Structured Decision Making for Collaborative Planning

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KEY POINTS

Structured Decision Making (SDM) provides a clear framework to identify values that relate to each water body and assess the consequences of alternative policy options.

Done well, SDM provides a solid foundation for the consideration of alternatives, benefits and costs required by section 32 of the Resource Management Act.

In SDM, all values are equally legitimate. The balancing process is left to the end so that participants can see clearly what the outcomes are.

With complex and contentious issues, doing SDM well takes time. Resist the temptation to jump to solutions early. All members of the group need to reach a similar level of knowledge, understand each other's values, and share a degree of trust within the group before considering policy options.

The SDM framework and terminology will be unfamiliar to most stakeholders. At each meeting, remind members of the terminology and where they are in the process.

SDM may not always be conducive to effective participation by tāngata whenua and others. Check to ensure all members of a collaborative group are comfortable with the framework for discussion and analysis and, if possible, provide opportunities for other forms of deliberation.

INTRODUCTION

Following recommendations from the Land and Water Forum (2012), collaborative approaches are being promoted by the New Zealand government as a way to resolve conflict over freshwater management, and legislation has been proposed to facilitate this (Ministry for the Environment 2013).

In 2012 the Hawke's Bay Regional Council (the Council) convened a collaborative stakeholder group to recommend policy settings for freshwater management, including allocation limits and water quality targets for a plan change for the Greater Heretaunga and Ahuriri zone. The plan change would give effect to the National Policy Statement for Freshwater Management (NPSFM), which directs councils to establish objectives, targets, and limits for water bodies based on values, and would provide guidance for

considering applications to replace a large number of water permits expiring from 2015 onwards.

The collaborative group is referred to locally as the TANK group, after the Tūtaekuri, Ahuriri, Ngaruroro and Karamū rivers within the Greater Heretaunga and Ahuriri catchments. At the outset, a Council resolution gave a "good faith" undertaking to implement any consensus recommendations from the group provided they are consistent with the Resource Management Act 1991 (RMA) and higher level council policies.

More recently, HBRC's Regional Planning Committee, comprised of nine Māori representatives of treaty claimant groups and the nine elected councillors, agreed to "have particular regard to any TANK consensus outcome"[4].

As of March 2014, the TANK group has met eleven times and tentatively reached a number of interim agreements, including on values and other factors the group will use to assess policy options. More meetings are planned for 2014, with a goal of making recommendations for the plan change by mid-2015.

The TANK group process is based upon a methodology called Structured Decision Making (SDM) (Gregory et al. 2012), which provides a clear and logical framework for implementing the NPSFM. SDM also provides a solid foundation for the consideration of alternatives, benefits and costs required by section 32 of the RMA.

This brief describes SDM, how the TANK group has used this framework to structure its discussions and how this can facilitate the process of reaching consensus on recommendations to the Council. We conclude with observations on how to make best use of SDM for collaborative planning.

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[4] Reasons for the difference in wording and broader issues for Māori involved in collaborative processes will be discussed in a separate policy brief.

BUILDING BLOCKS OF STRUCTURED DECISION MAKING

The TANK group is using SDM to identify and assess the issues and options for freshwater management in the Greater Heretaunga and Ahuriri catchments. In this process, group members have identified their Values and Objectives, as well as Performance Measures and Management Variables, which are used to identify Policy Options and estimate the Consequences of these options. These terms are briefly defined as follows:

- **Values:** Activities, uses or sources of value (from freshwater systems), i.e. things that matter.

- **Objective:** A desired outcome in a thing that matters (e.g. an increase in the suitability of water for swimming in a particular location).

- **Performance measure:** A metric for assessing the consequences of taking an action or set of actions (i.e. a criterion for evaluating options). These may later be used to measure and report on the actual outcomes achieved once policies are implemented.

- **Management variables:** Aspects of freshwater management that can be directly controlled or indirectly influenced by the Hawke's Bay Regional Council (e.g. allocation limits) to achieve the identified objectives.

