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Report for Hawke's Bay Regional Council

TANK plan change: Barriers and risks to the adoption of proposed mechanisms to coordinate management action

June 2018

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Version

Date	Comments	Authorised by
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Executive Summary

This research was commissioned to identify perceived barriers to the adoption of any of the three mechanisms proposed in the draft plan change for the Tutaekuri, Ahuriri, Ngaruroro and Karamu catchments (known as 'TANK'). It was commissioned by the Hawke's Bay Regional Council (HBRC) for use in the implementation of their plan. This plan change require farmers, growers and foresters to agree work (with Council) that is required on their properties through one of the following mechanisms:

- An individual farm plan;
- An industry programme; or
- By working collectively within local catchment collectives.

A mixed methods approach was used in the research, with a quantitative survey and a semi-structured interview being undertaken. Nineteen people were interviewed covering a range of involvement with the TANK plan change: either directly in the TANK stakeholder group; with the Farmers Reference Group; or as an employee of Council.

Many barriers were identified, as were a number of risks to the success of the mechanisms, which are also noted as in the future they may become barriers themselves. The groupings identified for these barriers are as follows:

- the need for mechanisms to be objective-focused and simple,
- ensuring appropriate expectations (everyone is on the same page to begin),
- ensuring access to the right support,
- interpersonal risks (catchment collectives only), and
- transparency of accountability (catchment collectives only).

A total of 43 recommendations have been made across these five groupings. Each has been given a scale of importance of Low, Medium, High or Critical. More than half of the recommendations (23) applied to all mechanisms. Additionally, one barrier was identified specifically for Industry Programmes; while the remainder (19) were found to specifically apply to Catchment Collectives. A summary of these are shown is shown in Table ES1.

Table ES1. Summary of recommendations made in relation to the barriers and risks identified in this research.

Grouping of barriers	Number of recommendations			
	Critical	High	Medium	Low
RECOMMENDATIONS RELATING TO ALL MECHANISMS				
The need for mechanisms to be objective-focused and simple		4	1	
Ensuring appropriate expectations (everyone is on the same page to begin)	4	6	4	
Ensuring access to the right support	3	1		
A RECOMMENDATION SPECIFIC TO THE INDUSTRY PROGRAMME MECHANISM				
The need for mechanisms to be objective-focused and simple		1		
RECOMMENDATIONS SPECIFIC TO THE CATCHMENT COLLECTIVE MECHANISM				
The need for mechanisms to be objective-focused and simple	3	1		
Ensuring appropriate expectations (everyone is on the same page to begin)		1	1	
Ensuring access to the right support	5			
Interpersonal risks		1	2	1
Transparency of accountability	4			
TOTALS	**19**	**15**	**8**	**1**

Many of the recommendations deal with actions that will improve perceptions or relationships between parties involved. Some of them recommend action that will not be perceived as direct activity 'on the ground', yet these are considered important enablers for the success of any activity that will occur. Further, the burden for delivering on the recommendations falls predominantly with Council, rather than the primary producers. This highlights the complex inter-related nature of factors that will enable such plans to be a success, and the need for Council to ensure that the 'groundwork' is laid for successful implementation of the plan.

While this research has identified a rich volume of potential barriers and provided recommendations, it recognises that many of these are likely to have already been discussed as part of the TANK process or may already be on Council's 'radar'. The recommendations provided in this report are provided to Council in the hope that their formulation and ranking might reinforce the importance of some barriers to be dealt with. It is expected that this will contribute to the successful implementation of the plan change.

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1 Introduction

Recent years have seen an increase in the development or revision of Regional Council plans relating to freshwater. While this is partly due to an increasing awareness that New Zealand's freshwater resources are coming under more pressure, it predominantly reflects the need for Regional Councils to respond to the *National Policy Statement for Freshwater Management 2014 (Amended 2017)* (Ministry for the Environment, 2014; 2017).

Since 2012 the Hawke's Bay Regional Council (HBRC) has been working with a representative stakeholder group to look at ways of better managing the waterways of the Tutaekuri, Ahuriri, Ngaruroro and Karamu catchments. This project is referred to as 'TANK', an acronym of the four catchment names. The TANK project is expecting to deliver a proposed plan change in the second half of 2018.

In April 2018, Deliberate was commissioned to undertake qualitative research focusing on identifying perceived barriers to farmers support for; involvement in; and implementation of the three main mechanisms proposed in the draft plan change to guide mitigation action. These three options are:

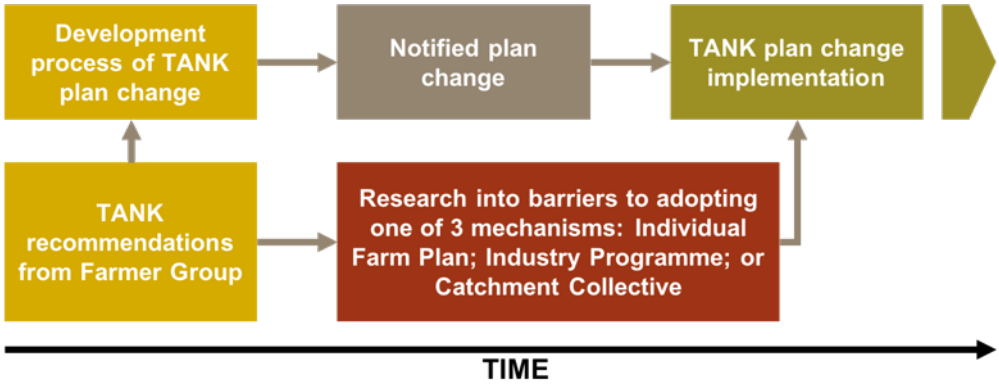
- To work individually through farm plans
- To work within industry programmes
- To work collectively within local catchment collectives

The TANK process has been progressing for some time and like many freshwater projects, it has been dealing with some protracted and difficult to understand issues. It is understood that because of challenges relating to uncertainties around data; difficulties with being able to establish firm contaminant limits at a property level; and the heterogeneity of issues across the catchments; a range of mechanisms for coordinating and managing improved environmental management are proposed, rather than a prescriptive list of mitigations. Also, in part because of this and in part because of the direct involvement of farmers through a Farmers Reference Group, this plan change has resulting in one of the mechanisms proposed being a 'Catchment Collective' (M-A. Baker, personal communication, April 2018). A Catchment Collective is a self-organising group through which collective environmental action can be taken, and the action agreed by the group is the means by which the members of the group are held accountable to council.

This research was commissioned and part funded by the Ministry for the Environment (MfE). It was completed within the ambitious and challenging timeframe of approximately 2.5 months. HBRC have an obvious direct interest in understanding the perceived barriers to adoption of the mechanisms and will use this research to inform the implementation stage of the plan

change (Figure 1). MfE have an interest in understanding barriers to adoption of such mechanisms more widely across the country.

Figure 1. Process diagram demonstrating how this research will inform the implementation plan of the TANK plan change



While this research has been planned by HBRC and MfE for some time (M-A. Baker, personal communication, April 2018), the fact that the particularly novel mechanism of the catchment collective has been proposed simply adds to the interest in this research from all parties involved. At the time of writing this is understood to be one of the first instances of this type of self-organising and collective approaches for dealing with *water quality* issues in the country. Therefore, it is expected that this research may be of potential interest to a number of Councils in New Zealand.

This report is structured in the following way:

- Firstly, a literature review is undertaken (section 2). In relation to Individual Farm Plans and Industry Programmes, this summarises the existing knowledge about the barriers and drivers to adopting management practices or mitigations to achieve better environmental outcomes. In relation to the Catchment Collectives, this summarises existing knowledge around self-organising groups.
- Secondly, an overview of the mixed methods research approach is outlined (section 3). A more detailed methodology, including the structure and questions of both the survey and semi-structured interview process, can be found in Appendix 1, Appendix 2 and Appendix 3).
- Thirdly, an overview of the results of the research are presented in section 4), This outlines the demographics of respondents, the results of the survey and the results of coding the data from the interviews. More detailed discussions of the results can be found in the appendices – the survey in Appendix 5 and the coding of semi-structured interviews in Appendix 6.

- Fourthly, the barriers and risks identified in these results are discussed. A range of recommendations are proposed to help minimise them and maximise adoption of the mechanisms (sections 5–9).
- Finally, these recommendations are collated and summarised and the research concluded (section 10).

This is a comprehensive report and much detail has been included due to the leading-edge nature of some of the proposals being made in the plan change, particularly the catchment collective. For this reason, the literature review is considered comprehensive for this type of report. This provides the reader with an opportunity to review a range of important concepts that would be useful to an understanding of the discussions that come later on. If, however, the reader is pressed for time, this section can be skimmed. Reading section 2.5 will provide an understanding of the research framework that has been developed and applied.

Similarly, in order to save some space, the methodology (section 3) and results (section 4) are summarised in the main body of the report, with more detail provided in appendices. A full discussion of the barriers that were identified and the recommendations made to deal with these have been left in the body of the report, for obvious reasons.

2 Literature Review

Freshwater resources across New Zealand have been coming under increasing pressure in recent decades (Gluckman, et. al, 2017; Ministry for the Environment & Stats NZ, 2017; OECD, 2017). The development or review of regional plans that deal with freshwater management continues apace, mostly as a response to the development of national level guidance for water quality in the *National Policy Statement – Freshwater Management* (Ministry for the Environment, 2011; 2014; 2017).

In the Hawke's Bay region, one plan change has already been undertaken in the Tukituki catchment (Hawke's Bay Regional Council, 2015). A second is currently underway concurrently in the four catchments of the Tutaekuri, Ahuriri, Ngaruroro and Karamū – collectively known as the "TANK" catchments (Hawke's Bay Regional Council, 2017).

The nature of the proposed TANK plan change means that this literature review will be focused on two main areas of literature: farm plan and innovation adoption; and the enablers/barriers to the success of institutions for collective action. Given the restricted timeframe available for this research (see Introduction), this literature review is pragmatic and applied, focusing on these two areas. The intent of this literature review is to build an understanding of the key components of these mechanisms, to inform the survey and semi-structured interviews that will investigate the barriers to adoption of these types of mechanisms.

2.1 The background to industry programmes and farm plans.

New Zealand has a long history of farm planning for erosion control. This was the main reason that Catchment Boards were set up in the 1940's and was the basis for the development of the 8-class Land Use Capability (LUC) system (Ministry for the Environment, 2003). Such plans have usually mainly focused on soil conservation and water management issues, such as riparian management, stream protection and run-off control. There was a distinct drop off in farm planning in the 1980's after central government funding was discontinued and further, local government amalgamation and restructuring resulted in most of the catchment board functions being vested in the newly constituted regional and unitary councils (Ministry for the Environment, 2003).

The popularity of farm plans, be they driven by regulators or industry groups, has been increasing again since the 1990's (Ministry for the Environment, 2003). Their reintroduction is often leveraged around the greater awareness of issues, like sedimentation and erosion from high impact weather events (AgResearch (2016) discusses the resulting farm planning after the 2004-05 storm and flooding events). Their increasing popularity is also due to their ability

to allow farmers to own their own farm practice improvements and provide increased autonomy from industry. They can also be a useful non-regulatory tool, allowing the relationship between farmers and Regional Council to evolve in a non-regulatory manner.

As New Zealand's economic activities continue to push towards its environmental limits and impact on freshwater quality (Gluckman et. al (2017); Ministry for the Environment & Stats NZ (2017); OECD (2017)) then they are likely to continue to be an increasingly common feature of environmental policy.

Most primary industries in New Zealand have also recognised the need to better support on-farm practice in relation to environmental practices. This has resulted in a range of industry programmes run by the various industry representative bodies, that are applied at a nationwide level. These include (but are not limited to):

- Sustainable dairying – water accord (dairy industry)
- Good management practices: A guide to good environmental management on dairy farms (DairyNZ)
- Land and Environment Plan (sheep and beef industry)
- NZGAP (horticultural industry)
- Sustainable winegrowing (wine industry)

Being familiar with the details of industry programmes such as these is not within the scope of this research. Rather, what is of interest, is the perceived barriers to their adoption, from the perspective of the farmer – particularly in light of the TANK plan change and their perceived ability to contribute to the objectives sought by that plan change.

2.2 Barriers to adoption of environmental mitigations

At their core, both industry programmes and environmental farm plans collate or prescribe a range of *management activities* to be undertaken, with the intention of achieving or moving towards a *desired environmental objective*. In other words, one way of viewing both industry programmes and farm plans may be to view them as a tool for *collating and/or coordinating* activities that have been identified as required, or beneficial. Therefore, understanding the barriers to adoption of these activities is of use. Given this commonality, the literature associated with the adoption of environmental farm plans and/or industry programmes is considered here together.

A range of factors identified in the literature are discussed below.

2.2.1 Personal values and identity

Obviously farmers' personal views and values strongly influence adoption of mitigations. However, the various ways in which this occurs is of interest.

It would be logical to assume that farmers with a greater environmental focus will be more willing to adopt better environmental practice. Yet in a comprehensive study of the farm planning in the Manawatu region of New Zealand, it was found that for both adopters and non-adopters of farm plans enhancing the natural environment ranked the top-equal (adopters) or very close second (non-adopters) value or priority, next to consistent economic profits from their farm (Horizons Regional Council, 2016). This is consistent with research findings in Australia where there was little difference in the stated level of environmental 'stewardship' between adopters and non-adopters of conversation cropping techniques (Cary et al., 2001). This would indicate that the stated preference of farmers in relation to their level of environmental stewardship while insightful, is likely to be a misleading indicator for predicted levels of adoption.

Kerr & Dorner (2013) propose three "C's" in relation to adoption of mitigations: That *concern* (the drive and desire to make a change) must firstly be built; as well as *capabilities* (the methods) to deliver the mitigation; and that both these must occur before any *contracting* (actual delivery of the mitigations) can occur. It is the first of these "C's", concern, that is seen as aligning with the personal values and identity motivators discussed here.

So what values, beliefs or traits *are* of use for understanding adoption of good environmental practice? The motivations of farmers are not singularly environmental and are often a complex inter-related range of drivers (Ministry for the Environment, 2003). While much further research in this area is required to understand this overlapping complexity, the existing research does provide some useful insights.

For instance, the views of farmers on the private/public goods and the role of the state has been found to be an influencing factor. That is, the extent to which farmers believe that 'the state' (i.e. a council) has a place in influencing the activity that occurs on private land, which is itself derived from the fact that individual activity on private land may contribute to wider social public goods (e.g. flood mitigation or other environmental benefits) (Horizons Regional Council, 2016).

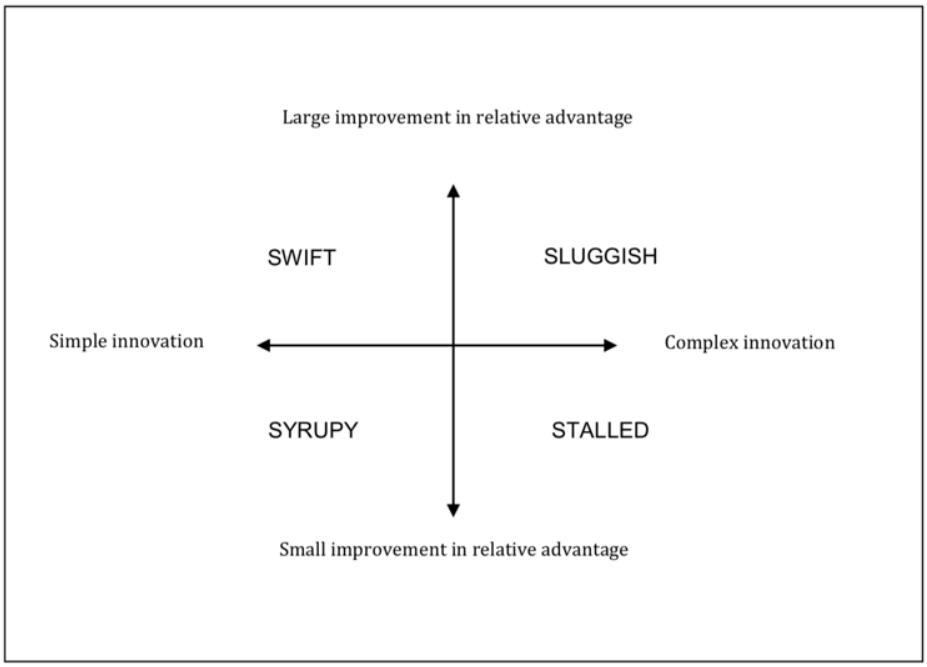
Similarly, the timeframe over which farmers frame their relationship with the land can have a large impact on behaviour (Pannell et al., 2006). The longer that they view their relationship with the land, the more they act in accordance with considering investments from a longer-term perspective – in other words, their actions reflect considering investments in the context of a low discount rate (Ostrom, 1990).

It is also worth noting that the type of farming that a particular farmer *identifies with* is also an important factor. Pannell et al. (2006) found that non-adoption of good environmental practice can sometimes mean more substantial changes in farm practice, or even an entire conversion to a different farm system and/or product. The identity of farmers in such situations can be a huge source of resistance to adoption. An example is, "all my friends are wheat farmers, I am a wheat farmer too, it is what I like doing, it is what I'm good at, it is what my family does, it is an important and respectable occupation for me" (Pannell et al., 2006).

