:

- Ecosystem health; all rivers are healthy places for native aquatic plants and animals, and
- Human health; rivers are suitable for activities like boating and wading.

Again, this will need to be managed over realistic time frames. Beyond these two bottom lines, communities will still make the decisions on what they want their river used for.

Next steps

So, in summary, there is still a lot to be done, including:

- Ongoing engagement with iwi/Māori
- Support and guidance for councils implementing the National Policy Statement for Freshwater Management
- Work on outstanding policy issues, particularly in relation to managing within limits
- Continuing monitoring and evaluation of reforms

Panelist comments

How to design and when to use collaborative processes: a Waikato example. (Notes from the panel discussion on the collaborative process for Healthy Rivers Wai Ora: Plan for Change, He Rautaki Whakapaipai) (Panel discussion – Collaborative processes)

Wendy Boyce, Community Engagement Workstream Lead, Healthy Rivers Wai Ora Project, Waikato Regional Council

Overview presented at *Freshwater Symposium: Tools for implementing the freshwater reforms,* Wellington, organised by the Values, Monitoring & Outcomes research programme, funded by the Ministry of Business, Innovation and Employment.

Context

The purpose of the Health Rivers Wai Ora project is to develop a plan change to the Waikato Regional Plan that address the health of the Waikato and Waipa rivers. Five river iwi have treaty settlement and/or co-management legislation relating to these rivers. This determines three things:

i. *Process* – iwi are joint signatories at front and back ends of the process.
ii. *Content* – the Plan must give effect to the Vision and Strategy for the Waikato River, deemed to be part of the Regional Policy Statement (RPS) and including objectives such as 'the river shall suffer no further degradation' and 'be swimmable and fishable along its entire length'. Therefore the plan change is about pace and price.
iii. *Structure* – in order to give effect to co-management, Waikato Regional Council and river iwi are putting in place joint decision-making structures at both governance and project levels.

> ➢ *Key point is that collaboration occurs under the umbrella of co-management*

Why collaborate…?

Because the Plan addresses socially complex environmental problems:

- Four main contaminants
- 1000's of mini catchments
- Highly complex on-farm practice change required
- High levels of voluntary compliance; high levels of variability in farm systems, soils, slopes, climate etc.
- 5000+ landowners; 10 hydro stations; significant forestry plantations and processing; 8 territorial authorities; significant new policy regimes in place for Lake Taupō and the allocation of water from the Waikato River

How is Healthy Rivers Wai Ora collaborating?

We are using a mixed model of collaboration – building on lessons from the Land and Water Forum, Environment Canterbury Zone Plans, ecological experience in Nordic countries, the International Association of Public Participation, Twyford's and Horizons One Plan experiences.

Where are we at now?

We are putting together a collaborative stakeholder group (CSG) to oversee and guide the plan change. In order to address the vexed question of how to construct a CSG we ran an open process, via a one-day facilitated workshop. The purpose was to:

- Design the size, composition, skills and nomination process for a CSG
- Run a transparent, inclusive, efficient and confidence-building event for stakeholders

One hundred and thirty stakeholders attended the workshop in addition to 40 leadership representatives from the partner organisations (river iwi and the Waikato Regional Council).

Participatory methods were used to determine size, composition, skills, number of seats per sector and nomination process. The result is a suggested group size of 20, with representatives from across the sectors, and including four community seats. We are currently calling for nominations and using a mixed selection process. This includes nominations from stakeholder sectors as well as self-nominations from community representatives.

> ➢ *Key point is that we are using a mixed model of collaboration drawing on the expertise of public participation specialists, as well as experiences elsewhere in the country. Our governors often say that this is 'The Waikato' version of collaboration.*

What feedback did we receive about the multi-stakeholder workshop?

Feedback received from stakeholders was that it was a strong start. They were strongly positive on some of the fundamentals of project start-up (building understanding about the project; understanding who else has a stake in the process; putting the building blocks in place for the CSG in a transparent way).

Some of the feedback challenged us on:

- What is fair representation? For example, relative numbers of stakeholders from the economic versus environmental sector. In contrast others considered that the CSG should be predominantly those who have 'skin in the game', i.e. are directly affected
- How to retain a connection to the greater community? Many suggested repeating the large-group workshops

- The use of a nominal voting method for allocating the number of seats per sector, as compared to a deliberative process

> ➢ *Key point is that running a participatory large-group workshop is inclusive and transparent; however, managing participatory methods in large groups is challenging and needs a level of deliberative process at the end of, or subsequent to, the workshop.*

Capacity and capability – enhancing collaborative practice in large organisations

In the Waikato we sometimes talk about 'Big C' or 'little c' collaboration. I think it's preferable to take an incremental approach to collaboration in large organisations.

Vivien Twyford talks about the importance of the 'commitment to collaborate' – it's easy to say 'let's collaborate' and much harder to do.

The International Association for Public Participation (IAP2) focuses attention on the decision makers and the decision-making process before embarking on any public participation process.

Getting these first principles in place prior to embarking on a collaborative process is essential if an organisation is to deliver on a collaborative promise.