- **Policy option:** An action or set of actions, using the Management Variables available, that could be taken to advance the achievement of one or more objectives.

- **Consequence:** An expected result of taking an action or set of actions, i.e. of implementing a policy option.

Table 1 presents a simplified hypothetical example of how these building blocks of SDM could be used in freshwater planning.

Table 1: The building blocks of structured decision making: a hypothetical example

Values ➡	Objectives ➡	Performance Measures	Management Variables
Primary Production	Create new jobs in Hawke's Bay	New full-time jobs in horticulture and farming	Minimum flow; allocation regime and volume
Trout Fishing	Improve river for trout fishing	Trout habitat as % of maximum	Minimum flow; nutrient levels; riparian vegetation
Mauri of River	Restore mauri of river	Cultural health index	Minimum flow; stock exclusion; nutrient levels

To help identify the consequences of different policy options, the TANK group first identified Values, Objectives and Performance Measures as building blocks for a conceptual model called a Bayesian Belief Network (BBN). See **Figure 1.**

Models such as BBNs represent a person or group's understanding of the cause-effect relationships between management variables and performance measures, often using intermediate variables for complex relationships.

This is sometimes called intervention logic, i.e. the rationale for how a given policy intervention will lead to desired outcomes.

BBNs can be used in a diagrammatic form called an influence diagram.

Figure 1: Developing an influence diagram.

BBNs can be quantified to indicate how much one component, or node, affects another, and to reflect uncertainty. Once the BBNs are quantified and agreed on, they can be used to estimate the consequences of alternative policy options.
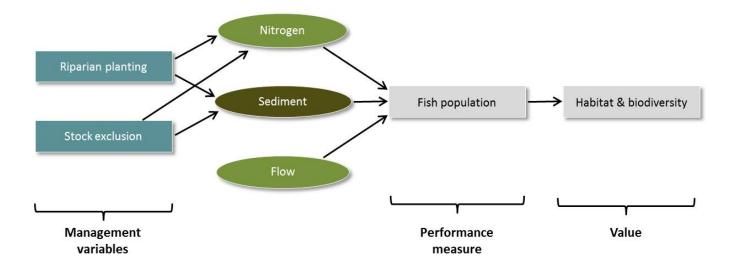
Figure 2: Simple influence diagram showing intervention logic for riparian management policy options, part of a BBN. Light green nodes are also influenced by other factors not shown here for purposes of simplicity.
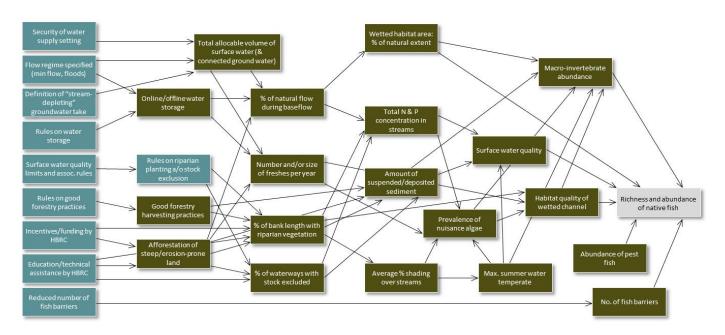

Figure 3: Example of a more complex influence diagram, part of a larger system diagram being developed by the TANK Group in Hawke's Bay.

Table 2 shows the Values, Objectives and Performance Measures the TANK group is currently working with. These were initially identified using influence diagrams and then refined through discussion.

Some of these parameters will be further refined as discussions proceed, e.g. the group will need to decide how *mauri* will be assessed. It is also likely that the Performance Measures will be rationalised into a smaller set – discussed below.