2.2.2 Relative advantage and farm profit

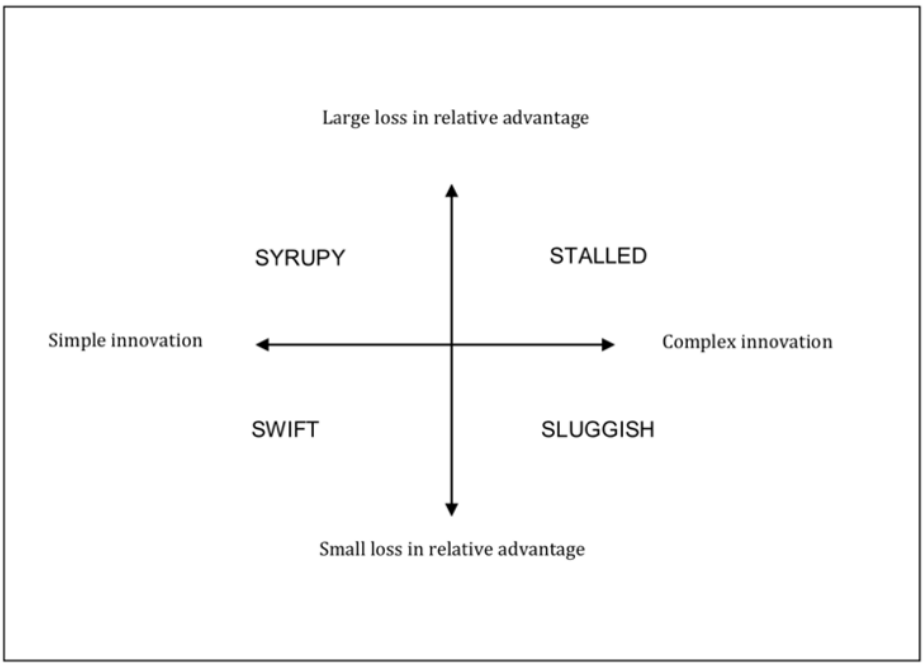
The previous section outlines a range of factors relating to personal values and identity which are important to adoption of farm mitigations. Notwithstanding these factors, it is difficult to ignore the fact that the primary motivator for farmers is that farming is a business and they are driven to ensure continued growth in farm profits (Horizons Regional Council, 2016; Ministry for the Environment, 2003). Two good perspectives on this are provided by literature at least partially influenced by economics. Pannell et al. (2006) talk about adoption being, at least in part, a function of the *relative advantage* provided by a proposed management practice and the *trialability* of that practice (trialability is discussed in more detail in section 2.2.4). Kaine & Wright (2017) also view relative advantage as a key factor in whether a management practice is voluntarily adopted, suggesting adoption is a factor of *relative advantage* and *complexity* of the management practice or innovation. They use the economic concept of 'stickiness' to describe the various types of adoption behaviours that may be observed in the context of these factors, where stickiness is the rapidity with which a certain management practice may be adopted. The stickiness in the rate of adoption is described as varying from 'swift' at the rapid end of the scale (high relative advantage and low complexity); through 'sluggish' (high relative advantage and high complexity) and 'syrupy' (low relative advantage and low complexity); to 'stalled' (both low relative advantage and high complexity) at the slow or stagnant end of the spectrum. These various profiles are shown in Figure 2.

Figure 2. Stickiness in the rate of adoption (Kaine & Wright, 2017)



They further demonstrate that the scale of relative advantage can apply when the adoption is not voluntary and is instead mandatory (or as part of *compliance*). The stickiness values remain the same on the complexity scale, but are reversed on the *relative advantage* scale, as shown in Figure 3.

Figure 3. Stickiness in the rate of compliance (Kaine & Wright, 2017)



Regardless which of the framework outlined above is used, the important thing to note is the impact that the *relative advantage* of a management practice for the farm, and therefore the farm profitability discussed earlier, that is of importance.

While relative advantage of a management action may be viewed as the 'benefit' that a management action might provide, the financial 'cost' of the action is equally important. The subsidisation (and therefore low cost) of farm planning undertaken in the Manawatu was identified as the primary reasons for its adoption in the last decade (Horizons Regional Council, 2016). Other reviews of farm planning in New Zealand has found that there is little financial incentive to adopt farm plans, especially in the dairy sector and that the reduction of direct government subsidies for farm planning in the 1980's was at least partially responsible for a significant drop in farm planning at that time (Ministry for the Environment, 2003). In short, the immediate cost is still very important, even if it leads to a longer-term benefit.

2.2.3 Demographic and structural variables

In addition to the personal values/identity and the relative advantage/cost of management practices that have been discussed, there are a range of demographic and structural variables which also need to be considered.

For example, the influence of the age of farmers on their adoption behaviour has often been investigated and mixed results found. Some found age to be closely related to the other factors already identified, such as identity and long-term view (Pannell et al., 2006); while other research has found little evidence for a correlation between the age of farmers (Cary et al., 2001); or even that some younger farmers were more focused on maximising production and profitability and perhaps less so on environmental outcomes (Horizons Regional Council, 2016). While it is difficult to disentangle the impact of age, it is perhaps most usefully viewed in association with the need for and progress with succession planning. The status of any succession planning has been found to be highly germane to older farmers (Horizons Regional Council, 2016) and, as this contributes to an intergenerational view around a resource, it is likely to affect the perceived discount rate applied to an investment decision (Ostrom, 1990).

Structure of the farm business has been found to be influential in adoption in dairying. Sharemilking is a common practice in dairying and this results in a contractual separation between the means of production on the farm (the cows and the sharemilkers); and the responsibilities of land owners (the land and the land owners) under environmental regulation (Ministry for the Environment, 2003). This is less of a feature on high country sheep and beef farms.

While there is some correlation between the level of farmers formal education and mitigation action adoption (Pannell et al., 2006), there is a stronger correlation between the amount of recent vocational training that a farmer has been on or been exposed (Cary et al., 2001; Pannell et al., 2006).

2.2.4 Trialability and observability of mitigations

The preceding sections outline human and system factors and their impact on the adoption of environmental management practices. These include things such as personal values and views; relative advantage and farm profit; and demographic and structural variables. This section will consider physical features of the environmental practices themselves such as their *trialability* and the *observability* of their impact/results.

The trialability of a management practice relates to the extent to which it can be implemented as a trail to begin, ideally with minimal restrictive capital investment and without necessary disruption to the other parts of the farming system (Pannell et al., 2006). This staged approach to adoption has been seen as important for farmers who may generally identify as conservative in their investment views (Pannell et al., 2006), and who are by nature cautious (Horizons, Regional Council, 2016). This also resonates with Kerr & Dorners second “C”, which is the need to build capability to deliver on mechanisms. The ability to trial mitigations and observe their outcomes are a way of building this capability.

The observability of the impacts of any management actions has also been identified as important to its adoption. Farmers respond better when they can *see* the impact of their actions (Pannell et al., 2006; Cary et al., 2001), again in the context of a conservative view on investment, but also importantly in the context of needing to develop trust that the action will work as anticipated. Trust is explored further in the following section.

2.2.5 Trust and communication

The final subset of factors being considered under industry programmes and farm plans is trust and communication. This has in part been left until last as it begins to cross over into factors that will be discussed in a subsequent section on collective groups (see section 2.4). Factors discussed here include the role of trust and the role of positive relationships, proximity and communication.

Trust and the relationship between field officers and farmers is a key factor in enabling the adoption of farm plans (Horizons Regional Council, 2016). This is not only trust between the farmer and the bureaucracy responsible for mandating or encouraging them, but also in the results that the mitigations achieve (Pannell et al., 2006).

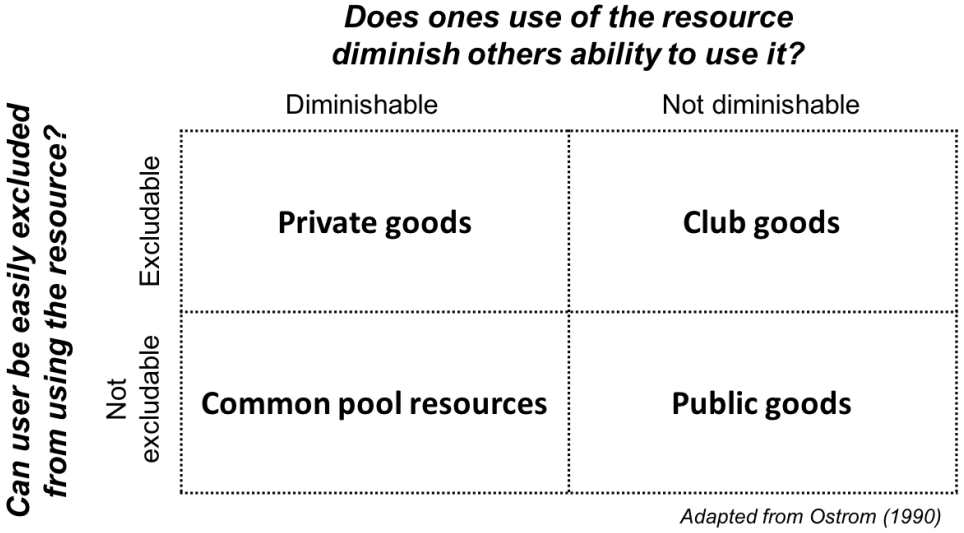
There is often a divide between the way farmers perceive their action and the way science perceives them (Duncan, 2015). This has to be bridged before higher levels of trust can be built with farmers. Investment in strong relationships with field officers, good communication and a commitment to transparency is one way of achieving this (Horizons Regional Council, 2016). Another way that such understanding and trust is built is via the network of farmers themselves, where adopters and non-adopters mix with each other, sharing views and building trust. The proximity of farmers to each other and the extent to which they tend to interact in their everyday lives has been found to be an enabler of this type of trust and awareness (Pannell et al., 2006).

Having considered a range of factors that enable or impinge on the adoption of good environmental management practices in the form of industry programmes or farm plans, it is now time to consider the factors that enable or inhibit collective groups to achieve positive environmental outcomes in relation to a common pool resource.

2.3 The background to self-organising groups and collective action in relation to common pool resources

The literature on collective action in relation to common pool resources draws heavily from political theory and economics. One of the obvious reasons for this is that the term common pool resources (or CPR), as most often used in natural resource management, is drawn from economic theory. In this, a CPR is a resource that is diminishable the more multiple actors use it, and from which it is difficult to exclude actors from using (Ostrom, 1990). This contrasts with other types of resources which are defined within a matrix of excludability on one axis and diminishability on the other axis. These are outlined in Figure 4.

Figure 4. Different types of resources according to excludability and diminishability.



The conflicts related to the use of these resources create social dilemmas and classical economic theory has long assumed that, when it comes to common pool resources, individuals will always act rationally and in their self-interest, which leads to an inevitable overuse and destruction of a resource (Hardin, 1968; Ostrom, 1990). In other words, because it is difficult to exclude people from using a particular resource, yet it is in the individual's best interests to keep using it at an *individual* level, this inevitably leads to deterioration or exploitation of the resource. This is sometimes called the 'tragedy of the commons' (Hardin, 1968).

This view was widely held until the work of Elinor Ostrom, who observed that there were many examples of self-organising groups that had chosen, of their own free will, to work in a way that preserved the integrity of a common pool resource (Ostrom, 1990).

Ostrom identified research that studied a number of self-organising groups of resource users who attempted to manage CPRs collectively. Many successful and unsuccessful case studies were compared across differing resources such as forestry's, fisheries and freshwater management schemes (i.e. for irrigation). From this work she identified 8 principles that she argued seemed to be present in all of the successful case studies (Ostrom, 1990). Further research revised these principles, splitting several of them (Cox et al., 2010). The resulting 11 principles are described in Figure 5.

These principles are of relevance to the TANK project. This is because the catchment collective option in the proposed plan change provides an opportunity for landowners to *self-organise* and determine their own course of action, under the jurisdiction of the Hawke's Bay Regional Council. Rather than *prescribe* a blanket range of activities to be undertaken, this

mechanism within the proposed plan change allows landowners to self-organise and *determine their own activities*, although they do need to receive final approval from HBRC.

Figure 5. 11 revised principles for successful institutions for collective action (Cox et al., 2010)

Principle	Description
1A	**User boundaries:** Clear boundaries between legitimate users and nonusers must be clearly defined.
1B	**Resource boundaries:** Clear boundaries are present that define a resource system and separate it from the larger biophysical environment.
2A	**Congruence with local conditions:** Appropriation and provision rules are congruent with local social and environmental conditions.
2B	**Appropriation and provision:** The benefits obtained by users from a common-pool resource (CPR), as determined by appropriation rules, are proportional to the amount of inputs required in the form of labor, material, or money, as determined by provision rules.
3	**Collective-choice arrangements:** Most individuals affected by the operational rules can participate in modifying the operational rules.
4A	**Monitoring users:** Monitors who are accountable to the users monitor the appropriation and provision levels of the users.
4B	**Monitoring the resource:** Monitors who are accountable to the users monitor the condition of the resource.
5	**Graduated sanctions:** Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and the context of the offense) by other appropriators, by officials accountable to the appropriators, or by both.
6	**Conflict-resolution mechanisms:** Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.
7	**Minimal recognition of rights to organise:** The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.
8	**Nested enterprises:** Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organised in multiple layers of nested enterprises.

While the 11 principles above are useful for guiding discussion around whether arrangements to manage common-pool resources may be successful, there remains the question as to whether water quality can be considered a CPR. Certainly, the *allocation* of water for use is a common example of a CPR, along with such things as forestry and fisheries – these are all easily demonstrable as diminishable if more people use them. But can water quality or, put another way, the capacity of a water body to *absorb pollution*, be viewed as a CPR?

It is argued here that it can be. For a resource to be considered a CPR it must be *salient* to the livelihood of the resource users (Ostrom, 2008, as cited in Parsons, 2016) and if pollution occurs in a water body then it can impact the resource user directly (for example through poisoned water) or indirectly (for example through the resource user incurring a tax or fine

from a governing body) (Parsons, 2016). Furthermore, even the *threat* of more comprehensive regulation or a greater tax/fine can be enough to make the damage being done to the water body more salient to the resource user (Kingi, Park & Scarsbrook, 2012, as cited in Parsons, 2016).

2.4 Factors of successful collective groups

Having established that the ability of a water body to absorb pollution can be viewed as a CPR, attention is now turned to the factors that have been identified as barriers or enablers to the adoption of collective action. The 11 revised principles have been applied in many literatures including political and social theory, and they have at least in part informed, and been informed by, experimental economics. While it is beyond the scope of this report to review any of these literatures in depth, a range of useful insights from work undertaken since Ostrom is provided in the sections that follow.

Oliver Parsons (2016) provides a useful summary of the increasingly complex variety of experimental economics games that can be played in relation to public goods and CPRs. While a detailed analysis of these is not considered of benefit here, it useful to note that they increase in complexity from linear trade-offs to non-linear trade-offs as the games progress from public goods to CPRs. Put another way, the choice for the individual becomes less binary and more complex as the games move from public goods to CPRs, especially when multiple people (players) are involved. Such experiments provide evidence that classic economic formulas that predict the maximisation of individual or public benefit are not sufficient to account for the variety of decisions that individuals will take in relation to CPR. What they have found to be important in the management of CPRs is the importance of having good communication and agreement on actions, as well as being aware of 'free-riders' and being able to manage somehow with sanctions (Parsons, 2016).

2.4.1 Communication and the covenant (agreement)

The importance of trust and communication as an enabler for successful industry programmes and farm plans was discussed earlier (see section 2.2.5). It is not surprising that in an environment where groups are self-organising to manage a resource, communication and agreement between parties should feature strongly.

A strong correlation between communication and success of institutions governing CPR's has been found, especially when face-to-face communication is the main method of communication as it has been found to be far more effective (Parsons, 2016). Much like in the adoption of industry programmes and farm plans, communication allows participants the

important opportunity to ask questions (Ostrom et al., 2012) and establish social norms by which to operate (Ostrom et al., 1992). It is also seen as an important mechanism for building trust between parties (Ben-Ner & Putterman, 2009, as cited in Parsons, 2016). Trust being one of the important things that the agreements (or covenants) made between parties will hinge upon (Ostrom et al., 2012).

One of the important factors that Ostrom repeatedly found to underpin successful agreements was that participants took a long-term view – that is, in economics parlance, they took decisions with a *low discount rate* in mind (Ostrom, 1990; Ostrom et al., 2012).

It was also found to be very important for the participants to be able to develop reciprocity and autonomy within any institution or agreement, these were related to the building of trust and are themselves important building blocks of a strong institutional arrangement (Ostrom et al., 2012).

2.4.2 Free-riding and the need for monitoring and punishment (sanctions)

Having identified strong communication and a foundation of trust as important factors, attention is now focused on the factors where a large amount of the experimental literature is focused: incorrect resource use (or 'free-riding'); monitoring the resource; and the ability to impose punishments (or sanctions). Free-riding is a ubiquitous feature of CPRs and much research has focused on the impact that punishments have on free-riding, and the corresponding impact on the efficient use of the resource (Parsons, 2016).

An exploration of free-riding, monitoring and punishment (sanctions) is important for the discussion relating to the TANK plan change for several reasons. Firstly, self-organising groups seeking to better manage water quality issues have not been a feature of New Zealand policy development, certainly as far as the author is aware. Further, given the lack of track record of this approach, there is a corresponding lack of awareness as to the nuances of such mechanisms. Intuiting the subtleties of these from the international literature indicates that conditional co-operators, or actors who maintain their activity only on the condition that other actors maintain a similar level of activity within a group (Parsons, 2016), are likely to feature in any groups developed in the TANK area.

In their seminal paper *Covenants with and without a sword: self-governance is possible*, Ostrom, Walker & Gardiner (1992) tested the impact of different combinations of communication and sanctions on the efficient use of a CPR. Communication by itself was found to provide an opportunity to establish social norms and limit free-riding use of a resource; while punishments by themselves (i.e. in the absence of communication and social norms) were surprisingly still freely used – even when there was a cost to those people

instigating the punishment – but not in a manner that maximised the efficient use of the resource. In the game where both communication AND punishment were allowed, actors were found to be able to both *discuss and agree an investment strategy* (a covenant), as well as appropriately and efficiently punish actors who did not adhere to the rules (punishment/sanctioning).

Other research has since reinforced this, finding that the ability to punish by itself (in the absence of communication) was much less successful at managing a public good than simply having the opportunity to communicate (without punishment) (Cason & Gangadharan, 2016).

While communication itself may be the stronger variable on its own, it is the use of both communication *and* punishment in combination that is necessary. Research has found that the punishment of free-riders is important for several reasons. Not only does it stop the *direct impact* of free-riding itself, it also stops the *indirect impact* that free-riding has on other rule-abiding members cooperating in a group. Many of the actors will be what is known as *conditional cooperators*, that is, they are willing to cooperate in a system of resource management so long as *other actors continue to operate* in the way that is expected of them (Parsons, 2016). In other words, free-riders will only be tolerated, unpunished, for so long before other group members wonder why they are adhering to the rules when others are getting away without having to. In effect, any non-punishment of free-riders may erode any social capital established in the group (good will and trust) and any agreements (covenants) made.