> ➢ *Key point is that river iwi and the Waikato Regional Council have focused on establishing the co-governance and co-management structures prior to establishing the CSG. That way the CSG has clarity on the decision-making pathway for its recommendations.*
> ➢ *Details are on our website, and you are welcome to ring me to talk any of this through. http://www.waikatoregion.govt.nz/healthyrivers under 'The process'.*

Reflections of the collaborative process from a regional council perspective (Panel discussion – Collaborative processes)

Tim Sharp, Hawke's Bay Regional Council

Doing things collaboratively is difficult. When I try to cook a meal collaboratively with my partner, I think the onions should go in first, she thinks the garlic should go in first; I want more salt, she wants less and inevitably it ends up with one of us saying, fine you do it. Collaboration doesn't work in the kitchen.

Doing things collaboratively with a large group of people on something really important, more important than dinner, is going to be really difficult. We all come from different backgrounds, we have different worldviews, we see things differently … and we want different things.

So, working collaboratively on something as important as water is going to be hard.

I think you all know that, and it's why you're all here. It's going to be hard. I haven't got time today to go into all of the ways you can make it easier like good facilitation, having a structured process etc. So I'll just cut to the chase and focus on the good news – it is going to be worth it.

One of the reasons it's going to be worth it is that through collaboration we end up with water 'champions' throughout the community. Not champions in the 'we are the champions' sense, but people championing the cause of better water management.

There are a number of 'hard' parts in collaboration and a significant one is the challenge of diverse people with vastly different interests working together to try to reach a common goal. I'll discuss this and then I'll discuss my experiences with how these people have become water champions.

Someone earlier asked what is new here? What are we doing differently? It is wrong to say that collaboration is something that has suddenly appeared – as if someone all of a sudden had the bright idea that we should talk to each other. No, we've always talked. What is different is now we're doing a lot more talking up-front.

Regional councils' primary tool for managing water is through regional plans and, where in the past these would largely be prepared by councils with some input from stakeholders and then a draft would be discussed, submitted on, and appealed; now the drafts are being prepared with the stakeholders in the room.

Having a draft regional plan to respond to is what people are used to and I wonder if it's what most people prefer. I think everyone loves getting a document put in front of them that they can then tear to pieces with track changes on. 'Don't like that, delete; that should be written like this, change – aah that looks better.' It's easier to respond or react to something put in front of you than to have a blank page and to have to write it yourself. That really is a paradigm-shift for people because now they, the people, have to decide what's going to go on the page.

A little about my experience in Hawke's Bay. With all of the people associated with the waters in and around the Heretaunga Plains, there are many values and complexities, and trying to meet all of the values and get around the complexities is extremely difficult.

We set up a collaborative stakeholder group 12 months ago and we have met every 5 to 6 weeks. We have technical people and lay people; people who know all about storativity and transmissivity of river substrate and contaminate pathways; people who know all about irrigation practices and soil moisture deficit, nutrient absorption at the root zone; and people who know all about wairua and mauri and that their mahinga kai is gone and taonga are at risk.

And yet together we're trying to set freshwater limits to support all of these interests with a group of people who know about a whole lot of stuff about a whole lot of different things.

We are trying to agree on flow regimes, water allocation limits, instream limits for nitrogen, phosphorus, *E. coli*, clarity, dissolved oxygen; groundwater – surface water connectivity; water efficiency, sharing, transfer rules. The list goes on. And we're not just doing that – we're trying to improve mauri and protect wahi tapu and wahi taonga. And we're trying to make sure estuaries still support recreational and amenity values, etc. etc.

We've been going for around 12 months and we haven't agreed on any of those things – yet. Maybe we won't agree on everything. But do we have to, to call it success?

We have got some agreements already into what we are trying to achieve, e.g. support native fish, and how we will go about trying to achieve things, e.g., we will use RHYHABSIM habitat modelling to assess fish habitat provided by minimum flows. If we can lock things like that in, it will give us less to argue about in court later. Certainly, if we can agree on some philosophies, values, and methodologies, without lawyers, that will be a success. I heard someone once say that *'you know collaboration is working when you are spending more on lunches than on lawyers*.'

The other thing we have agreement in is the process. The members of the group actually want to be there; even though many of them are there voluntarily. We get 80–90% turnout at every meeting.

And now people are out in the community explaining to their friends how water management works and that they're involved in the decision making. And they love it. In a recent public meeting for council elections, one of our collaborative group stood up and warned any potential new councillors that they better support the group if they get elected –because he's involved and he loves it! We've had others in the group getting annoyed that we don't put out more media releases letting people know that this work is going on – and that they're involved. They get angry when we don't name their group. They want people to know. We had one chap get really annoyed that he was referred to as an individual. 'I'm not here as an individual – I'm here as a representative of the community!'

In other words, they're not just there for a free lunch. They want to be there and they are proud to be there. They like the idea that they can make a difference. They are now water champions.