Table 2: Values, Objectives and Performance Measures identified by the TANK group (TANK Group 2014)

Values	Objectives	Performance Measures
• Life-Supporting Capacity • Mauri and Taonga • Habitat /Indigenous biodiversity	Safeguard the life-supporting capacity and enhance the mauri of waterways	• Macroinvertebrate assemblage including community index score • Mauri • Richness and abundance of native fish • Area of wetlands • Condition of wetlands • Mahinga kai quality and availability • Richness and abundance of native birds
• Food gathering • Household and urban water supply (for drinking and other uses) • Human health and wellbeing	Improve the health of Hawke's Bay communities	• Reported cases of water-borne disease/year • Potable water quality in groundwater • Potable water quantity (days of restrictions/year) • Potable water quantity (Number of people with vulnerable supplies)
• Food and fibre production and processing • Amenity & tourism • Household and urban water supply (for drinking and other uses)	Improve the Hawke's Bay economy	• Number of jobs in water-dependent sectors • Total profit in water-dependent sectors • Certainty of water supply for water-dependent sectors (Number of years with ≤5 days full water restrictions) • Net benefit of policy measures
• Food gathering • Swimming and wading (Primary Contact recreation) • Kayaking and boating (Secondary Contact recreation) • Trout fishing • Amenity & tourism	Improve recreational freshwater opportunities	• Aggregate number of days per year sites are suitable for swimming • Water flows for whitewater boating • Water flows for flat-water boating • Aesthetics of waters • Angler days • Income from freshwater related tourism
• Kaitiakitanga • Mana • Mauri and Taonga	Recognise and provide for tangata whenua values and interests in freshwater and improve opportunities for Māori to access and use freshwater resources	• Tāngata whenua involvement in governance • Use of Mātauranga Māori in environmental monitoring and reporting • Māori water allocations
• Whakapapa and Wāhi tapu	Increase identification, recognition and protection of wāhi tapu and wāhi taonga.	• Wāhi tapu register • Tāngata whenua involvement in governance

WORKING WITH STAKEHOLDER VALUES

An SDM process treats all values as equally legitimate. There is no attempt to rank or prioritise values or seek agreement on an over-arching vision or set of objectives. As such, SDM is primarily a mechanism for developing clear criteria so that each participant can see how each alternative meets their objectives. This facilitates creative exploration of new alternatives in an attempt to find a solution that everyone can accept. Participants can and will implicitly prioritise some values and objectives over others as they consider which alternatives they prefer and what they can accept. But SDM leaves the balancing process to the end so that participants can see clearly what the outcomes are and decide whether a given outcome set is acceptable.

This differs somewhat from the approach that has been used in Canterbury, where a regional committee developed a set of agreed targets. There, the task of each of ten collaborative zone committees is to develop an implementation plan to achieve the targets within its zone (Salmon 2012). Gregory et al. (2012), in contrast, recommend against specifying targets that must be met, as this precludes alternatives that do not quite achieve a given target. A zone committee could, however, use SDM to assess alternatives for how quickly or with what degree of certainty targets would be met, and to assess consequences other than those included in the targets.

IDENTIFYING AND ASSESSING POLICY OPTIONS

The TANK group has also identified a long list of Management Variables that could be incorporated in policy options. Some of these Management Variables are within the control of HBRC while others are steps that landowners, city and district councils, industry bodies and others could initiate themselves. Within the range of things HBRC can do, the NPSFM requires HBRC to address certain matters in the plan change for the Greater Heretaunga and Ahuriri catchments – such as allocation limits, low flow restrictions on abstractions and water quality limits – while other Management Variables are things that HBRC could do outside the Regional Resource Management Plan (RRMP), such as removing barriers to fish passage, increasing technical assistance to farmers, assisting with water storage proposals and funding riparian planting. **Box 1** lists the Management Variables on which HBRC is asking the TANK group for recommendations.

Using the SDM framework, the TANK group has begun the process of identifying and assessing policy options for the four catchments. Some options are generic across the area (e.g. a target for security of supply for water users), whereas others will be specific to a catchment or reach (e.g. a flow setting or water quality limit based on a particular use or value).