While instigating or administering a punishment itself has a cost, it has been found that so long as there is a significantly greater cost to the *punished* over the *punisher* (approximately a ratio of 1:4 (punisher:punished), there is a higher likelihood that the punishment will be effective (Parsons, 2016). In other words, a punishment has to be strong enough to be desirable for the instigator to initiate, and for the punished to feel suitably chastised.

Having established that both communication and punishment are important aspects of CPR, the extent that these both depend on *monitoring* is now considered.

Monitoring both the CPR condition and the behaviour of actors in its use were the core of Ostrom's original fourth principle (Ostrom, 1990). This was refined by Cox et al. (2010) into two separate principles: 4A – the actual *use* of the resource by the actors needs to be monitored; and 4B – the actual *condition* of the resource itself needs to be monitored.

The ability to clearly monitor the condition of the resource has been identified as one of 4 enabling factors of what is known as an ambient pollution scheme (Segerson, 1988). In these schemes it is argued that, in the absence of being able to determine and monitor individual activities that are impacting on a CPR (e.g. water pollution), the impact can be managed by a

collective tax/fine system (e.g. collective tax/fine everyone within a catchment). This is so long as there is a clear ability to accurately measure the *aggregate* condition of the resource; along with only being a small number of polluters; who are relatively homogenous in their activities; and the impacts have minimal lag time between farm activity and the resulting impact on the resource.

While there may be potential for some of these conditions to be met in the TANK project area, the clear ability to monitor the resource is a key weakness, as is the heterogeneity of actors in the lower catchments. So, while an ambient tax is unlikely to work on its own, if any kind of ambient tax was considered this should be in conjunction with a certain amount of peer punishment (Cason and Gangadharan, 2013, as cited in Parsons, 2016).

Yet, the experimental literature highlights an important paradox between public good and CPR situations that is difficult to explain, Casari and Plott (2003) call this the spite/altruist paradox. This is that in public good environments, actors tend to cooperate to a level higher (altruism) than that predicted by rational self-interest (selfishness); yet in CPR environments, they tend to cooperate to a level lower (spitefulness) than that predicted by rational self-interest (selfishness). That is, as soon as actors are dealing with a *diminishable* resource, they tend to operate in a way that is *spiteful* to other actors, usually in a way that is detrimental to their own net benefit. It is almost as if their motivation was: “well if I can’t use it (the resource), then neither can you!”. The reasons for this are not particularly well understood.

A useful example of a CPR institution that dealt with spitefulness by melding the factors of monitoring and punishment together very well, is known as ‘Carte di Regola’. This managed forestry and pasture in the Italian alps for 500 years until it was disbanded by Napoleon, yet was well documented and has been recreated under experimental conditions in the behavioural economics lab (Casari and Plott, 2003). These findings are worth discussing.

It was found that the heterogeneity of actors behaviour (i.e. altruistic, selfish or spiteful) was not a barrier, as the structure of the ‘Carte di Regola’ channeled these behaviours to their best use. It does this by providing the *actor that instigates the inspection* of another actor’s farm, as well as the *inspector*, a portion of any fine collected from that inspection/infringement.

When the punishments were weak in the game, the predominant instigators of inspections were those with a spiteful profile, whereas when the punishments were strong, the predominant instigators had altruistic profiles. While this may seem counter-intuitive, it is explained by some of the infringement paid also going to the *inspector*. When the punishment is stronger, the spiteful people are more frustrated (they don’t like others in the group benefiting at their expense), so they temper their behaviour and instigate less inspections and using the resource more efficiently. It is also noted that because the inspectors receive a

portion of any infringement paid, there is no incentive for free-riders to bribe other actors, as if they did they may need to keep bribing them, or bribe multiple people, which would end up costing them more (Casari and Plott, 2003).

While the relationships between these components are complex, it is apparent that a successful CPR regime is likely to be a well-balanced combination of appropriate monitoring (of both the resource and the users) and a suitable – and enforced – peer punishment scheme.

One final point to discuss is whether group size has an impact on the success of punishment in CPR schemes. While there can be a slight 'bystander effect' – where actors do not intervene when there are many people that could, as they think someone else will – an increasing group size has not been found to be a limiting factor in CPR monitoring. In fact, where monitoring can occur passively and by more than one other party, it can be highly beneficial in minimising free-riding (Carpenter, 2007).

2.4.3 Nested institutions

In the previous section the complex relationships between free-riding, monitoring and punishment were explored, in this section the ability of institutions to be nested is explored.

In her eighth principle Ostrom talked about the ability for different *functions* of the CPR institution to be incorporated in *nested enterprises* (also variously called *nested institutions*) (Ostrom, 1990). What she meant was that a 'one-size-fits-all' or 'top-down' institutional approach to the provision of services was usually unlikely to work and that the various functions required should reflect the scale at which they were required. Further, different scales could apply to different functions within the same scheme. For example, a resource might be managed, monitored and peer punished at a micro or medium scale, but relevant information may be provided by a larger regional institution and conflict resolution may be provided by a different sized institution again (for example at a local, regional or even national scale).

The nesting of systems or institutions was one of the more important principles that Ostrom reflected on towards the end of her career (Ostrom, 2012). The refinement of the principles by Cox et al. (2010) agreed and further added to the definition by suggesting that systems could be nested *horizontally* as well as *vertically*, as originally suggested by Ostrom.

2.5 Summary and insights for this research

There is a growing appreciation that freshwater resources in New Zealand are coming under increasing pressure and, as a result, various freshwater policy initiatives are underway across

the country such as the TANK plan change in the Hawke's Bay region. Rather than focusing on prescribing a range of required mitigations, the proposed TANK plan change provides landowners the choice of three mechanisms by which they can determine and coordinate appropriate mitigations measures: Individual Farm Plans; Industry Programmes; and Catchment Collectives.

While Individual Farm Plans and Industry Programmes have a more established history in New Zealand, institutionally recognised self-organising groups such as the Catchment Collectives proposed in this plan change do not. Furthermore, their success is informed by varying literatures: Insights to barriers to Individual Farm Plans and Industry Programmes is informed mainly by the literature around barriers to environmental mitigations (predominantly informed by Pannell (2006) and Kaine & Wright (2017)); while for Catchment Collective this comes from the literature relating to the design principles identified in self-organising groups who manage common pool resources (predominantly informed by Ostrom (1990) and Cox et al. (2010)).

For this research to be useful and for the results to be comparable across all three mechanisms being investigated, these various literatures need to be drawn together into a single analytical framework. When the elements of these literatures are viewed from the perspectives of a primary producer, they can be arranged into four groupings:

1. the attitudes of the producer as an individual,
2. the relationships of the producer to the resource,
3. the relationships of producer to other producers, and
4. the relationships between the producer and wider society.

These groupings and the elements of the literatures that inform them are shown in Figure 6. The reader will notice a gap in two of the three columns on the right, in the 'Producer to producer' section. This gap is explained by the fact that the literature relating to the interactions between producers is predominantly drawn from the work of Ostrom, particularly the concepts of monitoring and punishment of others within groups. This only applies only to the catchment collectives.

This framework is utilised further to develop a comprehensive survey and set of interview questions. See the detailed methodology in Appendix 1 and the survey and interview questions in Appendix 2 and Appendix 3 respectively.

Figure 6. A framework for researching proposed barriers to the mechanisms proposed in the TANK plan change.

		Literatures					
		Common Pool Resources and the Design Principles of self-organising groups. (Ostrom (1990); Cox et al. (2010))	Barriers to environmental mitigations. (Pannell (2006), Kaine & Wright (2017))	Line of questioning	Individual Farm Plans	Industry Programmes	Catchment Collectives
The producer as an individual	2A	**The DEMANDS on the resource and FOR MITIGATION are appropriate for the environment**		General background. General views of the farmer on the resource and the need for action.	✓	✓	✓
	2B	**The RETURN ON INVESTMENT from management is appopriate for the users**	**Relative advantage**	Views on risk and length of return on investment. What relative advantage does any one mechaism provide in your day-to-day decision-making?	✓	✓	✓
			Trialability	Trialibility, upskilling and potential disruption.	✓	✓	✓
			Complexity	Complexity and compatibility with existing farm practices/structures.	✓	✓	✓
The producer and the resource	1B	**Clearly defined RESOURCE**		How clearly is the resource defined and how clearly is that understood? How possible is it to monitor the resource and how comfortable would people be operating in an environment WITHOUT monitoring, if need be?	✓	✓	✓
	4B	**The RESOURCE ITSELF can be monitored**			✓	✓	✓
Producer to producer	1A	**Clearly defined USERS**		How clearly are the 'users' of the resource defined? How well is that understood? Questions relating to the monitoring and punishment of colelctive members. How might conflict resolution be dealt with?			✓
	3	**Those involved CAN INFLUENCE the outcome**					✓
	4A	**USERS of the resource can be monitored**					✓
	5	**Appropriate PUNISHMENT for violations**					✓
	6	**CONFLICT RESOLUTION mechanisms**					✓
The producer and wider society	7	**Level of PERMISSION to self-organise**		What are the wider relationships between communities and institutions like? What impact will that have on the level of trust and permission granted to operate in a self-organising way?	✓	✓	✓
	8	**Institutions & organisations are appropriate and WORK WELL TOGETHER**			✓	✓	✓

Note: The numbers listed on the left relate to the relevant Design Principles outlined by Ostrom (1990) and Cox et al. (2010).

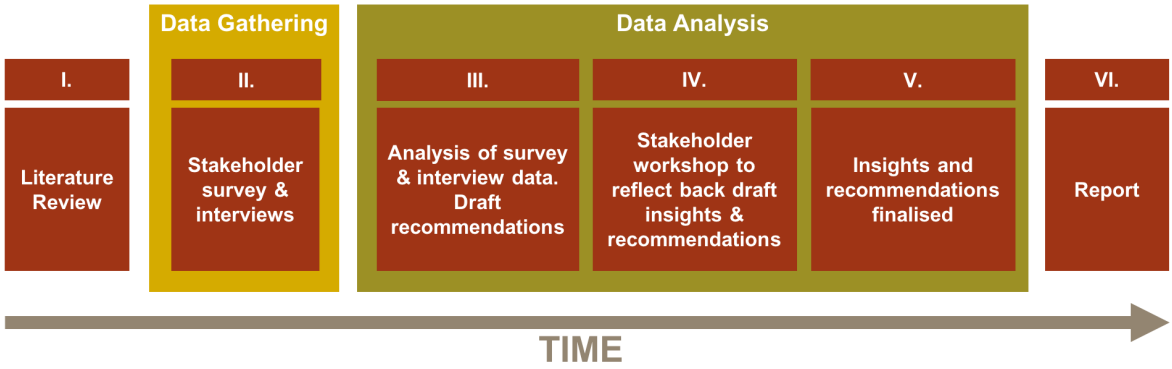
3 Overview of methodology

A mixed methods approach was used for this research, combining both qualitative and quantitative methods. As it is research into people's perceptions of the mechanisms proposed in the plan change, the majority of the research was focused on the qualitative data analysis. This was supported by some quantitative data analysis. A detailed description of the methodology is provided in Appendix 1, and an overview is provided here.

The research was divided into six stages (see also Figure 7):

I. Literature Review
II. Stakeholder survey & interviews (data gathering)
III. Analysis of survey & interview data and draft recommendations (data analysis)
IV. Stakeholder workshop to reflect back insights and recommendations (data analysis)
V. Interventions finalised (data analysis)
VI. Final report

Figure 7. Methodology outline



The Literature Review (Stage I) provided context for the research, informing the structure of interviews and much of the content (see section 2.5, previously). As described earlier, the questions were structured around: the producer as an individual; the producer and the resource; producer to producer and; the producer and wider society.

Data gathering was undertaken through semi-structured interviews of selected stakeholders (Stage II) who had some familiarity with the content of the proposed plan change and the mechanisms within it. As the main object of this research was to identify potential barriers to the adoption of the three mechanisms proposed in the plan change – Individual Farm Plans, Industry Programmes, and Catchment Collectives – interviewing people who were familiar with the mechanisms was necessary. This meant that interviewees were drawn from the Farmer Reference Group, the TANK Group and some Council staff who had been involved with the project.

There were also time constraints on when the results and recommendations from this research were to be delivered. This was in part driven by project timelines, and in part driven by a need to ensure that these insights were available for the development of an implementation plan for the plan change. This was being developed while the plan change itself was being finalised and agreed. The interviews were carried out over April and May 2018.

An initial analysis of the survey and interview data was then undertaken (Stage III). The analysis of the survey data was quantitative, while the analysis of the interview data was qualitative. The qualitative analysis consisted of both *deductive* and *inductive* coding of interview data. *Deductive* coding is where the data is analysed with a certain code or theme in mind, for example you may be interested in the role of group size, so you will look for comments relating to the size of groups. *Inductive* coding on the other hand, is where the data is analysed and a common code or theme is identified from the data. For example, multiple interviewees may talk about the role and importance of technology, so 'technology' may become a code.

This identified a range of draft barriers and interventions which were then reflected back to the Farmer Reference Group at one of their meetings in June 2018 (Stage IV). Following this the insights to barriers and recommendations were finalised (Stage V) and then the final report was written (Stage VI).

4 Summary of results

4.1 Participant demographics

The complete tabulated and graphed results of the individual farm and demographic data gathered from the survey is provided in Appendix 4. These results are summarised here.

Participants were predominantly male, over the age of 51 and having worked in primary production for more than 26 years. Nearly all participants were farm owners (or joint owners) and they were predominantly sheep and beef farmers, with some dairy farmers and fruit orchardists. The majority had been farming in New Zealand for more than 4 generations of their family.

The farms provided the majority (over 80%), if not all of the household income. They were predominantly profitable over the last two years and around half of the farms had successors identified who were their own children.

Most participants had some form of tertiary level education, through Certificate; Diploma; Bachelor's degree; to Post Graduate Diploma or Certificate. Around half of the participants also had post-secondary education in agriculture.

While it is difficult to compare due to the variety of farm types, the average farm size was 880 Hectares, while the median farm size was 750 Hectares. 14 participants answered the questions around nutrient and industry farm plans. Of these, 8 had nutrient management plans and 6 were members of their industries environmental programme.

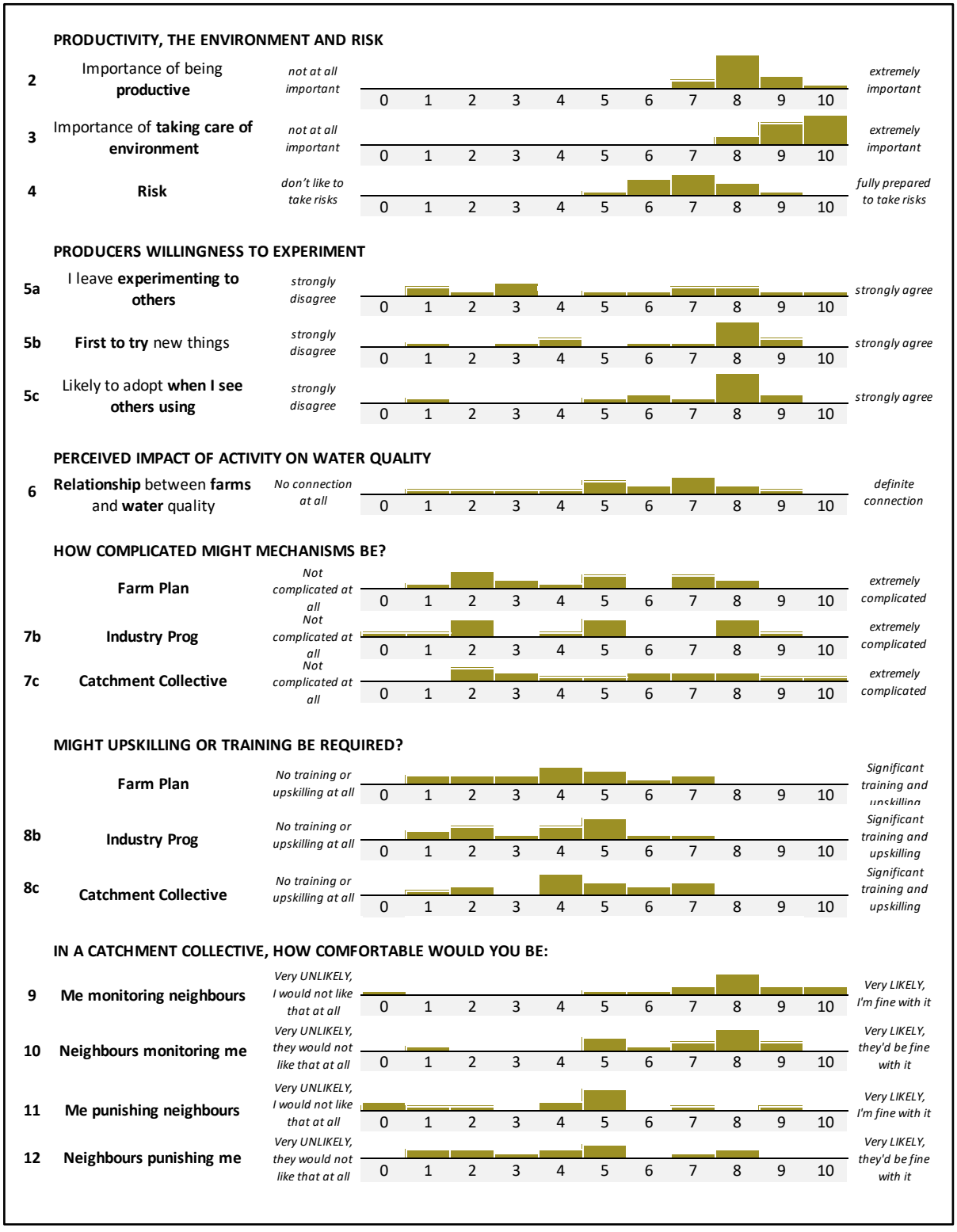
4.2 Survey data

While the survey was the lesser part of the data gathering, the data provides valuable quantitative insight to most of the four parts of the research framework outlined in section 2.5 (the producer as an individual, the producer and the resource, producer to producer, and the producer and wider society). An overview summary of the survey data is provided below, while a more detailed discussion is provided in Appendix 5. A summary of the survey results are provided in the graphs in Figure 8.