So, while the huge variety of people with interests in water makes collaboration difficult, it is also an opportunity to build capacity within the community. To create water champions. And this, I think, puts us in great stead for better water management in the future.

Tools for implementing freshwater reforms (Panel discussion: collaborative processes)

Barbara Nicholas, Environment Canterbury

We want to discuss two dimensions of our learning about collaborative processes in Canterbury:

1. The culture change required in the organisation (Environment Canterbury)
2. The challenges of shifting patterns of power and influence

Context

Collaborative process to develop CWMS and the zone committee structure where people (not stakeholders) from the local community, alongside council reps, collaborate to land a consensus about the pathways to deliver the CWMS targets out to 2040 within their area – make recommendations to councils and to other interested parties.

Powers and responsibilities of councils have not changed, but the regional council (commissioners) honours the community consensus that then drives both statutory and non-statutory activities. For instance, zone committee recommendations are reflected in the plans that are taken to the hearing commissioners for the statutory decision making.

1. The culture change collaboration requires of the organisation

We are much the same organisation – similar staff and expertise, same regulatory environment and accountabilities…

But collaboration has required a transformation of how we work, or our organisational culture.

We are delivering what the community wants – we are their advisors and supporters.

- Our purpose is to deliver the outcomes they want, rather than the ones we think are best for them.
- The community has expertise and knowledge that we need to do our job.

We have the same components, still linked to each other – but as an organisation we are relating to the external world and to each other in fundamentally different ways.

We would not minimise the challenge of that – we are used to operating in particular ways, relating to the community in particular ways, using our expertise in particular ways. We may get our professional confidence from that – and now we have to continue to use our professional expertise, but in a different way!

2. The challenges of shifting patterns of power and influence

In the old order, it was easier to exert influence and power if one had:

- expertise in planning processes
- money (to pay lawyers, consultants etc.)
- staff who could prepare submissions, attend hearings, lobby
- links to national conversations and political opportunities
- willingness to be adversarial.

This has fundamentally changed:

a) **The planning process is now fundamentally *shaped* by the pre-statutory community processes**. Influence/power of 'what needs to happen and how' now lies with the local community – people on the zone committees. They are:
   - locals (they have to have significant interests in the area),
   - not stakeholders.

b) **Recommendations/decisions are made by consensus so one needs to take all interests with you** to effect change, not just be the loudest person in the room. Turning up when we get to the statutory process is to 'miss the boat'.

This is a new situation for many of the traditional players, who:

- are used to deciding priorities and influencing things at a national level, and now have locals making decisions in particular catchments:

e.g. industry that did not engage with the community process to recommend river flows – missed chance to get an easy path through the re-consenting process;

e.g. national organisations:

- approaching commissioners to propose responses rather than engaging with the zone committee processes;
- turning up late in the sub-regional planning processes and trying establish a generic solution rather than a local one.

But the local collaborative process:

- gives locals power;
- is enabling those who care most about a particular area to find solutions that all can agree are the best we can do. Also building a huge amount of social and cultural capital for further discussions and decisions.

Reflections of collaborative processes from a regional council perspective (Panel discussion: collaborative processes)

Graham Sevicke-Jones, Greater Wellington Regional Council

1. Collaborative processes are resource hungry and there is a greater need to have the science/information at the front of the process to inform the consequent decision-making processes. This does result in current information needing to be used, rather than having 7–8 years to get data like we have had with the typical RMA Schedule 1 process; although the reality around this is that the data collection becomes reactive rather than properly integrated.

2. It is important to integrate mātauranga Māori knowledge into the information set used by collaborative processes. Māori have generations of knowledge based on long-term observations that could be useful for looking at condition and state of the water bodies.

3. We have existing information that we have analysed previously, but now need to work within the collaborative process to identify the questions Māori have and then reanalyse our data to answer those questions. State of the environment data may not be at the right scale to answer these questions.

Integrating mātauranga Māori into freshwater management and planning: he kōrero whakatūpato (Panel discussion: Monitoring and reporting)

Shaun Awatere, Landcare Research

He mihi tēnei ki ngā mana whenua no ngā tōpito o te motu nei, ki a koutou ngā kaitiaki o ngā taonga tuku iho i hōmai e te Atua, mo ngā uri whakatipu, na reira tena koutou katoa.

The focus of my comments is on mitigating the risk from integrating mātauranga Māori (Māori knowledge) into council science programmes and the challenges of co-opting Māori values into science-based monitoring.

Quantitative tools are designed to provide explicit and standardised methods. Potentially codifying Māori values within a reductionist framework, packaging one aspect of the indigenous perspective and potentially presenting it as representative of all things indigenous is both appealing for planners and appalling for kaitiaki. In effect this type of process has decontextualised the indigenous perspective.

The limitation of science-based monitoring is that while easily identifiable, tangible attributes such as the presence or absence of taonga species can be readily assigned a metric, it is with great difficulty that one would attempt to measure more holistic, metaphysical and spiritual values such as wairua, mana, tapu and mauri.