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Box 1: Management variables expected to be included in plan change recommendations of the TANK group

- Flow regime (e.g. abstraction restrictions at low flows, including rules on groundwater /surface water connectivity)
- Water allocation (including for municipal and domestic supply)
- Policy on security of water supply
- Surface water and groundwater quality limits
- Tāngata whenua involvement in freshwater decision making
- Use of Mātauranga Māori in monitoring and reporting
- Wāhi tapu register
- Policies, rules and incentives on:
  - riparian management & stock exclusion
  - water storage
  - water efficiency
  - water sharing/transfer
  - nutrient loss/allocation
  - good irrigation practices
  - stormwater management
  - other agricultural practices

Source: TANK Group 2014.

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Under SDM, each option is assessed to estimate its likely consequences in terms of the performance measures, which link back to stakeholder values. **Table 3** provides an example of how options would be assessed against the performance measures.

Table 3: Hypothetical example of the consequences of different Policy Options. Performance measures are derived from Values (see **Table 1**)

Performance Measures	Option A Raise min flow & Nutrient cap	Option B Current min flow & Stock exclusion	Option C Reduced min flow & Stock exclusion
New full-time jobs in horticulture & farming	Loss of x jobs (how many?)	No change in jobs	Gain of x jobs (how many?)
Trout habitat as % of maximum	90% of trout habitat	70% of trout habitat	50% of trout habitat
Cultural health index	Good	Fair	Fair-Poor

After an initial set of policy options has been considered, the group refines the options and updates the consequences table. The aim is to find a mix of policy options that is likely to advance all the objectives identified by the stakeholders, so that everyone has a reason to support the proposed solution.

Gregory et al. (2012) reported that, with sufficient time, groups often come up with creative solutions to seemingly intractable problems.

Provided deliberations have been robust – acknowledging and addressing conflict, and informed by science – and all significant interests, including the council, have been involved, the council would be expected to give effect to the consensus recommendations via a proposed plan change.

If the group is unable to reach consensus, it can report to the council on two or more options it considered, indicating its assessment of the likely consequences of each and the reasons it was unable to reach agreement.

OBSERVATIONS ON STRUCTURED DECISION MAKING

From our experience with SDM in Hawke's Bay, we have several observations and reflections.

CHOOSING AND USING PERFORMANCE MEASURES

For each objective identified by a participant, there should be a performance measure (PM) to assess how well any proposed solution delivers on that objective and the values that underpin it. In choosing PMs, groups should consider what data already exists and what data might be used later to monitor how well policies are delivering on objectives. Performance Measures that are already being monitored will provide a baseline for comparison, facilitating use for estimating consequences and for policy evaluation later. But for some important objectives there are no existing indicators, so new PMs will be needed.

Because some objectives are influenced by many factors, it can be difficult to find a PM that is closely related to the objective of concern and significantly influenced by management variables included in policy options. This can be especially true of social and economic objectives. For example, regional employment may be a good PM for concerns about the economic well-being of a community but in practice the employment effects of a plan change could be lost in the noise of weather variability, prices in global markets, and exchange rate fluctuations. A better PM might therefore be the number of employees on farms and orchards, if this can be estimated as a function of water-management decisions. However, if the plan change really is likely to be insignificant in terms of regional employment, the group should consider whether there is actually a somewhat different objective that is more important, such as financial viability of existing businesses.

In the TANK process, the complexity of the social-ecological system associated with freshwater has led to a large number of performance measures (**Table 2**). Gregory et al. (2012) recommend having no more than ten performance measures for

a given decision. The TANK group could rationalise its 26 measures to a smaller number by grouping those that respond similarly to management decisions. For example, several in-stream PMs have been tentatively grouped and assessed using simple qualitative descriptors of "improved, the same, worse".

Grouping PMs should be done only after the first round of assessing consequences. If done earlier, some participants might feel their values are being diluted or ignored by being lumped in with others. Participants need to be confident that any proxy or grouped PM still provides a good indication of the consequences for their values.

Information to estimate consequences will be better for some PMs than for others. For some PMs, it might be necessary to rely on expert judgement or a range of values agreed by the stakeholder group. While imperfect, this is often the reality, and SDM can help make this uncertainty more transparent.