Firstly, the perspectives of producers as an individual are considered. Generally, the producers strongly identified as being environmentally focused, slightly more so than being production focused, and with a reasonable appetite for risk (questions 2-4). The strong self-identified tendency towards an environmental focus is likely to be the result of the small sample

size and it being drawn from those producers who have been proactively involved in the development of the plan.

Figure 8. Summary of survey questions - graphed.



While the appetite for experimentation was quite spread across respondents (question 5a), there was a general skew towards them being one of the first to try new things (question 5b);

and them being highly likely to adopt something if they saw other people doing it (question 5c).

In relation to the perceived complexity of the mechanisms (question 7a-c) proposed in the plan (individual farm plans, industry programmes or catchment collectives), opinion was quite divided. Each was varyingly seen as relatively simple, complex, or a mixture of both.

Similarly, in relation to the perceived need for additional training or upskilling for the proposed mechanisms (questions 8a-c), each was varyingly seen as either requiring little training through to requiring a moderate amount. For a more detailed discussion of these issues of complexity and training/upskilling, see Appendix 5.

Secondly, the relationship between the producer and the resource is considered. Only one survey question directly related to whether there was perceived a connection between the activity on a producers' farm (or farm like theirs) and water quality (question 6). Responses to this were highly varied, although there was a small grouping of respondents around the 5-8 mark on the scale (where 10 was 'definite connection').

Thirdly and finally are the questions relating to the relationships of producer to producer. These questions *only* related to the catchment collectives and sought to gauge how comfortable producers would be with two things: monitoring their neighbours in an informal way and/or them being monitored by their neighbours; and punishing their neighbours for inappropriate behaviour in the group and/or being punished by their neighbours.

While the importance of these concepts was identified in the Literature Review (section 2) which lead to their involvement in the survey, their inclusion generated some discomfort and much discussion with participants, often requiring some clarifying. For clarity, 'monitoring' should be thought of as a passive 'keeping an eye on each other over the fence' rather than an active auditing of each other's activities. Whereas 'punishment' should be thought of a 'holding each other accountable', however that might be determined and agreed by a group (e.g. a fine or some other mechanism).

There was a much greater acknowledgement that monitoring would be required, although there was a slight bias towards people being more comfortable with monitoring their neighbours then they perceived their neighbours would be monitoring them. There was a much lower level of comfort with the concept of people punishing their neighbours or their neighbours punishing them, with most respondents returning answers in the middle or lower end of the scale for this question. Again, see Appendix 5 for a detailed discussion of these results.

No survey questions responded directly to the producer and wider society component of the framework. Data for this was gathered in the semi-structured interviews.

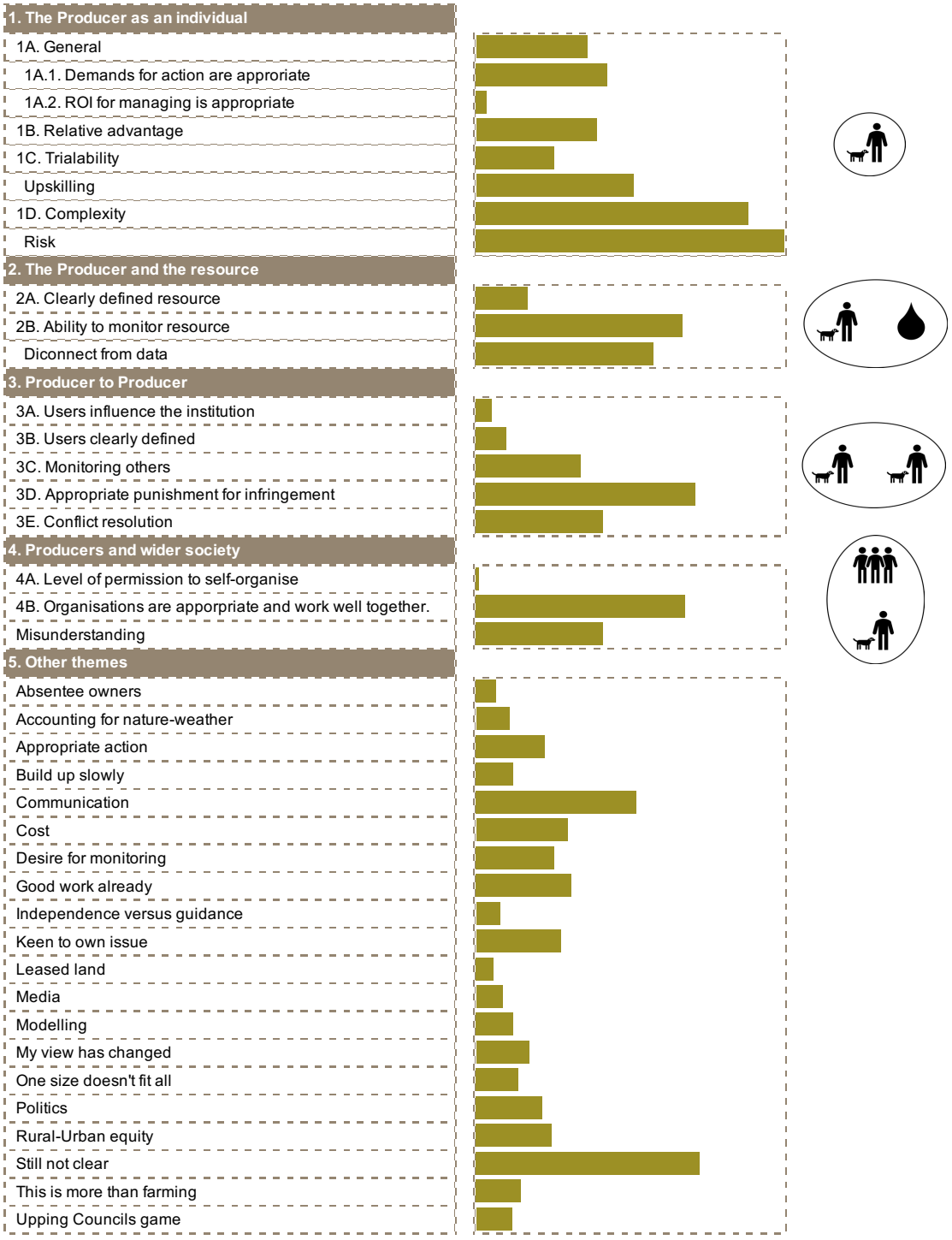
4.3 Coding of semi-structured interview data

The thematic structure used in the coding process is described in Appendix 1. This section provides an overview of the coding results.

Firstly, the level of coding that occurred in each part of that thematic structure, independent of any particular mechanism or attitude, is shown in Figure 9.

These data indicate that the largest volume of comments seem to have been coded from the first section of the interview (part 1 of Figure 9). While larger spikes of coded data occur in the other semi-structured areas of interview (parts 2-4 of Figure 9), it is also noted that there were a significant number of comments coded to various inductively developed themes (part 5 of Figure 9).

Figure 9. Overall level of coding attributed to thematic structure, independent of mechanism or attitude.

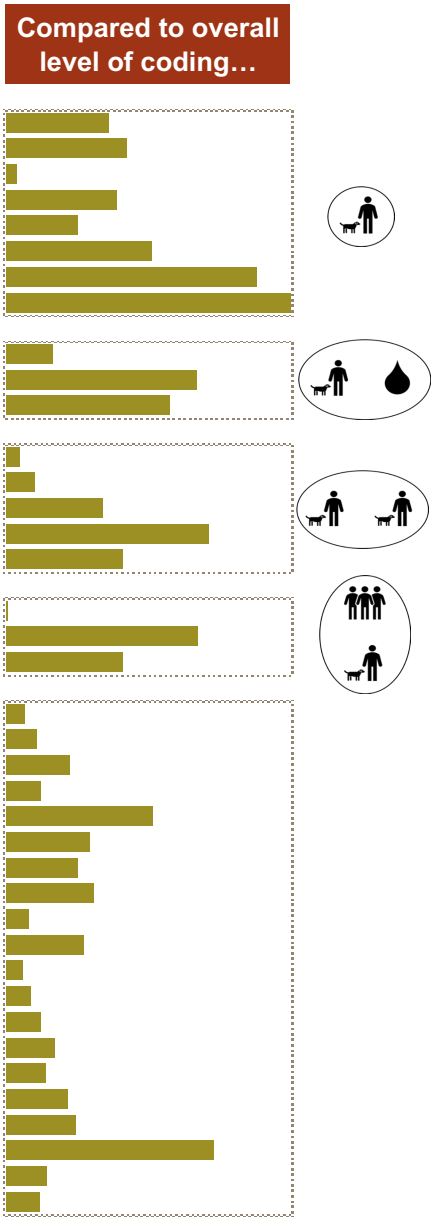


The green bars indiate the volume of total comments coded for each theme.
The images to the right match the images provided for each part of the interview structure against their relevant graphs, for visual consistency.

When the attitudinal coding of the overall number of comments is added (see Figure 10 below), a more comprehensive picture of the type of data from the interviews emerges.

Figure 10. Coding attributed to thematic structure by attitude (positive, neutral, negative) compared against overall level of coding.

Coded theme	☺	😐	☹
1. The Producer as an individual			
1A. General	23	23	5
1A.1. Demands for action are approriate	18	16	27
1A.2. ROI for managing is appropriate	2	3	0
1B. Relative advantage	36	8	14
1C. Trialability	20	6	12
Upskilling	30	21	22
1D. Complexity	35	41	50
Risk	41	45	55
2. The Producer and the resource			
2A. Clearly defined resource	7	7	11
2B. Ability to monitor resource	19	31	47
Diconnect from data	6	17	57
3. Producer to Producer			
3A. Users influence the institution	5	0	2
3B. Users clearly defined	4	7	4
3C. Monitoring others	16	12	19
3D. Appropriate punishment for infringement	26	26	52
3E. Conflict resolution	29	17	11
4. Producers and wider society			
4A. Level of permission to self-organise	1	0	0
4B. Organisations are apporpriate and work well together	29	23	46
Misunderstanding	4	16	38
5. Other themes			
Absentee owners	1	0	9
Accounting for nature-weather	2	3	10
Appropriate action	13	11	9
Build up slowly	5	11	1
Communication	33	20	20
Cost	11	11	23
Desire for monitoring	9	9	17
Good work already	29	4	11
Independence versus guidance	5	6	0
Keen to own issue	33	5	2
Leased land	1	1	6
Media	0	2	10
Modelling	2	6	9
My view has changed	18	7	1
One size doesn't fit all	3	4	14
Politics	1	4	27
Rural-Urban equity	2	4	28
Still not clear	13	51	40
This is more than farming	9	6	9
Upping Councils game	1	4	13



A range of clusters of comments are worth describing in summary.

The highest number of comments were coded to the risk and complexity themes in the interviews. While most of these were negative, a large number were positive or neutral, indicating that some things were not seen as being complex or risky.

The ability to monitor the resource and the level of connection (or disconnection) that people have with the data were areas that generated a large amount of coding. While there were some positive and neutral comments, these tended to be negatively skewed, particularly those relating to a 'disconnect' from the data, which was an inductively (bottom up) generated theme

that highlighted a level of disconnection from, or understanding of, the data that was understood to be available.

Many comments were also coded around monitoring others in a catchment collective; holding other members of a catchment collective to account; and conflict resolution within a catchment collective. For the first two of these the larger number of comments were negative, although importantly there were a comparatively moderate amount of positive comments, too. For the last of these, conflict resolution, the *majority* of comments were positive, indicating that people viewed this as something that was important, would be useful, or even necessary.

Another significant cluster of comments was coded to the 'still not clear' theme. By far the majority of these were neutral or negative, indicating that many things still required clarity. The relationships between groups, organisations or society also garnered many coded instances. Half of these were negative compared to a quarter each of positive and neutral, indicating that not all relationships were viewed as working well.

Two other areas of significant coding were the upskilling or training that may be required and communication. Both of these had higher levels of positive comments, indicating that they tended to be viewed as advantageous or low risk areas.

A much more detailed discussion of the coding is provided in Appendix 6, which covers:

- An overview of results by representative affiliation,
- An overview of results by mechanism and attitude,
- Detailed results by mechanism and interview structure (deductive coding), and
- Detailed results by other identified themes, by mechanism (inductive coding).

A reading of this detailed discussion will provide the reader with a deeper understanding of the discussion in the following sections, where barriers are identified and recommendations made to address these. If the reader has time to read these appendices they are recommended, but not necessary.

5 How the results are discussed and the structure for recommendations

The previous section summarised the results from the surveys and interviews of participants. This section will outline how those results will be discussed in subsequent sections.

The remainder of this report is divided into four main sections: Positives that have been identified in the research; Barriers and risks that apply to all mechanisms; A specific risk identified with the Industry Programme mechanism; and Additional barriers and risks to the Catchment Collectives.

The Catchment Collectives are given their own specific section for several reasons. Firstly, they are the more novel mechanism proposed, so there is less research available to guide what barriers might exist to these. Secondly, they are the only collective mechanism at a property level, so there are several barriers that relate specifically to this.

Supporting imagery is used within the subsequent sections to support the explanation of some of the barriers and recommendations. The images used to refer to each of the three mechanisms are shown in Figure 11. Here, the name of the mechanism is underneath, the image on the left is intended to represent the type of mechanism it is, and the 'check-list' on the right of the image is intended to demonstrate that each mechanism results in a list of things to do on farm.

Figure 11. Images for the three mechanisms.

It is also worth noting that while this research was commissioned to identify potential *barriers* to the adoption of the mechanisms in the plan change, the discussion will talk about both *barriers and risks*. A *barrier* is defined as something that will inhibit the *uptake or adoption* of something. A *risk* is defined as something that may inhibit the *success* of a particular mechanisms or course of action once it has been adopted, or which may inhibit the *future continued adoption or roll out* of a particular mechanism.

Whilst this is a subtle distinction, it is an important one to make as both were identified in the wealth of insight from this research and the impact that risks may have on the *future* success of adoption of a mechanism warrants their inclusion in the following sections.

Firstly though, the next section (section 6) articulates a number of positives or strengths that were identified during this research. Section 7 outlines some barriers and risks identified as being applicable to *all mechanisms* and is divided into three areas: The need for mechanisms to be objective-focused and simple; Ensuring appropriate expectations (everyone is on the same page to begin); and ensuring access to the right support. Section 8 discusses a specific risk to the Industry Programme mechanism. Finally, Section 9 discusses additional barriers and risks specifically identified as applicable to the Catchment Collective mechanism. Section 9 considers barriers and risks specific to the Catchment Collectives in five sections. The same three discussed in section 7 - The need for mechanisms to be objective-focused and simple; Ensuring appropriate expectations (everyone is on the same page to begin); and Ensuring access to the right support – as well as two additional groupings: Interpersonal risks; and Transparency of accountability.

At the end of each section or sub-section, the recommendations made are summarised as numbered dot points in a coloured box, with a priority rating beside it. The priorities are Low (green); Medium (yellow); High (orange); and Critical (red).

Many of the recommendations made in the following sections, through information gathered from the participants, build on discussions that appear to have been ongoing within the TANK process for some time. In that regard, they may not be perceived as a 'new' insight or recommendation, *per se*. Council are likely to already aware of them, although some may be new. Where they are already familiar with them, they should be regarded as being further reinforced and supported by the research that has been undertaken here. This may lend weight to the need to support them and provide additional impetus for them to be further developed and implemented.

6 Strengths identified in the research

Because this research seeks to identify barriers it can be viewed as negative research, focusing on the challenges without acknowledging the positives. Therefore, before exploring the barriers and risks that have been identified, the *positive* things that were identified in the research are recognised first. Most of these are indirectly related to the barriers and risks that have been identified. They provide a base upon which further positive change in relation to environmental management in the TANK catchment may be built.

- Firstly, there was a strong desire amongst those that were interviewed to take ownership of the problem and the solution. Rather than being told what to do, there was a genuine desire to be a proactive part of the solution.
- Secondly, there was also a large amount of good work that had already been done with regards to improving environmental performance. Many participants talked about the level of planting that had been going on across the district, the good practices that were already in place, or the amount of land that had been proactively retired.
- Thirdly, farming has a proven and celebrated history of innovation and problem solving, partly which underpins the first and second points.

All of these three positive points indicate that there is the desire, the ability and a proven track record to support the further environmental management improvements that the plan change seeks.

There are several other positives that are also worth noting.

- Fourthly, the research identified many examples where respondents' views had evolved or changed over their time of their involvement in the TANK process. This indicates that participants were willing and able to develop new ways of thinking and working, which are skills that are likely to be required as the plan change is implemented.
- Fifthly, many participants noted that all types of farm planning were good for a producers' business, as they made them more aware of their constraints and opportunities, and better helped them learn about and subsequently adapt business, not only in the environmental sense.
- And finally, there is perceived potential for both Individual Farm Plans and Catchment Collectives to tailor environmental management specifically as it is required, rather than drive generic actions. This was seen as potentially very efficient, effective and also potentially engaging.

7 Barriers and risks to all mechanisms

The previous section outlined some of the positives about the mechanisms proposed in the plan change, or the situation or people in the TANK catchments. This section will discuss a range of potential barriers to adoption and risks to success that were identified as applying to ALL mechanisms proposed in the plan change. That is, Individual Farm Plans; Industry Programmes; and Catchment Collectives.

7.1 The need for mechanisms to be objective-focused and simple

The single most significant barrier to adoption and risk to success is that the mechanisms proposed in the plan change are **not appropriately focused or not simple**. The core concepts of this are explored here further: Does the mechanism actually address the problem? (i.e. the danger of it not being appropriately focused); reduce their perceived complexity (i.e. keep it simple); and being clear about the longer-term requirements of the mechanisms (i.e. don't 'move the goalposts').

7.1.1 Does the mechanism actually address the problem?

Most of the interviews reflected themes of conversations that had already occurred throughout the TANK process. Many participants stressed that discussion had consistently come back to the question "What are we trying to achieve?", to which the answer was "improve water quality". There was a consistent perception that there was a danger the plan change may become more focused on ensuring everyone was undertaking action of some kind, rather than *appropriate action* in *appropriate areas* that actually addressed the water quality issues. There was widespread concern that a "one-size-fits-all" approach would not be appropriate and that blanket requirements across the catchments would not be useful, eroding trust and goodwill in the Council in the longer term. Many respondents referred to the recent experience in the Tukituki plan change as evidence of this risk. Many of these comments tended to be coded in the 'risk' or 'appropriate action' codes.