Therefore, the key question for me is: what priority is given to science-based monitoring amongst a suite of monitoring tools that include what for me are qualitative/narrative kōrero such as whakatauki (proverbs) that give priority and significance for a waterway on the basis of whakaaro (ideology) of kaitiaki (empowered sustainable resource managers).

In terms of setting priorities for freshwater management and monitoring progress towards long-term aspirations, the following whakatauki certainly lets me know that the Kaipara Moana (Kaipara Harbour) is a significant taonga for Ngāti Whātua and that the whole system – not parts, but the entire system and its well-being – is linked to the well-being of the iwi:

Te kete kai o Ngāti Whātua, Te Wahapū Moana o Kaipara e ngūngūru tonu nei, ko ngā ngaru o te moana e pāpaki ana ki te takutai moana.

The vibrant Kaipara Harbour with waves crashing on its shores is the food basket of Ngāti Whātua

Koina te mauri o te iwi nei, te aroha hoki hei wairua mo te rohe nei.

That signifies the life force of the iwi and the respect they have for their taonga, and spiritual well-being for the region

[*my translation*]

Another potential pitfall regarding monitoring is that a one-size-fits-all approach towards monitoring is limited by the reliance on all iwi/hapū within the catchment agreeing that science-based monitoring method(s) are relevant for them. In that way, trade-offs can be made of one river system

over another. But, who are we to say that one hapū's awa is more significant than another hapū's awa?

Consider the following whakatauki: *Mo rātau ano rātau e korero*.

This proverb recognises that each hapū or iwi has its own distinct customs, practices and values. It embraces the philosophy of subjectivity, which is so much a part of matauranga Maori. So, aggregation of values across catchments, even subcatchments, will be an issue.

But, just because something is hard to measure doesn't mean it doesn't matter.

Hence it is appropriate that other approaches like collaborative planning be utilised in freshwater management. Ethical, social, and cultural considerations should be examined equally alongside metrics in freshwater management. There is no harm in using underlying moral considerations to guide decision making on resource allocation. There is no fundamental rule of decision making that requires the mauri or the wairua of a proposed resource allocation to be measured, quantified or traded off. In conjunction with science-based models and monitoring, resource managers and policy analysts ought to engage with kaitiaki directly to get a better understanding of iwi/hapū whakaaro with regard to freshwater management in order to enhance their (planners and analysts) capability to comprehend Māori values. This is most pertinent for Māori, who place great importance on developing long-term relationships with resource managers and who value concerted efforts at co-planning, co-governance and collaborative processes.

The challenge for all of us going forward is, how do we recognise Māori values, particularly the metaphysical and spiritual; wairua, mauri, mana and tapu along with Pākehā ethics within collaborative processes and planning for freshwater management?

Glossary of Māori words

awa	waterway (river, stream, creek)
hapu	subtribe
iwi	tribe
kaitiaki	empowered sustainable resource manager
korero	narrative, story, account
mana	prestige
mātauranga Māori	Māori knowledge
mauri	life force
Ngāti Whātua	tribal group of the area from Kaipara to Tāmaki-makau-rau
Pākehā	non-indigenous New Zealanders
taonga	treasured possession
tapu	sacred
wairua	spirit
whakatauki	proverbs
whakaaro	ideology

Reflections of state of the environment reporting from a regional council perspective (Panel discussion – Monitoring and reporting)

Bill Vant, Waikato Regional Council

1. SOE (State of the Environment) monitoring can but not often meet the needs of policy decisions (used the example of Lake Taupo science)

2. How is SOE information/data used

    a. care required not to "cry wolf" and over interpret trends in water quality data. (e.g., an apparent 5-yr trend in Taupo water quality turned out to be cyclic)

    b. Care required to not wait until they are 'supremely' confident about a declining trend before bringing to attention of managers – by which time the environment may be degraded. The precautionary principle would say managers 'had' to act when Taupo was identified as 'worsening'.

How mātauranga Māori and science work together to assess health of the Toreparu wetland (MSc project at University of Waikato) (Panel discussion – Monitoring and reporting)

Mahuru Robb (Ngāti Awa/ Ngāti Ranginui), University of Waikato

Background: Working with Mōtakotako Marae at the Toreparu wetland along the Waikato west coast between Raglan and Aotea harbours. Project evolved due to my personal connection with the site and with the marae through mum's partner, and observing a lack of meaningful Māori involvement in enviromental monitoring/management post-consultation during my job as a consultant ecologist – a concern that was raised by iwi/ hapū groups, local governing bodies and other clients. So there seemed to be a communications gap, a site in need of attention, and tangata whenua who wanted to do something about the decline in the health of their wetland.

The project: The starting place was the Mōtakotako Environmental Management Policy (EMP) (clearly defines values, sites of significance and priorities/goals). Used the Wetland Cultural Health Index (CHI) as a tool to incorporate these values/ priorities. My role was to be a facilitator in indicator development, help build capacity and carry out the scientific assessment. As an outsider, who doesn't whakapapa to the area, I cannot carry out any cultural value assessment.