FINDING SOLUTIONS

Collaborative groups should resist the temptation to jump to solutions early.

> People need an opportunity to talk and to learn together, about both the facts basis and the values basis for choices. Preferences that seem fixed at the beginning of a process may change as a result. In this sense, people are more like architects than archaeologists, building their values from the information and cues that are at hand, rather than simply uncovering them (Gregory et al. 2012, p. 26).

It is important first to get all members of the group to a similar level of knowledge, to understand each other's values, and to build a degree of trust within the group. This is as important for council staff as for other members of the group, many of whom will be under time or other pressures from their respective organisations to resolve the issues. Senior managers need to give the process time to develop mutual understanding and then room to explore a range of alternatives. At the same time, the council is also a stakeholder and needs to state its own values and objectives and engage in the solution-finding process with the rest of the group (Berkett & Sinner 2013).

To start the policy consideration process, Gregory et al. (2012) suggest creating "bookend alternatives", i.e. policy options that best meet only one or a few objectives. For example, one bookend might be aimed at maximising financial returns to the community while another would be the best possible combination of measures to improve freshwater biodiversity. According to Gregory et al., this promotes creative thinking about what might be 'best' for some outcomes and makes it 'safer' to explore alternatives between the bookends.

However, when we asked the TANK group to identify bookend policy options, they resisted. It became evident that they did not want to start the policy discussion by presenting polarising views, but wanted to start building consensus. One group member took the initiative and presented what they considered to be a moderate proposal for the group to use as a starting point. There was some consternation when another group member responded with their preferred position (seen by some as extreme) on a key management variable.

The TANK group is still considering policy options, so we have no firm advice on how to resolve this dilemma other than to be flexible and try to encourage creativity before settling on a solution.

KEEPING ON TRACK

Finally, the SDM framework and terminology can be confusing to those unfamiliar with it. In the TANK group, which typically has 4–8 weeks between meetings, we have used the diagrams in Tables 1 and 3 at each TANK meeting to remind members of the terminology and where we are in the process. Without this, stakeholders can easily lose track of the purpose of a discussion or how policy options are going to be assembled and assessed.

A tāngata whenua member of the TANK group has noted that SDM may not always be conducive to effective participation by tāngata whenua. They saw SDM as somewhat regimented and not inclusive of the open-ended discussion that characterises tikanga Māori. Another member added:

> … it is not just a problem for tāngata whenua but for all participants. It is important … to allow sufficient time and space for free dialogue … It's simply all about making sure everyone feels they've had a chance to have their say on what's important to them and some chance to fit it into a decision-making framework. Thanks to the tāngata whenua member for highlighting this! (email from TANK member)

Other members of the TANK group have commented that the large time commitment required "above and beyond our day jobs" is a significant burden and have expressed frustration at the time taken to work through the SDM framework. "The process may have advantages but the costs need to be factored into that," one said. Another suggested dropping the "bonding sessions we had to sit through". However, some of these sessions were precisely intended to allow members to have their say on what's important to them and some chance to fit into the decision-making framework. So the group needs to find a way to balance these two ostensibly conflicting requests.

While SDM helps focus discussion on the elements essential to a decision, it is important to check occasionally with all members of a collaborative group to ensure they are comfortable with the framework for discussion and analysis and, if possible, provide

opportunities for other forms of deliberation. This might mean getting 'off track' temporarily in terms of SDM – and possibly extend the time required to reach decisions – but this reinforces the point that there is no 'single path' to reach the final destination of a consensus decision about freshwater management.

FINAL THOUGHTS

As more councils move to give effect to the NPSFM utilising collaborative planning, SDM provides a flexible yet structured process for organising discussions and analysis by collaborative groups. As with any process, time, trust, and space are important components for its success. The experiences from the TANK process, as it moves to fruition, are providing an evidence-base on SDM's strengths and weaknesses as well as challenges from which other councils and collaborative processes can learn.

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