Multiple respondents talked about the need for a pragmatic risk-assessment based approach to determining appropriate action on the ground, informed by the relative issue(s) being experienced in the different catchments. This would likely be based on an observational assessment of the land, its condition and use, as well as a consideration of the farm practices currently being utilised. While Industry Programmes will have their own approach to risk assessment, there is an opportunity to align any risk-assessment based approach developed for both the individual Farm Plan and the Catchment Collectives (see Figure 12). Any risk-

assessment developed should be consistent across both, so that this is eliminated as a potential area for confusion and does not become an influencing factor in choosing between these two mechanisms (and therefore potentially a barrier to one of them).

Figure 12. Recommendation to keep risk assessments consistent across both Individual Farm Plans and Catchment Collectives.

Keep structure of risk-based assessment consistent across Individual Farm Plans and Catchment Collectives.

	Recommendation	Priority
1.	A clear risk-assessment should be developed to identify *appropriate* action in response to relevant freshwater quality objectives at a catchment level.	High
2.	Ensure the risk-assessment is applied consistently across both Individual Farm and Catchment Collective plans. This removes confusion around how action is decided.	High

7.1.2 Reduce the perceived complexity of each mechanism (i.e. keep it simple)

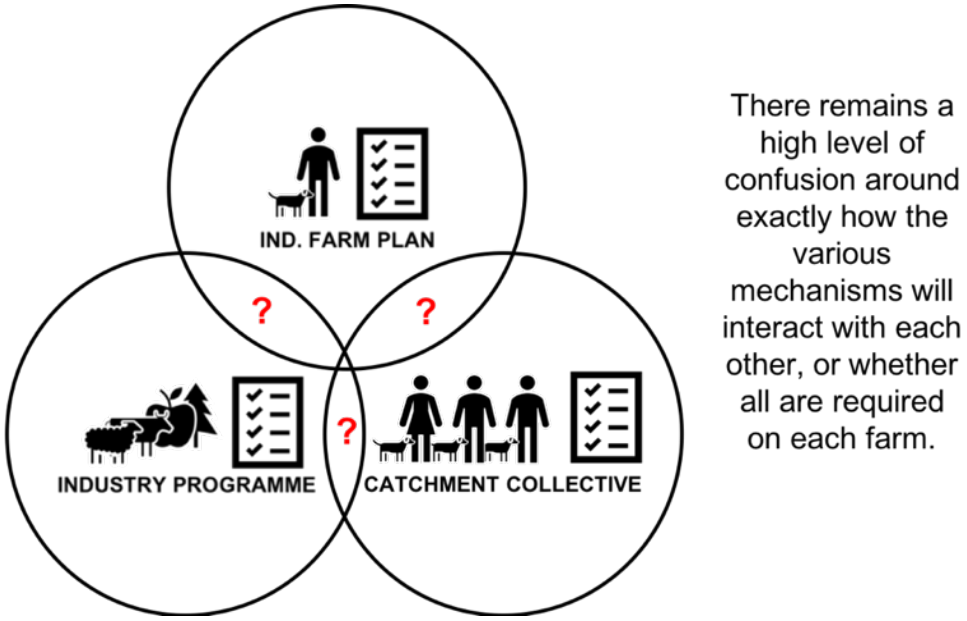
Hand-in-hand with comments from participants about ensuring any action was *appropriate*, were comments calling for any action to be *simple* and easy to understand. Complexity was seen as a key barrier and risk, which is consistent with the findings of both Pannell at al. (2006) and the matrices developed by Kaine and Wright (2017). There was a clear concern amongst interviewees that the mechanisms being developed could become cumbersome, burdensome, and an effective 'tick-box' exercise. Ensuring the mechanisms developed were concise, accessible and understandable were seen as key enablers of their use.

Therefore, hand-in-hand with the recommendations to develop a risk-assessment approach to determining action, recommendations to keep that risk-assessment and all elements of any of the mechanisms as simple as possible are outlined below. Again, as the Industry Programmes are developed by Industry, the below recommendations are targeted at those mechanisms that Council will develop (Individual Farm Plans and Catchment Collectives).

Firstly, (recommendation #3) a clear process is outlined for what each of these mechanisms entails and how they are developed. This will provide a clear outline of the effort required to develop a plan under either and will enable to clear comparison of the relative advantages/disadvantages of both to the producer.

Secondly, (recommendation #4) there remains a high level of confusion around how each of the mechanisms overlap (or not) and how they will (or will not) operate and work together (see Figure 13). While this is not surprising given the early stage of development for some of these mechanisms, it does highlight that confusion is a key risk and may be a powerful barrier to adoption of the most appropriate mechanism.

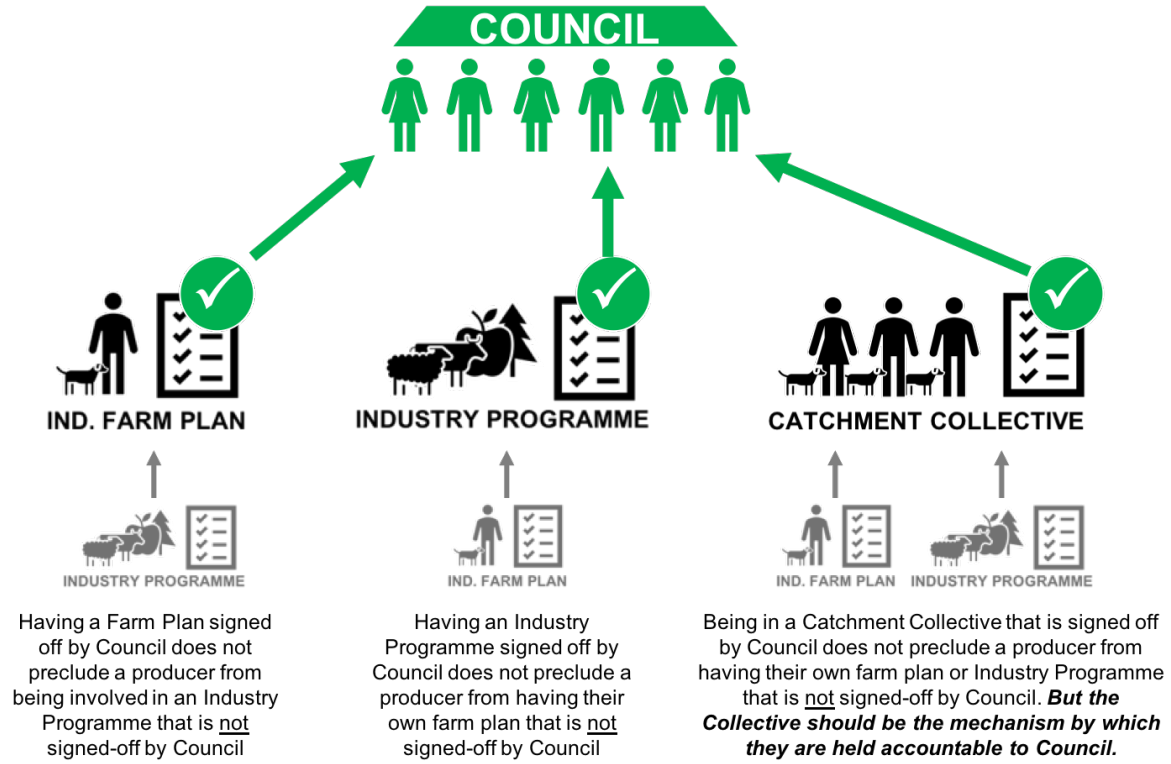
Figure 13. Lack of clarity around how the mechanisms work together



Interviews from participants (largely coded to the 'still not clear', 'complexity', or 'risk' themes) indicated that there were inconsistent views on this and varying degrees of understanding. The core element of this confusion seemed to be that only one mechanism would require the sign-off of Council and the means by which they (individually or jointly) would be held accountable to Council. It would appear that the extent to which one producer may in fact be utilising a range of mechanisms is more widespread than expected, yet it is the lack of clarity around which ones would be used to hold someone accountable to Council that may be problematic. For example, many people talked about already doing some of the various components of a farm plan, such a nutrient budget, which they would still do even if they were part of a Catchment Collective. Others spoke of how they expected that members of a Catchment Collective would *each need to have* an individual farm plan as a way of both developing the individual commitments that they would make to a Catchment Collective (e.g. nutrient allocations), or to deliver on the promises each made individually to a Catchment

Collective. Similarly, Industry Programmes were seen as something that many people may have alongside an Individual Farm Plan or a Catchment Collective, either because they may already be in one, or because that may be required as a pre-requisite for access to a certain product market. A visual demonstration of this is provided in

Figure 14. A visual representation of how the mechanisms that producers could still be involved with, depending on the mechanisms they use to sign-off with Council.



It is unlikely that all the mechanisms will ever be mutually exclusive at a property level, and nor should they be. Yet to reduce the barrier of confusion around how they all fit together it should be made clear that while producers may actually be involved with many of these mechanisms, only one will require sign off from Council. Further, only the Catchment Collective should take precedence in a hierarchy. In other words, if not involved in a Catchment Collective the producer may decide the mechanism to sign off with council (e.g. Farm Plan or Industry Programme). If a producer *is* involved in a Catchment Collective, then that becomes the mechanism by which they become accountable to Council.

Recommendation	Priority
3. Outline a clear framework for how to develop both an Individual Farm Plan and Catchment Collectives. These should be accessible and consistent where there are common elements, so that an easy comparison between the relative advantage/disadvantage of both can be made.	High
4. Be clear that producers can be involved in multiple mechanisms but only one needs to be signed off by Council. If involved in a Catchment Collective, that takes precedence as the mechanism that is required to be signed off by council.	High

7.1.3 Be clear about what the likely longer-term requirements of the mechanisms may be (i.e. don't 'move the goalposts')

This sub-section discusses a potential consequential barrier that may result from keeping action focused and simple. While keeping things focused and simple is a proactive way of only dealing with the most pressing issues first and not overwhelming a producer(s) with too many actions at once, returning to secondary and tertiary priority actions in the future may be viewed as 'moving the goalposts' if those priorities are not clearly recalled. Given the length of time (i.e. multiple years) that is likely to be involved with dealing with a priority area (e.g. sediment) before changing focus to a secondary issue (e.g. nutrients).

The extent to which this may be an issue will depend on the issues within each catchment. Yet being clear about immediate as well as longer term priorities in any of the mechanisms (particularly the Individual Farm Plans and the Catchment Collectives because they are driven by Council) will go a long way to maintaining trust between parties in the longer term (recommendations #5).

Recommendation	Priority
5. Be clear about longer term objectives and how a different contaminant may be the focus of attention in the future, once a higher priority objective has been dealt with. This will reduce the chance that a change of focus in the future will be viewed as 'moving the goalposts'.	Medium

7.2 Ensuring appropriate expectations (everyone is on the same page to begin)

The previous section outlined a range of barriers related to ensuring that the focus of any action is appropriate, and that the mechanisms are kept as simple as possible. This section will consider a range of barriers and risks that relate to the various levels of access of

understanding that different parties have of monitoring, data, and the activities or each other, how this may cause an issue, and recommendations for dealing with this.

7.2.1 Distance from monitoring (awareness of and access to council data)

One of the two inductive codes added to the deductive codes determined by the interview structure was called 'Disconnect from data'. This was added because it became apparent when the interview discussed water quality monitoring that many participants felt that there was a significant gap of data when there may well have been data available and they were simply unaware of it. The author understands that unless respondents were directly involved with the TANK group and many of the presentations made there, they were unlikely to be aware of what data there was.

It is beyond the scope of this research to assess the level of data that is held and whether that is appropriate for the requirements of producers in the TANK catchment, yet it has identified that there is a potential disconnect between the producers and the data that *does* exist, regardless of whether it is sufficient or not. This is seen as a barrier to the potential evolution and alignment of producers' personal views on the nature of the problem and therefore their support for any action that may be required, and the mechanisms that will be used to deliver it. If considered through the framework of Kerr & Dorner (2013), this is an opportunity to increase the level of *concern* that producers have about the problem which, in conjunction with a *capability* to undertake action, can lead to more successful *contracting* via one of the mechanisms in the plan.

While the interviews with Council staff indicated that effort was certainly being put into this area, it was acknowledged this could be more effective or perhaps made a higher priority. The following are suggested as areas to explore to potentially reduce this barrier and increase concern and understanding.

	Recommendation	Priority
6.	Explore additional, user friendly ways, of sharing Councils existing longitudinal monitoring data with the public. Consider an increased use of science communication expertise in Council operations.	Medium
7.	Actively work with farmers to identify ways that are more accessible for them to access and understand longitudinal monitoring data.	Medium
8.	Explore the viability of 'catchment champions' for data communication from within the catchments (i.e. in addition to Council staff). This is to help understand and communicate it, not defend it. For example, as part of environmental programmes with local schools.	Medium

7.2.2 Potential lack of understanding of what can be monitored and the role of modelling

While the previous section explored the *disconnect* between producers and data that already exists (***what*** monitoring there is), this section explores a perceived lack of understanding of *what is able to be monitored* and the *role of modelling* (***how*** things are monitored).

The interviews highlighted that producers were generally very tangible people with a higher level of trust and motivation for action when they could clearly draw a connection between the cause and effect of an issue. In other words, they tended to believe something was contributing to an issue when they saw it themselves. Because there was a disconnect from the data, many respondents did not perceive a strong connection between activity on their land and issues with water quality or whether action itself was widely justified (see Appendix 6). Therefore, there tended to be a strong desire for more monitoring, which is discussed further in section 7.2.3. This was coupled with a strong desire to take ownership of the issue and proactively be involved in monitoring at a community level with some participants asking to be shown how to take monitoring samples so that they could do so.

Yet whether this desire was driven by enthusiasm or the need to develop a property level data set for future self-preservation purposes, there were high expectations around what *could* be monitored. There were quite different expectations around what could be meaningfully monitored at a community level; and the level of scientific rigour that was required for Council to use any data as evidence of the success of the plan change (or any State of the Environment (SOE) reporting). In other words, while many people may be motivated to gather samples at a property level, these are unlikely to meet the scientific standards required by Council to prove their plan efficacious or use as evidence in any legal process.

If unaddressed this perception gap will remain or may even grow, reducing the ability to develop *concern* for action (Kerr & Dorner, 2013) or worse, increasing pessimism in the mechanisms. It is recommended that Council seek to build understanding of the scientific standards required for monitoring; actively discuss the role of citizen science and community generated data; and clearly outline what data will be collected and how it will be used, as relevant for each mechanism.

Recommendation	Priority
9. Build an understanding with producers of the scientific standards of monitoring processes, particularly the need for longevity and frequency of sampling for statistical relevance. Also build an understanding of how data is used in legal processes. Be open to innovation in this area, if any is identified through working with the community.	High
10. Council to prioritise discussing the role that 'citizen science' or 'crowdsourced data' may play in monitoring, both internally within council and externally with producers/communities. Expectations around this are unlikely to align and highly likely to pose a large risk to establishing and maintaining strong relationships moving forward.	High
11. Whatever monitoring protocols are agreed when mechanisms are agreed, these should be clearly outlined in agreements so that all parties are aware of them from the beginning.	High

7.2.3 Possibly unrealistic expectations of the quantity of future monitoring

That monitoring warrants three sub-sections indicates its importance. The previous two sub-sections relating to monitoring and data discussed the disconnect between ***what*** data already exists; and the potential lack of understanding around ***how*** water quality was monitored and the scientific rigour required. These may potentially increase the risk of unrealistic expectations around the capability of monitoring, which may become a barrier to adoption. This section specifically considers the potential unrealistic expectations around the *quantity* of future monitoring and the risk this may post to the mechanisms. In other words, ***how much more*** monitoring will be undertaken.

It is well known that producers are 'hands-on' operators and respond better when the results of action are observable (Pannell, 2006), and the findings of this research are consistent with that. It was found that there were high levels of expectation that the *amount* of monitoring (whether done by Council or otherwise) would significantly increase. Many of these comments were captured in the 'demand for monitoring' code and highlights a potential barrier to successfully adopting the mechanisms in the plan change.

The producer interviews consistently highlighted high expectations of monitoring. Yet the (admittedly lesser number of) interviews with Council staff indicated that those expectations are highly likely to be mal-aligned with the actual capacity of Council to be able to deliver such levels of monitoring (both in terms of staff and financial cost). This may present a barrier to adoption in that it may increase reluctance to be involved in any mechanisms, if there is not a high level of confidence that the results of any action will be able to be measured.

It is therefore recommended that Council develop a clear understanding of the establishment and ongoing costs (including staff costs) of monitoring stations and regimes (recommendation

#12). It is acknowledged that this may already be well known. This information will form supporting information that can be used to have a constructive and informed discussion with producers and the community around what future level of monitoring is able to be committed to, and the role that modelling will continue to play.

Recommendation	Priority
12. Council to calculate the average establishment AND ongoing operational costs of various types of monitoring stations and regimes. This should combine both direct capital costs and indirect costs of staff time. This can then be used in correlation with expectation setting discussions with the community around the ongoing level of monitoring that will occur.	Critical
13. Supported partly by the results of recommendations #10 & #12, Council to proactively work with the community to build an understanding of what is technologically and cost-effectively possible to monitor, as well as a clear understanding of how modelling will continue to play a role in the future. It should be noted that this will be linked to the formation of the Catchment Collectives, as monitoring will play an important role in determining their area.	Critical

7.2.4 The expectation that Council needs to 'up its game' (traditional non-enforcement)

Having considered monitoring issues in the previous sections, this section looks at the identified need for Council to improve its own track record of enforcement.

Many producers highlighted the fact that the proposed plan change would create a huge demand for action on producers, as one person put it "Council are asking a lot of us". When discussing this point there was a notable sense of frustration amongst many producers that Council was asking them to increase the amount that they did, when it was considered that Council itself was not currently doing all that it could do. Examples were given of Council being resistant to enforcement action; or that some farmers' bad practice or activity had been reported and Council had done nothing about it.

Such comments indicated that this had eroded the level of confidence that producers had of Council. The implication was that unless there was an equitable increase in effort from Council, when they were asking so much of producers in the plan, future confidence in Council would continue to decline and pessimism regarding the plan change would continue to rise. This would create a loner term barrier to the adoption of the mechanisms in the plan.