The benefits: Being out there doing the research has led to dialogue and communication with landowners, council, Landcare Research Department of Conservation, Waikato Tainui and within whānau/hapū groups. There are currently talks of a catchment care group starting up and the Regional Council are investigating funding options. By putting this project into the public arena through talks, presentations, media interviews it has led to really positive discussion/moves towards restoration. Collaborative relationships are being built.

Evaluating collaborative processes: Multiple indicators can be used to evaluate success.

Look at relationships being built – are they meaningful, ongoing, maintained?

Is there formal recognition under the RMA (Resource Management Act) (co-management, voluntary, statutory or Joint Management Agreement? Are Mōtakotako recognised as mana whenua by governing bodies, with decision-making power?

Is the health of the Toreparu increasing as a result of collaborative processes? Are CHI indicators increasing over time? Are there restoration efforts taking place and ongoing CHI monitoring? Is knowledge being transferred through the generations?

> **Key message:** RELATIONSHIPS! These take time, especially if historically there has been tension between Māori and governing bodies. They need to be maintained, not just when you need something. Need to be a process of "passing the relationship baton on" when people leave organisations, not reinventing the 'relationship' wheel. Capacity building within councils etc. Māori also need to be resourced to successfully carry out mana whenua duties (funding/capacity, etc.).

Glossary of Māori words

hapū	subtribe
iwi	tribe
mana whenua	territorial rights, power from the land – power associated with possession and occupation of tribal land
Mātauranga Māori	Māori knowledge
Ngāti Awa	tribal group of the Whakatāne and Te Teko areas
Ngāti Ranginui	tribal group of the Tauranga area
tangata whenua	local people
Waikato Tainui	a term used for the tribes whose ancestors came on the Tainui canoe and whose territory includes the Waikato, Hauraki and King Country
Whakapapa	ancestry
Whānau	family

Science strategies and monitoring networks. (Panel discussion – Monitoring and reporting)

Lian Potter, Greater Wellington Regional Council

Science strategies

The Greater Wellington Regional Council's monitoring programmes and science are needed to inform a number of questions, sometimes competing, often with limited resources.

We need to *inform others* so they can manage the natural resources effectively – 'others' may include:

- Our stakeholders – internal (our Council) and external
- The public
- Tangata whenua
- Communities of interest

We need to *inform policy* for:

- Policy development
- Robust decision making
- Monitoring plan effectiveness
- Monitoring outcomes

And for many councils now, including our own – to *inform community collaborative processes*.

1. Monitoring needs to be robust so the science can be trusted.
2. It needs to be expressed and reported appropriately – so that limitations and uncertainty are transparent and understood.
3. It needs to be communicated to a number of different stakeholders and communities with different levels of understanding and different uses for that information.

With our science being used to underpin and inform so many important decisions for our region, as a Council we felt that we needed to be proactive about this, and so decided to develop science and monitoring strategies for the way we will operate around science, and engage and communicate with our stakeholders and science experts.

An important need highlighted in this strategy is forming engagement processes with internal and external stakeholders and communities; so that we understand the questions that our monitoring programmes are required to answer. We are in the process of setting up internal science steering groups to help us outline what these questions are and how we will prioritise the science information we need.

We have also set up a Science Advisory Group – consisting of external experts in a range of science disciplines from a number of research providers, i.e. from Crown Research Institutes and universities.

Good collaboration with external providers can help us to:

- Prioritise research
- Gain expertise on our science programmes so these are robust and use good-practice protocols
- Channel more relevant research for our region; and
- Help us bring external expertise into the whaitua process – as that process will be information hungry, and we're going to need help to provide that information.

Building relationships with others is vitally important to ensure we have successful science programmes and outcomes for our region.

Monitoring networks

State of the environment (SoE) programmes are designed to monitor state and trend in *regional* resources to meet the requirements of the Resource Management Act. But council SoE monitoring networks are being used more and more to answer many science questions that they weren't designed to answer, and they can do this to a lesser or greater degree:

- For example, for its National Environmental Monitoring and Reporting (NEMaR) project the Ministry for the Environment wanted to use council SoE data to look at national freshwater state and trends, and impacts of land use. While SoE data are an amazing resource, those monitoring networks were designed for the purposes of regional objectives, and so the network doesn't meet the national objectives – there is a whole work stream around the network required for this.
- And now, at a regional level, our own SoE network at Greater Wellington Regional Council doesn't meet all of the objectives it is being used for.

So, we have decided to review all our monitoring networks and will start by asking what our objectives are. We think this may mean we need a number of networks to answer different questions. These may be for national or regional purposes, to monitor state and trends, for policy, for the whaitua, to monitor plan effectiveness, etc.

- Some sites will overlap as they may meet a number of objectives, but it will certainly mean the creation of new sites – at a cost, and perhaps retiring some sites – at the cost of loss of long term data they have been collecting.
- It will involve looking at the best design for different purposes – and we'll certainly require expert advice around that. On top of that we have to think about accessibility, flow recorded, cost and what do we do with our long-term-data sites?
- Networks will need to be developed that will satisfy all these needs with limitations expressed appropriately.

Our role at Greater Wellington Regional Council is to provide robust designs that meet the uncertainty levels required to provide good science to answer the questions posed by our clients.

Policy performance monitoring for complex systems and wicked problems. (Panel discussion – Monitoring and reporting)

Claire Mortimer, MBIE

I want to reflect on **how** the complexity of freshwater systems shapes the nature of freshwater policy, which in turn shapes the core purpose of policy performance monitoring.

So I want to talk about the core purpose of policy performance monitoring.

When we attempt to manage fresh water we are attempting to manage a dynamic socio-ecological system. That system has emergent not mechanical qualities; the people using the waterways don't always behave as we expect them to – they are not always utility-maximising rational decision-makers. At the same time external forces – like the climate or commodity prices – create unpredictable change to the water system.

So what does this complexity mean for the nature of freshwater policy?

Richard Dawkins first used the metaphor of throwing a rock and a bird to describe the difference between classical science and the science of complex dynamic systems. This metaphor has been used to describe the difference between solving simple policy problems and complex ones.

When we throw a rock, we have a pretty good idea where that rock will land – we can predict the impact of our policy. But when we throw a bird – or when we intervene in a complex system – it's a lot less predictable because when we throw a bird, it takes flight.

We might know a lot about bird behaviour and about the terrain we are throwing it into – we might have laid out great policy incentives (the bird's favourite seed) to encourage it to land where we want. But many things can happen during that bird's flight: it might find food it likes better, it might not notice the bird food, strong winds might blow it off course, or while eating bird food it might get eaten by a cat.

Like birds, the policy impacts of complex systems are not predictive. It is not like throwing rocks – it's about understanding as much as we can about the system but recognising we can't know everything. It's about the adaptive management of throwing birds.

So what does this mean for the core purpose of policy performance monitoring?

It means that it is fundamentally about **learning …** at its heart it is less about asking the question did we get it right? But rather asking what do we need to do next?

There are four overarching questions in this learning process:

First – Was the policy well implemented or are there implementation challenges we have to address? And we of course need to explore that question with the people implementing the policy just as we need to design policy with the people implementing that policy.

Second – Did the policy have its anticipated impact? Did the bird fly where we wanted it to and did it fly there because we threw it or because of something else?

Third – Did any unanticipated factors influence the results? Were there violent storms or hungry cats?

And finally taking the answers of the first three questions – **what do we need to change**, improve, backtrack start afresh; in other words, what do we need to do next?

These questions are hard and require forethought and time to answer.

But answering them then leads us to the really hard bit…

If policy performance monitoring is essentially about **learning**, how do we ensure that that learning is then fed back into our decision making? What cultural shifts, what institutional changes are required to enable us, especially those working in political organisations, to routinely report on mistakes as well as successes, to have the time to reflect on our performance in the busyness of government?

The challenge of managing complex freshwater systems is therefore inherently about the challenge of building learning organisations and building a learning local and central government sector. That is a huge challenge, and the VMO project – and the experiences shared today – is an excellent example of meeting that challenge and in learning the complex art of throwing birds.

Small Groups: Summary of discussions

Issue 1: Balancing Diverse Values

Values should be identified and shared early in a collaborative process; multiple methods may be needed to do this well. A technique used by Horowhenua iwi is a hikoi – walking the catchment together and sharing stories about the place, which can lead to discussion of possible solutions. Role-playing (swapping) between antagonists was used effectively in the Land and Water Forum.

It is not necessary to prioritise or balance values explicitly. The key is to understand each other's values, and then to find a set of initiatives that address all values and that everyone can accept.

One issue is inter-generational decline in environmental quality, which leads to lower expectations in each subsequent generation. Experiential learning, sharing stories and visioning futures were all suggested as ways to address this, along with a suggestion that communities should expect improvement, not just maintenance of the status quo (which might turn into further decline).

Some see collaboration as requiring compromise of values. This poses difficulty for stakeholder representatives who do not have a mandate to compromise, and may even have a statutory purpose or mandate to uphold. Compromise is more viable if it is better than the alternative and if the sponsoring agency or council has committed to implement it (thus minimising risk of further slippage). Others suggested that describing collaboration as compromise misses the fundamental point: collaboration is about finding creative solutions to difficult problems in a way that improves everyone's situation.

A question that was not resolved is, who speaks for the national interest in a local or regional collaborative process? How are nationally significant values identified and advocated? Do we need different tools or processes to protect these?

Issue 2: Structure of the Collaborative Process

There are a number of factors that can help when establishing a collaborative decision making group. These include, establishing:

- Facilitation and chairperson
- Support for participants in the group
- Getting the right group of people together
- Commitment level and turnover policy
- Structure of the collaborative process
- Community engagement processes

Facilitation and chairperson

Each collaborative group needs a good facilitator to run the decision making process. Both Environment Canterbury and Waikato Regional Council expressed the importance of the role of the facilitator for a successful collaborative process.