One of the potentially contributing factors to this that was identified in interviews with Council staff, was the counter-intuitive nature of Council policies for enforcement staff. It is understood that there is a requirement for enforcement staff to recover the costs of virtually all their time against come kind of chargeable code, as very little of their overhead costs are covered from

the general rates collected by Council. In effect, the attention of enforcement officers is likely to only go where there is either: an existing consent whose fee covers the cost of regular monitoring and site visits (i.e. time can be recovered directly from that consent fee); or an infringement is likely to be bad enough that it will result in a successful prosecution, which will result in cost recovery through some kind of penalty.

While such a policy may have good intentions, it is potentially driving counter-intuitive behaviour in that this means that enforcement officers only tend to visit consented activity, they are likely to be reactive and are less likely to be proactive. As there is no ability to recover costs from permitted activities, there is no incentive for enforcement officers to visit or monitor permitted activities. Below is a quote from a Council interviewee that describes this tension:

> *"compliance... need to be able to charge back most of their time to a consent. So, there's not much running around finding people, working out whether people are doing the right or wrong thing, just because they don't have anyone to charge for that. You need to find a thing. You can't guarantee that you're going to find something, so… and then you don't have anything to charge to [if you don't find anything]…"*

This does appear to be impacting producers' perception of Council as an effective organisation, with an implication that Council need to take some responsibility for an improvement in their own performance. Two other producers described it as below, when talking about some bad practice observed on another farm:

> *"And the regional council have done NOTHING to stop it...*
> *They've almost, like they turned a blind eye to it. So, they are going to start policing that thing now? Or is it not the problem that I perceive it to be? I just… I think it's [the plan change] going to put the regional council in a whole different light, really."*

> *"But the point I'm making is the regional council are going to have to be the policemen and they're going to have to show some balls which they haven't shown before. And the silly part about it is that if they'd done something 10 years ago, and there's an example of it, that person that I'm talking about up there, would be "Okay, remember so-and-so? He got done by the regional council for doing less than what you've done. If you want to go down that road fine" and "oh... okay". An example should have been made somewhere along the line and when this comes in if they make an example of someone everybody will know about it and I reckon that'll be the best form of compliance of the whole lot. [laughs] Everybody knows that the Regional Council is weak."*

This report does not suggest that Council is unaware of this perception, yet it does seek to highlight it as an area that requires attention. While this plan change is developed within one part of Council and compliance/enforcement sits in another part, there is no difference to how Council is viewed by producers. Therefore, for some in the community, this means that Council is perceived as ineffectual or weak.

This section is intended to highlight the need to ensure that the plan change is considered from a wider organisational perspective. Therefore, it is recommended that Council highlight and discuss internally the potential counter intuitive impacts of the need for compliance/enforcement staff to recover the costs of their time from consents (recommendation #14). Further, Council need to be prepared to be publicly seen to take more corrective and enforcement action (recommendation #15).

	Recommendation	Priority
14.	Council should highlight and discuss internally the unintended consequences of requiring compliance and enforcement staff to recover the cost of their activities. This is contributing to the perception within the wider community that Council are ineffectual or weak.	Critical
15.	To ensure that Council are seen to be equitably improving their own performance, whilst asking producers to improve theirs, Council should be prepared to take more public corrective and enforcement action against bad practice. It will be important to do this consistently across the region.	Critical

7.2.5 Continued misunderstanding between the different rural industries and the urban areas

A lack of understanding of what producers did – both by other types of producers as well as urban communities – was a consistent theme. Most producers did not believe that activity from their own land was having a major effect, while at the same time most held strong views around which other production activities they perceived were having a major effect. At the same time, an increased disconnection between urban people from farms was noted and lamented, in part because the number of people with relatives on – and therefore access to – farms had declined.

For all of these examples it was perceived that this lack of connection has reduced familiarity, resulting in more misunderstanding around what actually happens on farms/orchards/forests. This is important as it has reduced levels of trust both between industries and rural/urban areas. In turn, this may increase resistance to the adoption of the plan mechanisms, as there is a strong feeling that some industries are being “picked on”.

This is a very systemic and big-picture issue, and in part would be aided by improved science communication already discussed in recommendations #6, #7 and #8. Some additional novel recommendations are suggested here that may help decrease this risk. Firstly, inter-industry 'open gate days' (recommendation #16), where industries can become more familiar with each other and their practices, with a view to building familiarity and trust in the longer term. These are marked as 'High' importance as they should be prioritised in catchments where there are likely to be both Catchment Collectives AND heterogeneity of producers. Secondly, over the much longer-term, there may be an opportunity to continue to build understanding between urban and rural communities by exploring peer-to-peer partnerships between rural and urban schools, and by linking school learning activities to coordinated farm visits (recommendation #17).

It is acknowledged that schools may have existing programmes like this, and it has not been within the scope of this report to investigate the level to which such programmes already exist.

Recommendation	Priority
16. Consider inter-industry 'open-gate days' or 'familiarisations' as a way of building familiarity and understanding of different practices between rural industries.	High
17. To improve longer-term understanding between rural and urban communities, Council might consider supporting an educational programme that connects urban schools with rural schools or industries. For example: farm visits associated with urban and rural school studies (primary and secondary school); or peer to peer school partner programmes between rural and urban schools.	Medium

7.2.6 Equity of action across both rural and urban areas

Two of the lesser prevalent inductive codes were called 'rural-urban equity' and 'politics', both of which were dominated by negative comments. While these codes did not feature highly in the overall analysis of the results discussed earlier, they are worth revisiting here.

The comments coded to rural-urban equity tended to highlight the consistent feeling that farmers were being 'singled out' or were being asked to carry a disproportionately high burden of corrective action and mitigation, in relation to water quality. This is important as like many of the challenges highlighted in the previous sub-sections, this perception may lead to an erosion of social capital supporting the plan change and increase barriers or resistance to the adoption of the mechanisms. As noted by one Council respondent:

> *"So, I do think the farmers get a lot of the blame and it's not that… those issues shouldn't be raised with them, but there is certainly a lot of issues that the urbanites haven't confronted yet."*

This links with the comments coded to 'politics' as many producers felt that the high level of misunderstanding of producer operations, particularly between rural and urban communities (see section 7.2.5), was resulting in the politicisation of the water quality issues. This only reinforced the feeling of being 'singled out' and would continue to erode any wider appreciation or support for action that is generated and is so important (Kerr and Dorner, 2013).

Determining what impact rural areas are having on water quality compared to urban area, and what action may be required by urban areas to improve water quality, is obviously well beyond the scope of this report. However, it is recommended that Council ensures that whatever action is required is perceived to be equitable across all parties, proportionate to the perceived contribution that they make (recommendation #18).

Recommendation	Priority
18. Council should ensure any action required across both rural and urban areas is perceived as being equitable and proportionate to that parties perceived contribution to the problem. This will ensure social capital in the plan is maintained and no particular party feels 'picked on'.	High

7.2.7 The good work that has already been done is not recognised or appreciated

Having dealt with a number of perception issues in the previous sub-sections, this sub-section looks at the perception that good work that has already been done, is not recognised. Acknowledging the self-selection bias of the sample group that was discussed in the detailed methodology (Appendix 1), many producers talked about the proactive and progressive action that they had been taking on water quality issues (either intentionally or consequentially due to other activities) over a number of years.

During the interviews, several talked about the frustration of being expected to do work when they had already been doing a lot of work that was not recognised or appreciated. In effect, some of the more proactive farmers were frustrated that with the plan change the benchmark from which all future improvements would be measured was very high. This was perceived as limiting the potential future marginal improvements in water quality that they could make, thus biasing support and the perception of progress towards less proactive farmers. For example, some spoke of the concept of providing financial support to less proactive farmers to plant or fence parts of their property. Such a move was not seen as fair as it rewarded those who had not done work (with subsidies) and ignored the costs that were already sunk by more proactive farmers at their own expense. Further, if detailed measurement only began with plan implementation, then those that had done no work previously would demonstrate a greater marginal improvement.

Like the challenges noted in the previous sections, this has the potential to erode the level of social capital supporting the plan change. Further, it may bias the adoption of some mechanisms over others. For example, while some proactive farmers were keen to be involved in the Catchment Collectives, they also acknowledged that it would be easier for them to simply develop an Individual Farm Plan or an Industry Programme, because they would likely already be enacting most of the appropriate practices.

It is therefore recommended that Council explore ways of recognising or rewarding the good work that has already been done by proactive farmers. This would help to maintain support for all mechanisms equally, enabling proactive farmers to be recognised leaders in collective groups, and not biasing them towards the individual mechanisms (farm plans and industry programmes).

Recommendation	Priority
19. Council to consider some kind of reward and/or recognition for the good work that has already been undertaken by proactive farmers. For example, an awards programme; rates relief; or reduced future consenting/monitoring costs.	High

7.3 Ensuring access to the right support

Pannell (2016) identified a range of potential barriers to the adoption of mitigation practices. The main elements of those that have been incorporated into the framework for this research are complexity, the potential level of upskilling and training required, and the ability of a mechanism to be trialed before being adopted more widely. As discussed in section 4, Appendix 5 and Appendix 6, this research found mixed views as to whether all of the mechanisms were viewed as complex; whether a large amount of upskilling or training was required; and how trialable they were perceived to be.

Council should ensure that appropriate support is provided to producers, so these potential barriers are minimised for all mechanisms. Many interviewees noted that ‘support’ had been pledged from Council in the proposed plan change, yet it was still unclear exactly what that would be. It is likely that Council and producer expectations around this will differ and indeed reasonably divergent levels of expectation were described by different interviewees. Council should prioritise discussion around what type and level of support that it considers appropriate and then decide how to resource that. This will set expectations earlier and avoid the potential risk of mal-aligned expectations once mechanisms are adopted.

Setting the expectations around the provision of expertise that is expected from Council (e.g. erosion control, riparian planting, guidance on plan writing, etc) is a two-step process. Firstly,

Council should consider what level of that type of support would be appropriate across all properties. Importantly, this should be independent of the current level of staff (recommendation #20), as at the time of writing this was currently being reviewed and restructured. Secondly, once a reasonable level of support is determined then Council should assess whether this can all be provided with existing in-house resource; whether there is a case for expanding the number of Integrated Catchment Management staff; or whether the existing Council staff could be supplemented with contracted external resource (recommendation #21).

In addition to Council expertise, support from other experts may help reduce these barriers, particularly around complexity and upskilling/training. Council should consider whether there is a case for providing limited financial support for producers to procure relevant expertise that is NOT in line with Council areas of expertise (e.g. farming advice), so long as that is acting equitably across the region (recommendation #22).

One additional and quite specific area of potential complexity that was identified in the interviews related to leased land. There was confusion amongst interviewees around whether the ultimate responsibility for meeting the plans objectives rested with the landowner or the lessee, or both (many of the interviewees operated leased land themselves, in addition to that which they owned). Regardless, it was considered important to ensure that lease documents enabled appropriate action agreed in any of the mechanisms to be passed on to the lessee.

To minimise this area of complexity and risk, it is recommended that Council consider providing landowners a set allowance of time for legal advice to ensure lease agreements are appropriate and reflect actions agreed to in any of the mechanisms (recommendation #23). This might be provided by Council legal staff or an approved external provider paid for by Council.

Once Council has determined an appropriate level of internal and possibly external support that it is comfortable providing, the appropriate expectations can be set with the community.

These recommendations should be considered in conjunction with some additional specific recommendations of a similar nature for the Catchment Collectives (see section 9.3).

Recommendation	Priority
20. Council to undertake an assessment of what level of Council expert advice would be considered an appropriate expectation across all properties. This calculation should be made independently of the constraints of current resource, as it is intended to scope up the level of resource that may be required, regardless of whether it is currently available.	Critical
21. In-house expertise: Once #20 has been assessed, Council to assess whether this can be achieved with existing internal resource; whether that team needs to be expanded; or whether Council provision of this can be supplemented by contracted external resource.	Critical
22. External expertise – general: Council should consider whether there is a case for providing limited financial support for producers to procure relevant expertise that is NOT in line with Council areas of expertise (e.g. farming advice), so long as that is acting equitably across the region. This could also be provided through an allowance of time available to each property (e.g. X hours) from an agreed list of experts that is paid for by Council.	Critical
23. External expertise – leases: Council to consider providing landowners a set allowance of time for legal advice to help write appropriate lease agreements. This could be either from council legal staff or from approved providers paid for by council. This will ensure that, where required, lease agreements are appropriate and transfer any responsibility for relevant mitigations agreed in the chosen mechanism to the lessee.	High

8 A risk specific to the Industry Programme mechanism

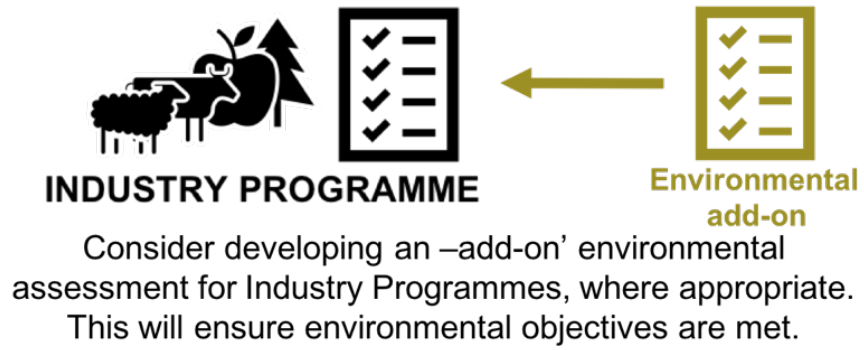
The previous section looked at barriers and risks that applied to all three of the mechanisms proposed in the plan change. This section looks at one barrier specifically relating to Industry Programmes, which relates to the need for mechanisms to be simple and focused.

8.1 The need for mechanisms to be objective-focused and simple

A consistent risk highlighted by interviewees was that Industry Programmes tended to be product, rather than environmentally, focused. While they may include things that may result in environmental benefits, it was generally not perceived as their main focus.

This is not a barrier to adoption in itself. Yet, if many producers choose an Industry Programme as their mechanism to be held accountable to Council, there is a perception that the desired environmental outcomes may not be achieved. This would erode confidence in the plan and be a barrier to the adoption of other mechanisms in the longer-term. It is therefore recommended that Council investigate the development of an 'add-on' environmental assessment to go with Industry Programmes (recommendation #24), where the environmental component is not considered to be covered well enough within the Programme itself. This is demonstrated visually in Figure 15.

Figure 15. Recommendation to develop an 'add-on' environmental assessment for Industry Programmes, where appropriate.



	Recommendation	Priority
24.	Investigate the development of an 'add-on' environmental assessment for Industry Programmes, arranged by HBRC with the various industry bodies, where appropriate. This would ensure that the generally product-orientated Industry Programmes achieve the desired environmental objectives. Any such 'add-on' should be aligned with the risk-assessment discussed in recommendations #1 & #2 for Individual Farm Plans and Catchment Collectives, to ensure consistency.	High

9 Barriers and risks specific to the Catchment Collective mechanism

The previous sections outlined a range of barriers and risks that applied to all the mechanisms, as well as a specific risk that applied to the Industry Programmes. This section outlines a range of specific risks that apply to the Catchment Collectives. As they are the only collective mechanism and the most novel, a range of barriers and associated recommendations have been identified. There are grouped according to the three sub-sections that have been consistent across the previous two sections: the need for mechanisms to be simple and focused; ensuring appropriate expectations (everyone is on the same page to begin); and ensuring access to the right support. In addition, two further sub-sections have been identified: interpersonal risks; and transparency of accountability.

In some instances, the barriers and risks are substantially or completely covered by recommendations made elsewhere. Where this is the case the barriers are still articulated, and the recommendations are cross-referenced.

9.1 The need for mechanisms to be objective-focused and simple

In addition to the barriers and risks relating to simplicity and focus identified in section 7.1, the following have been identified as more specific risks in relation to the Catchment Collectives: administrative burden; a simple and clear collective agreement; the need for a staged approach.

9.1.1 Administrative burden

One of the consistent concerns identified in the interviews was that the administration of Catchment Collectives may be a burden. This was clearly viewed as potentially complex (Pannell, 2006) and a barrier to adoption.

While this is articulated as a specific barrier, it is considered that recommendations made elsewhere would ensure that this is minimised, specifically recommendations #20, #21, #22, #23, #25, #26 and #34.

9.1.2 A simple but clear collective agreement

In addition to the possible administrative burden, a range of barriers around the potential perceived complexity of what is agreed in a collective; how it operates; and who is responsible for what, was identified in the interviews.

While some of these specific barriers are addressed with recommendations in other sub-sections, the primary way of coordinating all of the membership, objectives, agreed actions and expectations of members is through a simple but clear collective agreement. This should articulate a range of pertinent factors relating to the collective. These are shown visually in Figure 16 and listed in Table 1 below.

Figure 16. Recommended components of a Catchment Collective agreement – diagram

Table 1. Recommended components of a Catchment Collective agreement – table

Component		Description	Recommendation(s)
Governance		How the group is governed	#26
Objectives		Clear outcome-based objectives	#25
Risk-based assessment		A clear risk-assessment to determine *appropriate* action	#1 and #2
Agreed action	**Works**	The physical works that has been agreed	#25 and #30
	Practices	The farm practices that have been agreed	#25 and #30
Monitoring (& how it will be used)		The monitoring that has been agreed. Also, how it will be used and what influence it has.	#25 and #29
Reporting		Reporting lines, frequency, data and standards agreed.	#25 and #29
Conflict resolution, enforcement & expulsion		Clear process for conflict resolution, enforcement action, and possible expulsion from the group (if required) are agreed.	#26

One of the inductive codes identified from the interviews was 'one size doesn't fit all', in which most comments were negative. This was because there was a strong feeling that a 'blanket' approach to action was usually not appropriate and did not reflect the subtleties of individual property characteristics. Yet some interviewees did think that some guidance, even prescription, was useful depending on the context. Many of these comments were captured in the inductive code called 'independence versus guidance', which highlighted the desire for independence and the benefit provided by prescription.