Having a group chairperson is not essential; however, Environment Canterbury and Waikato Regional Council both expressed the importance of having a chairperson for their groups. The group's chairperson helps to administer meetings as well as playing an important role in representing the views and work of the group in other forums.

<u>Getting the right group of people together</u>

At Waikato Regional Council and Environment Canterbury a clearly defined process for recruiting members to the group was established and followed. These councils used clearly defined job descriptions to call for nominations for the group. Once nominations were received, interviews were held to select group members and each member signed a contract.

<u>Support</u>

The group will require adequate support from council; this may include admin support, science and technical support, and financial support. For example, some form of payment for group participants is common.

<u>Commitment and turnover</u>

A high level of commitment from participants is required, for example either a 2 or a 3 year term sitting on the group and actively contributing to the process; as well as outreach work in the community to communicate the findings and outcomes of the process.

Even with high levels of commitment from participants turn over and continuity issues can arise. ECAN and WRC both have turnover policies to ensure new participants are ready and available to join when participants have to exit the group. Turnover planning includes sufficient induction procedures being available for new participants to ensure continuity of the process over time.

<u>Structure of the collaborative process</u>

A structure for the group to follow (e.g. learning about the water issues they are work for, the science, a process for decision making etc.) through the collaborative process is also important. For example, both Environment Canterbury and Waikato Regional Council are currently developing the long term plan for their collaborative process groups. This plan is developed by the group facilitator with input from council staff.

<u>Community engagement</u>

How do you engage with the wider community is an important consideration. While no definitive approaches was determined, one approach tried by some processes in Canterbury were that members of the group agreed to set external liaison goals and tasks for themselves and have gone about becoming freshwater spokespeople within their respective communities, and drafting an interim set of agreement.

Issue 3: Māori in collaborative processes

The Treaty of Waitangi breakout group was attended by a small number of planners from local government (Taranaki Regional Council and Hawkes Regional Council), a number of iwi representatives from Te Upoko Taiao Natural Resource Management Committee,[1] other Māori professionals from central government bureaucracies including Te Ohu Kaimoana (Treaty of Waitangi Fisheries Commission) and non-Māori from MfE and DOC.

---

[1] The Committee comprises seven elected Greater Wellington councillors and seven appointed members from the region's mana whenua. The tangata whenua iwi (tribes) are: Ngati Raukawa ki te Tonga, Te Atiawa ki Whakarongotai, Ngati Toa Rangatira, Te Atiawa/Taranaki ki te Upoko o te Ika a Maui, Ngati Kahungunu, Rangitaane.

A number of themes emerged including but not limited to:

- Co-governance of natural resources: Local government are seen as the default manager of natural resources. The idea that iwi/hapū are natural resource management partners needs to be continually promoted.

- Capability building:

  o Building capacity of local government planning staff and local government politicians in Te Ao Māori (Māori perspectives) is required to provide staff and politicians with a greater awareness of Māori issues and aspirations. Suggested methods included: wānanga (workshops) based on marae with mana whenua; Treaty of Waitangi workshops; and more NZPI training seminars based on Māori resource management.

  o Capacity building for mana whenua including resource contributions from local or central government to aid effective kaitiaki participation in freshwater management. Examples discussed included: the Te Upoko Taiao Natural Resource Management Committee for Greater Wellington; iwi/hapū involvement on the Canterbury Zone Committees; and Mahaanui Kurataiao a resource and environmental management advisory company established in 2007 by the six local Ngāi Tahu hapū rūnanga to assist and improve the recognition and protection of tangata whenua values in their takiwā (Christchurch City). Lack of capacity and resourcing in general has hindered efforts by iwi/hapū to engage effectively with local government and contribute positively to planning processes. Attitudes towards Māori contributions also hinder progress; Māori contributions are not given the same status as for example a landscape architect or an environmental consultant. Compensation is woefully inadequate at times.

- Importance of maintaining the existing relationships between council staff and local iwi: It is important to identify 'champions' and 'deal with people who deliver to you'. Councils should communicate with the local iwi/hapū through the marae, to get the right people involved from the start. There is some uncertainty around what happens when the 'champion' is no longer available to be engaged.

- Property rights: the unresolved issue of Māori property rights over water still remains.

- Engagement: Quality engagement with iwi/hapū and implementation of co-planning strategies between local government and iwi/hapū is an issue for resource challenged regional councils. Some councils, like Taranaki Regional Council and Hawkes Bay Regional Council, have limited resources to engage iwi/hapū and fewer resources still to employ a Māori planner.

- Barriers: Attitudinal barriers exist within local government in terms of implementing effective policy outcomes for Māori and disparities exist amongst mid-level planners and senior planners with regard to implementing Māori policy within council. Māori resource management issues are seen by some as not a priority.

- Communication: The same issue is sometimes communicated differently and therefore conflicts may arise between science and mātauranga Maori. Science and mātauranga Maori should be used to complement each other.

Issue 4: Changes from Business as usual – institutional change

The introduction of collaborative processes to resolve freshwater management issues involves institutions changing from their business as usual behaviour. For a collaborative process to be successful, change needs to happen across the spectrum of stakeholders – from national level organisations (central government ministries, industry bodies, NGOs, science providers) through to regional and local level organisations (regional councils, local community representatives).

A key requirement for collaborative process to work is a 'level 1 commitment to not get in the way'. Particularly for agencies and interest groups used to working in adversarial ways, this will require their leadership to explicitly commit to open and collaborative processes, mandating and supporting staff to "let go" and allow conversations between stakeholders to run their course. Keeping such open conversations positive and constructive presents significant challenges and will require new skills.

One of the most challenging aspects of a collaborative process is to move participants and organisations to an 'appreciative' mindset. This is different to the current mindset where people just want to have their say. However, it is important to remember that many people need to have their say. So, by allowing people to initially say their piece will help move the process on. Achieving an appreciative mindset requires a certain maturity of both being more enquiring and to build different kinds of relationships. One way to help move people to an 'appreciative' mindset is to ask open questions about positive experiences of working with someone.

Having a container for the process will also help achieve an appreciative mindset. This involves having the same people in the room for each conversation and being aware of the various personalities. This holds for within organisations involved/interested in a process and within the process itself.

Of course, organisational culture can undermine any individual change that is needed. Where there is no move to change an organisations culture then this will likely reinforce status quo behaviour.

To move an organisation in a new direction requires skills and resources to support this change. An institution will need to:

- Provide a leadership mandate to support the change
- Identify a champion/project team that has the power or ability to request staff time to get work done for a collaborative process
- Provide an atmosphere that encourages people to explore and learn outside of their disciplines
- Create an organisational cultural change (especially where it involves changing who makes decisions)
- Enable people to be held accountable for making that change.
- Be prepared to experiment with processes to determine what works and what doesn't. This changes what the cost of failure is so it is not threatening and allows organisations and people to learn from their mistakes.
- Give people the space to change.
- Be prepared to move resources around to support a collaborative process.

Issue 5: Science and communication

A number of issues related to science communication, as well as science capacity were identified. Changes in the decision- and recommendation-setting processes – including more collaboration with stakeholders and communities – may increase the demand for science, across New Zealand, as regional councils implement the freshwater reforms. In many cases, existing resources and research

capacity in CRIs and universities are fully-utilised, and increasing capacity will require a long-term agenda, political will and substantial investment. The role of scientists, within the decision-making process, will also continue to evolve. While it is likely that scientists will be called on to provide expert opinion, research findings and evidence may need to be communicated in much different ways. More effective two-way communication, participation and consultation with stakeholders *about* the most effective ways to communicate, and facilitating communication between participants in a collaborative process and the wider community, should be considered instead of a 'loading dock' approach to knowledge and information transfer. The view was expressed that the old paradigm, where science led the way in describing the issues and suggesting solutions, was giving way to a new paradigm where science was "on call" to answer questions – serving the process that is driven by the values of the community. On the other hand, it was pointed out that sometimes science can identify issues that are not perceived by non-scientists, and that science can alter people's values. So ideally there is two-way communication between scientists and the community.

New tools and innovative approaches including those associated with foresight or futuring, scenario development and systems thinking can help communities and stakeholders better understand the consequences and tradeoffs related to different management options. Identifying stakeholders' values for freshwater through participatory and collaborative approaches may also require new tools to be developed or existing ones extended into new areas and applications.

In anticipation of increased demand for consultation and science input into collaborative processes, a pool of experts might be funded to ensure that a portion of their time is freed up to provide advice for communities and stakeholder groups. This group might be comprised of experts from a range of CRIs, universities and consultancies, and from a range of disciplines. Scientists should be encouraged to develop their communication skills, and the use of professional science communicators should also be considered. The use of GIS and other ways of visually representing spatial data (photography, 3D visualisation, etc.) may be an effective way to engage with stakeholders, and portray some of the multiple values for freshwater in a community.

Issue 6: Dealing with scale in collaborative processes

While each issue will be best addressed at a particular scale, the breath of issues means there is no right scale rather multiple scales should be considered. From an integrated catchment management (ICM) perspective we need to 'zoom in, zoom out' when collaborating over management options – some are questions of geographical scale (farm to catchment to region to national), some are governance scale issues (land manager to sector to council to government).

An example in Canterbury is that because water demand may be met by inter-catchment transfers, a nested collaborative approach is needed, not just a siloed catchment-by-catchment approach. Hence the Canterbury Water Management Strategy implementation has zone committees plus a regional committee. One challenge is how to network such groups for integrated and consistent decision-making.

For catchments with valued coastal areas, the collaboration must include a voice for the coast, not just the catchment. For issues of national significance, the national voice must be included in decision-making, either as part of a collaborative group or through briefing opportunities as the group reaches its decisions.

Collaboration should be seen as discursive democracy in which there is sufficient breadth of views to speak for the community. It also requires good communications of its progress and champions for

the process – "carrying the community with you". Collaborative meetings require design of facilitation, policy contexts and technical Information, and can bring in industry knowledge and other necessary knowledge without those parties having to be members of the collaborative group.