In this vein, interviewees perspectives on the extent to which components of the Catchment Collective should be prescribed or not, were divided. Certainly, there was the desire that many of the *outputs* from the Catchment Collectives should be consistent. Yet views on whether this was best achieved by prescribing things (which tended towards a one-size-fits-all approach), or by allowing flexibility, varied. Therefore, the components of the Catchment Collective listed in Table 1 can be divided into two groups: Components where a high level of prescription is

required to ensure consistency across Catchment Collectives and usefulness of data; and components where several prescribed options may be offered, so as to minimise the complexity, while still allowing for bespoke solutions to be developed by individual collectives.

Components where prescription is required include: the *process* for describing the objectives (even though the actual objectives will differ per collective); the *format* for recording agreed works and practices (even though these will differ per group); the *processes and standards* for monitoring of water quality and the provision of that data (whoever does it); and the *format, standards and frequency* of reporting about the collective (recommendation #25).

There are two main components where it is recommended that some prescribed options should be offered but bespoke solutions should still be allowed, so long as they respond to the required need. The first of these is *Governance*. 2-3 options for governance structure should be provided for collectives to choose from, as it is unlikely that one model will suit all collectives developed. Yet collectives should still be allowed to develop their own – so long as it meets the needs of Council. The second area is *Conflict resolution, enforcement & expulsion*. 2-3 examples of processes for resolving conflict within a collective might be provided for collectives to choose from. Yet, again, groups could still develop their own – so long as it clearly sets out a process for members of a collective to follow in the event of conflict resolution and how any non-conforming behaviour will be dealt with or enforced (recommendation #26).

Further detailed suggestions on how conflict resolution might be *resourced* with the appropriate skills is provided in section 9.3.

The risk-assessment component of the Catchment Collective has already been addressed in recommendations #1 and #2. Some recommendations relating to the transparency of accountability and being able to ensure enforcement action can be taken by Council against collective members is discussed in section 9.5.

	Recommendation	Priority
	Recommendations for a clear risk assessment to inform objective-focused activity have been discussed in recommendations #1 and #2.	
25.	Determine the aspects of a Catchment Collective agreement where prescribed approaches MUST be used to ensure consistency. For example: the *process* for describing the objectives; the *format* for recording agreed works and practices; the *processes and standards* for monitoring and the provision of that data; and the *format, standards and frequency* of reporting about the collective.	Critical
26.	Determine the aspects of a Catchment Collective agreement where prescribed approaches ARE OFFERED BUT NOT COMPULSORY, allowing bespoke options to be developed, as long as they respond to Council's need. For example: *Governance* structures; *Conflict resolution, enforcement & expulsion* processes and protocols.	Critical

9.1.3 The need for a staged approach

Staged or incremental implementation is often required in the successful adoption of mitigations or new technologies, with the need for trialability and direct sight of proven results often being cited (Pannell, 2006). The findings of this research are consistent with that identified need for staged and incremental progress.

Many respondents highlighted the long-term nature of their businesses and the need to stage implementation, reinforcing that progress towards improved water quality was a journey not a single step. A rushed or hurried implementation of collectives across the entire region may prove to be a barrier to the more widescale adoption of them in the longer term.

While it is understood that Council plans to stage the implementation of the collectives, two specific recommendations are made in relation to that. Firstly, Council should prioritise catchments based on the level of environmental risk AND the perceived level of societal acceptance/success of the Catchment Collective approach (recommendation #27). Secondly, the Council should actively identify 1-3 trial catchments in which to pilot the collective approach. This could be done during the notification period of the plan change before it becomes operative and could in effect be a 'trial' for the TANK area – thus building confidence in the approach with a wider range of producers. When piloting the collectives, a range of catchments that represent the diversity of likely land-uses and issues should be considered. In other words, a mixture of catchments dealing with sediment versus nutrients; and a mixture of catchments with homogenous as well as heterogenous land use (recommendation #28).

Recommendation	Priority
27. Prioritise catchments based on the level of environmental risk AND the perceived level of societal acceptance/success of the Catchment Collective approach	High
28. Actively identify 1-3 trial catchments to pilot the collective approach before the plan change becomes operative. This provides a 'trial' that the wider community can observe. A range of catchments that represent the diversity of likely land-uses and issues should be considered, such as a mixture of contaminant issues; as well as homogenous versus heterogenous land use.	Critical

9.2 Ensuring appropriate expectations (everyone is on the same page to begin)

The previous section considered specific issues relating to Catchment Collectives being simple and focused. This section considers specific issues relating to ensuring everyone is on the same page.

Three key issues were identified here in the research. Firstly, a strong barrier to adoption and a critical risk to success of the collective mechanisms, is the probable mal-alignment between producers' high expectations around monitoring of water quality and the actual level of monitoring that is likely to be affordable. This has already been discussed in earlier sections and those recommendations are considered relevant here (see recommendations #6 to #13).

The second expectation issue that may prove to be a barrier to the collective mechanism relates to how natural disasters and severe weather events will be accounted for. This is considered more relevant for the collective option as this is likely to be more closely tied to collective monitoring trends in a waterway (rather than an agreed list of actions at a property level). The variability of nature was highlighted as one of the key risks that producers consistently face in their lives. While producers may collectively have excellent land management practices, high impact natural events may impact the monitoring data to an extent that trends are difficult to determine. It is recommended that pragmatic ways of accounting for natural disasters and extreme weather events are investigated that are in addition to narrative recording (recommendation #29). This may provide data to supplement and perhaps estimate their impact on formal monitored results.

Thirdly, the issue of properties that may physically sit in multiple catchments remained an area of confusion and a potential barrier. Certainly, there was no desire by producers to belong to more than one Catchment Collective, as this was seen as an administrative burden. Yet the objective-focused (and therefore locally relevant) action of the Catchment Collectives may mean that neighbouring catchments are dealing with different issues. In addition, if a property

is physically located in several Catchment Collectives, but is only a signed-up member of one, then all of the governance and conflict resolution mechanisms of the collective that that property is a member would apply. This poses a serious risk of confusion between catchments and a barrier to the adoption of this mechanism. If producers are keen to belong to only one Catchment Collective, it is recommended that any works or practices agreed by that property is noted as applying to which geographic area in their catchment agreement (recommendation #30).

This allows for the producer to only be involved in one collective, while it also allows for objective-focused action to be nuanced to the needs of the individual catchment. The producer may then benefit from only being involved in one collective, while the other collectives who this property may have an impact on have transparency of accountability for the action that property owner will be undertaking in relation to their catchment.

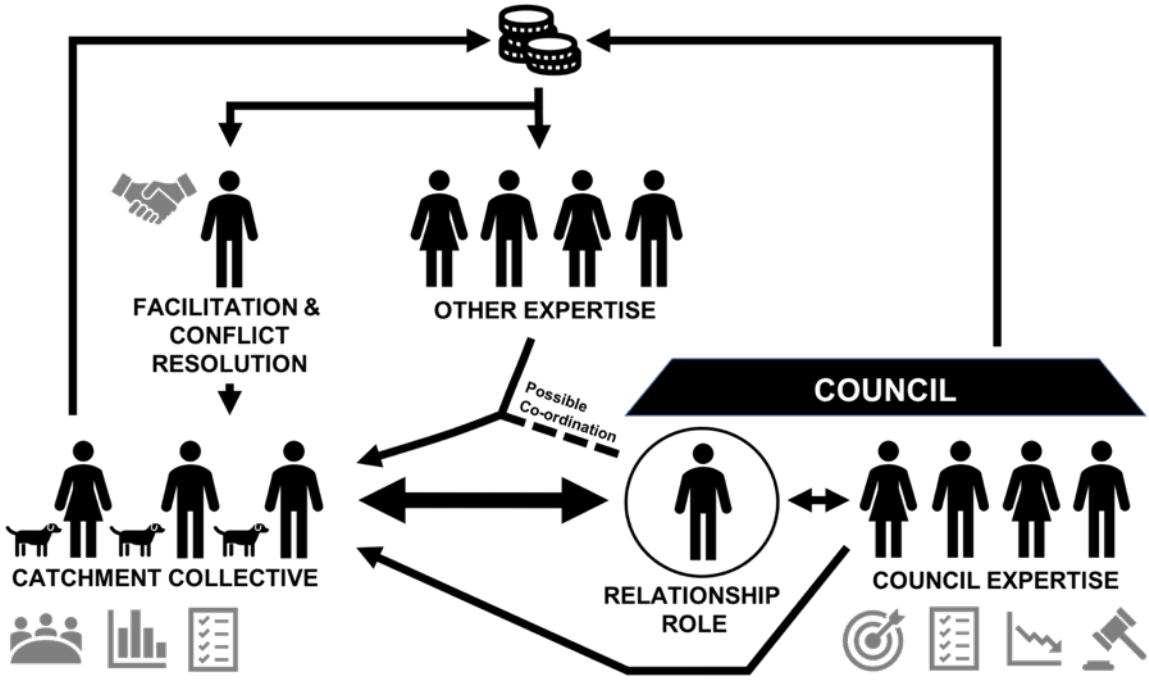
Recommendation	Priority
The malalignment of expectations around monitoring of the resource are covered by recommendations #6 to #13	
29. Investigate pragmatic ways of accounting for natural disasters and extreme weather events in addition to narrative recording. This may provide data to supplement and perhaps estimate their impact on formal monitored results.	Medium
30. If properties cross catchment boundaries and the producer chooses to only be involved in one single Catchment Collective, any works or practices agreed for that property should be recorded by geographic area. That way, if they apply to a different Catchment Collective, there is a transparency of what action is occurring, even if a property is not a member of the other collective.	High

9.3 Ensuring access to the right support

Ensuring access to the right support has already been discussed as a way of reducing the complexity of potential mechanisms, and a range of general recommendations have already been made (section 7.3). Given the novel nature of the Catchment Collectives and the potential barriers that additional complexity of working with others may result in, a range of additional recommendations are made here.

Firstly though, a visual representation of how it is recommended that the Catchment Collectives interact with other individuals or organisations is described. This provides context for the information in this and the next section (9.4 Interpersonal risks).

Figure 17. Visual representation of how the Catchment Collectives should operate in conjunction with other individuals and organisations.



Five main nodes of people (group or individuals) are identified in the diagram: The Catchment Collective itself, Council expertise; a *relationship role* at Council (which is shown in a circle to highlight its importance; other expertise; and independent facilitation and conflict resolution. The elements highlighted in grey indicate the various elements of the possible Catchment Collective agreements described in Table 1.

9.3.1 The relationship management role(s) between Council and Catchment Collectives

In the development of the proposed plan change it was widely accepted that Council would resource some kind of role to liaise between Council and the Collectives, supporting them in their development. There was a consistent perception amongst interviewees that this role would be critical to the success of collectives. While called various things in the interviews, it is recommended that the role is a r*elationship management* role, not a role responsible for the actual *facilitation* of the groups (recommendation #31).

Views on whether this role should be responsible for the direct *facilitation* of groups or to help them *resolve internal conflict* were varied. Given the regulatory role of Council; the importance of coordinating expertise and other support for Collectives; and the possible role that Council may need to have in enforcement, it is recommended that the skills for facilitating the groups and helping them resolve internal conflict (if this is required) comes from outside of Council (recommendation #32). This separates any potential conflict of interest in that role between

the skills of facilitation and conflict resolution; and the possible need for Council to require enforcement as a regulatory authority.

Council should explore various ways to potentially resource this role. While they will be representing Council, it was seen as important by interviewees that this person was familiar with the *realities of farming and different farming practices*. Key characteristics that should be explored by Council in this role are: a) broad familiarity and experience with farming/growing, rather than experience with Council, and; b) likely longevity in the role, given the expected long relationships with Catchment Collectives (recommendation #33).

Recommendation	Priority
31. Establish an HBRC role(s) responsible for the proactive relationship management of the Catchment Collectives and connecting them with appropriate expertise. This role(s) would likely be actively involved in the Collectives but does not facilitate them.	Critical
32. Any *facilitation and support for internal conflict resolution* within a collective should be provided independent of Council. This recognises and seeks to not confuse the proactive relationship management, regulatory and enforcement role that Council has.	Critical
33. Council to explore sourcing an appropriate resource(s) for this relationship management role(s) via direct employment or contracting (e.g. appropriately skilled NGO). Several key attributes that should be considered are: a) Broad familiarity and experience with farming/growing, rather than experience with Council. b) Likely longevity in the role, given the expected long relationships with Catchment Collectives.	Critical

9.3.2 Additional funding for Catchment Collectives

The interviews highlighted a strong desire from many producers to proactively own the issues moving forward. Catchment Collectives were seen as a key way of achieving this, yet their lack of track record may prove a barrier to their adoption; and the need for potential support to help them navigate this new space is a key risk to their success.

Many interviewees stressed the fact that while the Catchment Collectives had multiple benefits for both producers, they did for Council too. Most notably it would save them a huge administrative burden in terms of the amount of staff time required to manage one mechanism delivering action (e.g. a Catchment Collective), as opposed to managing all properties in that area via Individual Farm Plans. There is a risk that the Catchment Collective mechanisms may be viewed as Council trying to abrogate its responsibility to producers, which could be a barrier to their adoption. To mitigate this risk, it is recommended that Council recognise the benefits this mechanism provides to their operation and establish a financial fund that can be used to support the collectives with the appropriate expertise they need: for example, specialist

farming or growing advice; reporting and plan writing; facilitation; or conflict resolution (recommendation #34).

Guidance on what this advice can be used for should be provided by Council. Allowing the collective the independence to determine how they may use those funds is seen as a way of encouraging independence and innovation, within the predetermined limits of their allocation (recommendation #35). It will be important to allocate funds in an equitable way across collectives, and this also allows collectives to spend their own money on additional support as required as well.

Recommendation	Priority
34. Council consider establishing a fund ('Collective support fund') to financially support Catchment Collectives. This could be a pool of funds that is available for all range of things (expert advice, reporting, plan writing, facilitation, conflict resolution etc).	Critical
35. Allocate money from this support fund in a way that is equitable across Collective groups of varying sizes. Further, allow what it is spent on to be at the discretion of the individual Collective (up to their allowed limit), as this both provides support from Council but allows collectives to be innovative and efficient with how they use those funds. Collectives can then also use their own funds if they wish.	Critical

9.4 Interpersonal risks

One of the key barriers to Catchment Collectives identified was the perceived potential for personal conflict between individuals within the collectives. While there was broad support for the collective approach, when potential challenges relating to conflict and conflict resolution were explored in the interviews, there was generally a high level of discomfort around dealing with those types of issues, as they tended to be individualistic by nature. As one farmer put it:

"Farmers, on average, are individual people, that's why they went farming.
So, they are more than happy with their own company"

There is a risk that if *one* Catchment Collective has a bad experience, this may become a well-known example in the community and become a barrier to the adoption of this mechanism in other catchments.

9.4.1 Build familiarity with the collective approach across the wider producer community

From the point of view of building support for the collective approach, previous recommendations have already highlighted the need for collectives to be prioritised in

catchments where they can be piloted and are more likely to be adopted (recommendations #27 and #28). In addition, working proactively with the farming media (e.g. industry magazines or Country Calendar) may be a way of both generating familiarity with the approach and documenting the journey of the first collectives (recommendation #36).

Recommendation	Priority
36. Consider working with farming media (e.g. industry magazines or Country Calendar) to document the journey of the pilot collectives and build familiarity with the collective approach across a wider audience. This may help build familiarity and acceptance in the longer term.	Low

9.4.2 The danger of conflict within groups

Even if there was wider awareness and adoption of the mechanism, it remains a critical risk that collectives are adequately supported to ensure that they can deal with internal conflict as best they can. The potential for internal conflict within collective groups was explored at length in the interviews. This was because the ability of a self-organising group to 'keep an eye on each other' (monitor) and 'hold each other accountable' (punish) has been found to be critical within the CPR literature (Ostrom, 1990; Cox et al., 2010; Parsons, 2016).

While it was acknowledged that questions around how such issues would be dealt with had often been raised in the TANK process, it was still unclear in most interviewees minds as to how this would actually be dealt with, short of referring such matters to Council. These comments made up a significant amount of those coded to 'risk', 'still unclear', 'monitoring others' and 'appropriate punishment for infringement'.

As noted in the results section, it was also a predominant view that most producers would be uncomfortable dealing with interpersonal conflict within their groups. Yet many did recognise the importance of this and suggested or were open to such expertise being provided from outside the group. A range of recommendations have already supported this. The need for the independent provision of group facilitation and conflict resolution skills has already been highlighted in recommendation #32, while the ability to resource this with funds from Council has been covered by recommendations #34 and #35. Further, recommendation #26 outlined that some prescribed options for conflict resolution should be provided to Catchment Collectives to choose from, as well as allowing them the opportunity to develop their own.

One additional recommendation is made to help make conflict resolution as clear as possible. Any conflict resolution processes that are developed for the set of prescribed options available to Catchment Collectives should be developed with professional conflict resolution expertise (recommendation #37). The benefit of such conflict resolution expertise talking to nascent

Catchment Collectives when they are beginning, so as to provide an overview of the types of things to avoid, should also not be under-estimated. This may reduce the need for their services later.

Recommendation	Priority
37. Ensure appropriate conflict resolution expertise is utilised when developing a set of prescribed processes for dealing with internal conflict for Catchment Collectives.	High

9.4.3 Absentee owners

One final area of interpersonal risk within Catchment Collectives identified in the research, was perceived challenges with absentee owners. Many interviewees spoke negatively of absentee owners (predominantly in pastoral farming areas), perceiving them not to be as personally invested in the outcomes that were being sought. In other words, they were not seen to care and would likely take the minimum amount of action that they could get away with in order to be compliant with Council rules. In catchments where absentee ownership features this may be a barrier to the collective approach, as the perceived attitude of these owners may result in resistance to the collective approach from other farmers.

Several recommendations are made to attempt to mitigate this risk. Firstly, in areas where Catchment Collectives are likely to be used (predominantly the high-country areas), Council should try to assess where landowners may be absentee (recommendation #38). This is not to imply that all absentee landowners may be resistant to the collective approach, but it does provide guidance on which landowners may benefit from more targeted and personalised information about the collective, as they are less likely to have heard about it in the community.

Secondly, Council should consider a direct marketing campaign targeting absentee landowners (recommendation #39). This can familiarise them with the plan, the desired objectives and the mechanisms – particularly the Catchment Collectives.

Recommendation	Priority
38. Council to assess (if possible) where landowners may be absentee landowners within the likely Catchment Collective areas. They are less likely to have heard about the collectives in the community and can be provided more targeted and personalised information.	Medium

Recommendation	Priority
39. Consider a direct-marketing campaign targeted at absentee landowners designed to familiarise them with the plan, the mechanisms (particularly the Catchment Collectives) and what they seek to achieve. This would likely involve a number of foreign landowners as well as domestic absentee landowners, so may require specialist support (e.g. language advice) where appropriate. *Various industry groups (e.g. Beef & Lamb, Dairy NZ) or government departments (e.g. NZTE) that have regular foreign interactions may be able to provide advice here.*	Medium

9.5 Transparency of accountability

Several of the key areas of confusion around how Catchment Collectives may work have been explored in the previous sections. Conflict resolution is seen as critical and best provided by an external resource (section 9.3.1) and part funded by Council (section 9.3.2); the administrative burden and potential confusion around how Catchment Collectives may operate will be reduced through the use of a simple but clear Catchment Collective agreement (sections 9.1.1 and 9.1.2); and the role of a relationship manager employed (or contracted) by Council has been clearly recommended (section 9.3.1). One final area relating to reducing barriers to adoption of the Catchment Collectives relates to ***being clear around who has committed to doing what action, and how that can be enforced***.

While this section may be last chronologically, it deals with some of the ***most critical risks and important recommendations*** in relation to Catchment Collectives.

It was noted earlier that there may be a need for enforcement action against members of a collective, if they were not implementing work or practices that had been agreed within a group. It has also been noted that such enforcement action is clearly seen by interviewees as the role of Council, both because they are the regulatory body; and because for the collective to do it may be disruptive to the wider fabric of the rural communities in which they operate.

The draft plan change states that collectives need to articulate a process for expelling people from the group. If that were to occur (likely only in extreme cases of disharmony), then it would become a clear and simple process for the Council to then require that person to develop an Individual Farm Plan or and Industry Programme, which would then need to be signed off by Council. This provides Council a clear opportunity to ensure that any required action is appropriate to that property and provides a mechanism for them to be held accountable.

So, it is well known that expelling someone from a collective would enable Council to make them accountable.

Yet there was also a clear expectation from many interviewees that Council would be the entity taking any kind of enforcement action against a member of a collective, if required, *while that person was also a member of the collective*.

Crucially, however, it is not clear how Council may take enforcement action against a member of a collective, without the collective first expelling that person.

Obviously, Council has a regulatory responsibility to enforce the rules in its own plan. Yet if the plan rule being enforced is a one where a group has come together and ***collectively*** agreed a list of actions, then how can Council only take enforcement action against one member of that group? It is beyond the scope of this report and the expertise of the researcher to provide legal guidance on whether this is possible or not. However, having been highlighted in the research it is noted as a *critical risk* to the potential operation of the collectives, and therefore a *key potential barrier* to further adoption of this mechanism.

Several recommendations are provided to get greater clarity around this issue and minimise its potential impact.

Firstly, it is recommended that as part of the Catchment Collective agreements, any physical works or farming practices agreed to by individual producers in a collective are clearly articulated and ascribed to the relevant property. This will ensure that there is transparency of accountability for specific actions both within the collective, and outside of it if required (recommendation #40).

Secondly, it is recommended that Council seek legal advice as to whether it is possible for them to take any kind of corrective or enforcement action against a member of a collective, where it is requested by the collective, while that person/property is still a member of a collective AND, crucially, they *will remain so* after the enforcement action has been taken (recommendation #41).

Thirdly, it is important that clear internal conflict resolution processes are developed for each collective that clearly articulate how conflict resolution and enforcement action will be taken against a member of the collective, while they are a member. These should also clearly outline the process for expelling someone from the collective (recommendation #42).

One final risk was identified to the success of the Catchment Collectives, and therefore a potential barrier to their adoption in the longer-term. That was the risk of a property within a Catchment Collective changing ownership. In reality, this is a fairly likely scenario, and so some thought should be given to how this may be dealt with. It is recommended Council seek legal advice as to whether it is possible to transfer the actions agreed by one owner, as part

of a collective agreement, to a subsequent owner. If this is possible, this should also be clearly stated in Collective agreements (recommendation #43).

Recommendation	Priority
40. Ensure actions agreed by members of a Catchment Collective are clearly recorded, transparent and allocated against relevant members/properties within the Catchment Collective agreements. This is to ensure that if corrective action is required by Council for individual collective members (while they are still part of the collective), this can be done clearly and simply.	Critical
41. Council should seek legal advice as to whether they are able to take corrective action of any kind against a member of a collective, where it has been requested by the collective, while that person/property is still a member of the collective AND will remain so after the enforcement action has been taken.	Critical
42. Clear internal conflict resolution processes should be developed for each collective and should be appropriate for that collective. These will articulate processes for conflict resolution; how corrective or enforcement action will be taken against a group member while they are a member of the group; and the process for expelling members from the collective.	Critical
43. Council to seek legal advice as to whether it is possible to transfer the actions agreed by one owner (as part of a collective agreement) to a subsequent owner if that property changes ownership. If this is possible, this should also be clearly stated in Collective agreements.	Critical

10 Summary and conclusion

This research has investigated the barriers and risks to the adoption of the three mechanisms proposed in the TANK plan change for coordinating management action, in relation to water quality. These mechanisms are Individual Farm Plans, Industry Programmes, and Catchment Collectives. A mixed methods approach has been used, with a quantitative survey and a semi-structured interview being undertaken. The sample included a range of people who have been involved with the TANK plan change, either directly in the TANK stakeholder group; with the Farmers Reference Group; or as an employee of Council.

The resulting data set was analysed by collating quantitative survey results and by thematically coding interview data to identify barriers and risk according to a range of deductive and inductive themes. The majority of the data analysis was via the qualitative coding process.

Many barriers and risks were found and a large number of these could be categorised as applying to all mechanisms. Additionally, one barrier was identified specifically for Industry Programmes specifically, while a number of additional potential barriers were found to apply specifically to Catchment Collectives.

For all mechanisms and the additional barrier specific to the Industry Programme, these barriers can be grouped as follows:

- The need for mechanisms to be objective-focused and simple
- Ensuring appropriate expectations (everyone is on the same page to begin)
- Ensuring access to the right support

For the Catchment collectives, these three groupings also applied, as well as the following additional groups:

- Interpersonal risks
- Transparency of accountability

A total of 43 recommendations have been made across these five groupings. Each has been given a scale of importance – Low, Medium, High or Critical. These recommendations are summarised in Table 2 below.

Table 2. Summary of recommendations made in relation to the barriers and risks identified in this research.

Grouping of barriers	Number of recommendations			
	Critical	High	Medium	Low
RECOMMENDATIONS RELATING TO ALL MECHANISMS				
The need for mechanisms to be objective-focused and simple		4	1	
Ensuring appropriate expectations (everyone is on the same page to begin)	4	6	4	
Ensuring access to the right support	3	1		
A RECOMMENDATION SPECIFIC TO THE INDUSTRY PROGRAMME MECHANISM				
The need for mechanisms to be objective-focused and simple		1		
RECOMMENDATIONS SPECIFIC TO THE CATCHMENT COLLECTIVE MECHANISM				
The need for mechanisms to be objective-focused and simple	3	1		
Ensuring appropriate expectations (everyone is on the same page to begin)		1	1	
Ensuring access to the right support	5			
Interpersonal risks		1	2	1
Transparency of accountability	4			
TOTALS	**19**	**15**	**8**	**1**

The 43 recommendations are also collated into three tables in order of priority at the end of this section: Critical (Table 3); High (Table 4); and Medium & Low (Table 5).

This research has identified a rich volume of potential barriers & risks and has provided recommendations to address these. It recognises that many of these are likely to have already been discussed as part of the TANK process or may already be on Council's 'radar'. They are commended to Council here in the hope that the formulation and ranking of recommendations might reinforce the importance of some barriers to be dealt with and that this may help guide implementation action in this regard.

This research has been focused on barriers and risks. While this has an obvious negative focus, it is for a positive reason. A huge amount of effort has already been collectively invested by Council and a number of supporting stakeholders to develop the TANK plan change. The success of that plan in the longer-term is heavily dependent on the successful adoption of the mechanisms proposed. The recommendations outlined here are intended to assist with the successful uptake of whatever mechanism an individual may choose. A significant amount of

goodwill, positive energy and a desire to make progress as a community was also identified in this research. Ensuring such goodwill is maintained will be key to the success of the mechanisms proposed in the plan change. If that goodwill is able to continue, supported by the recommendations in this report, the future of action taken to address the water quality issues in the TANK catchments looks positive.

Table 3. Critical recommendations across all groupings of barriers.

Recommendation	Priority
RECOMMENDATIONS RELATING TO ALL MECHANISMS	
Ensuring appropriate expectations (everyone is on the same page to begin)	
12. Council to calculate the average establishment AND ongoing operational costs of various types of monitoring stations and regimes. This should combine both direct capital costs and indirect costs of staff time. This can then be used in correlation with expectation setting discussions with the community around the ongoing level of monitoring that will occur.	Critical
13. Supported partly by the results of recommendations #10 & #12, Council to proactively work with the community to build an understanding of what is technologically and cost-effectively possible to monitor, as well as a clear understanding of how modelling will continue to play a role in the future. It should be noted that this will be linked to the formation of the Catchment Collectives, as monitoring will play an important role in determining their area.	Critical
14. Council should highlight and discuss internally the unintended consequences of requiring compliance and enforcement staff to recover the cost of their activities. This is contributing to the perception within the wider community that Council are ineffectual or weak.	Critical
15. To ensure that Council are seen to be equitably improving their own performance, whilst asking producers to improve theirs, Council should be prepared to take more public corrective and enforcement action against bad practice. It will be important to do this consistently across the region.	Critical
Ensuring access to the right support	
20. Council to undertake an assessment of what level of Council expert advice would be considered an appropriate expectation across all properties. This calculation should be made independently of the constraints of current resource, as it is intended to scope up the level of resource that may be required, regardless of whether it is currently available.	Critical
21. In-house expertise: Once #20 has been assessed, Council to assess whether this can be achieved with existing internal resource; whether that team needs to be expanded; or whether Council provision of this can be supplemented by contracted external resource.	Critical

Recommendation	Priority
22. External expertise – general: Council should consider whether there is a case for providing limited financial support for producers to procure relevant expertise that is NOT in line with Council areas of expertise (e.g. farming advice), so long as that is acting equitably across the region. This could also be provided through an allowance of time available to each property (e.g. X hours) from an agreed list of experts that is paid for by Council.	Critical
RECOMMENDATIONS SPECIFIC TO THE CATCHMENT COLLECTIVE MECHANISM	
The need for mechanisms to be objective-focused and simple	
25. Determine the aspects of a Catchment Collective agreement where prescribed approaches MUST be used to ensure consistency. For example: the *process* for describing the objectives; the *format* for recording agreed works and practices; the *processes and standards* for monitoring and the provision of that data; and the *format, standards and frequency* of reporting about the collective.	Critical
26. Determine the aspects of a Catchment Collective agreement where prescribed approaches ARE OFFERED BUT NOT COMPULSORY, allowing bespoke options to be developed, as long as they respond to Council's need. For example: *Governance* structures; *Conflict resolution, enforcement & expulsion* processes and protocols.	Critical
28. Actively identify 1-3 trial catchments to pilot the collective approach before the plan change becomes operative. This provides a 'trial' that the wider community can observe. A range of catchments that represent the diversity of likely land-uses and issues should be considered, such as a mixture of contaminant issues; as well as homogenous versus heterogenous land use.	Critical
Ensuring access to the right support	
31. Establish an HBRC role(s) responsible for the proactive relationship management of the Catchment Collectives and connecting them with appropriate expertise. This role(s) would likely be actively involved in the Collectives but does not facilitate them.	Critical
32. Any *facilitation and support for internal conflict resolution* within a collective should be provided independent of Council. This recognises and seeks to not confuse the proactive relationship management, regulatory and enforcement role that Council has.	Critical

Recommendation	Priority
33. Council to explore sourcing an appropriate resource(s) for this relationship management role(s) via direct employment or contracting (e.g. appropriately skilled NGO). Several key attributes that should be considered are: a) Broad familiarity and experience with farming/growing, rather than experience with Council. b) Likely longevity in the role, given the expected long relationships with Catchment Collectives.	Critical
34. Council consider establishing a fund ('Collective support fund') to financially support Catchment Collectives. This could be a pool of funds that is available for all range of things (expert advice, reporting, plan writing, facilitation, conflict resolution etc).	Critical
35. Allocate money from this support fund in a way that is equitable across Collective groups of varying sizes. Further, allow what it is spent on to be at the discretion of the individual Collective (up to their allowed limit), as this both provides support from Council but allows collectives to be innovative and efficient with how they use those funds. Collectives can then also use their own funds if they wish.	Critical
Transparency of accountability	
40. Ensure actions agreed by members of a Catchment Collective are clearly recorded, transparent and allocated against relevant members/properties within the Catchment Collective agreements. This is to ensure that if corrective action is required by Council for individual collective members (while they are still part of the collective), this can be done clearly and simply.	Critical
41. Council should seek legal advice as to whether they are able to take corrective action of any kind against a member of a collective, where it has been requested by the collective, while that person/property is still a member of the collective AND will remain so after the enforcement action has been taken.	Critical
42. Clear internal conflict resolution processes should be developed for each collective and should be appropriate for that collective. These will articulate processes for conflict resolution; how corrective or enforcement action will be taken against a group member while they are a member of the group; and the process for expelling members from the collective.	Critical
43. Council to seek legal advice as to whether it is possible to transfer the actions agreed by one owner (as part of a collective agreement) to a subsequent owner if that property changes ownership. If this is possible, this should also be clearly stated in Collective agreements.	Critical

Table 4. High priority recommendations across all groupings of barriers.

Recommendation	Priority
RECOMMENDATIONS RELATING TO ALL MECHANISMS	
The need for mechanisms to be objective-focused and simple	
1. A clear risk-assessment should be developed to identify *appropriate* action in response to relevant freshwater quality objectives at a catchment level.	High
2. Ensure the risk-assessment is applied consistently across both Individual Farm and Catchment Collective plans. This removes confusion around how action is decided.	High
3. Outline a clear framework for how to develop both an Individual Farm Plan and Catchment Collectives. These should be accessible and consistent where there are common elements, so that an easy comparison between the relative advantage/disadvantage of both can be made.	High
4. Be clear that producers can be involved in multiple mechanisms but only one needs to be signed off by Council. If involved in a Catchment Collective, that takes precedence as the mechanism that is required to be signed off by council.	High
Ensuring appropriate expectations (everyone is on the same page to begin)	
9. Building an understanding with producers of the scientific standards of monitoring processes, particularly the need for longevity and frequency of sampling for statistical relevance. Also build an understanding of how data is used in legal processes. Be open to innovation in this area, if any is identified through working with the community.	High
10. Council to prioritise discussing the role that 'citizen science' or 'crowdsourced data' may play in monitoring, both internally within council and externally with producers/communities. Expectations around this are unlikely to align and highly likely to pose a large risk to establishing and maintaining strong relationships moving forward.	High
11. Whatever monitoring protocols are agreed when mechanisms are agreed, these should be clearly outlined in agreements so that all parties are aware of them from the beginning.	High
16. Consider inter-industry 'open-gate days' or 'familiarisations' as a way of building familiarity and understanding of different practices between rural industries.	High

Recommendation	Priority
18. Council should ensure any action required across both rural and urban areas is perceived as being equitable and proportionate to that parties perceived contribution to the problem. This will ensure social capital in the plan is maintained and no particular party feels 'picked on'.	High
19. Council to consider some kind of reward and/or recognition for the good work that has already been undertaken by proactive farmers. For example, an awards programme; rates relief; or reduced future consenting/monitoring costs.	High
Ensuring access to the right support	
23. External expertise – leases: Council to consider providing landowners a set allowance of time for legal advice to help write appropriate lease agreements. This could be either from council legal staff or from approved providers paid for by council. This will ensure that, where required, lease agreements are appropriate and transfer any responsibility for relevant mitigations agreed in the chosen mechanism to the lessee.	High
A RECOMMENDATION SPECIFIC TO THE INDUSTRY PROGRAMME MECHANISM	
The need for mechanisms to be objective-focused and simple	
24. Investigate the development of an 'add-on' environmental assessment for Industry Programmes, arranged by HBRC with the various industry bodies, where appropriate. This would ensure that the generally product-orientated Industry Programmes achieve the desired environmental objectives. Any such 'add-on' should be aligned with the risk-assessment discussed in recommendations #1 & #2 for Individual Farm Plans and Catchment Collectives, to ensure consistency.	High
RECOMMENDATIONS SPECIFIC TO THE CATCHMENT COLLECTIVE MECHANISM	
The need for mechanisms to be objective-focused and simple	
27. Prioritise catchments based on the level of environmental risk AND the perceived level of societal acceptance/success of the Catchment Collective approach	High
Ensuring appropriate expectations (everyone is on the same page to begin)	

Recommendation	Priority
30. If properties cross catchment boundaries and the producer chooses to only be involved in one single Catchment Collective, any works or practices agreed for that property should be recorded by geographic area. That way, if they apply to a different Catchment Collective, there is a transparency of what action is occurring, even if a property is not a member of the other collective.	High
Interpersonal risks	
37. Ensure appropriate conflict resolution expertise is utilised when developing a set of prescribed processes for dealing with internal conflict for Catchment Collectives.	High

Table 5. Medium and low priority recommendations across all barriers.

Recommendation	Priority
RECOMMENDATIONS RELATING TO ALL MECHANISMS	
The need for mechanisms to be objective-focused and simple	
5. Be clear about longer term objectives and how a different contaminant may be the focus of attention in the future, once a higher priority objective has been dealt with. This will reduce the chance that a change of focus in the future will be viewed as 'moving the goalposts'.	Medium
Ensuring appropriate expectations (everyone is on the same page to begin)	
6. Explore additional, user friendly ways, of sharing Councils existing longitudinal monitoring data with the public. Consider an increased use of science communication expertise in Council operations.	Medium
7. Actively work with farmers to identify ways that are more accessible for them to access and understand longitudinal monitoring data.	Medium
8. Explore the viability of 'catchment champions' for data communication from within the catchments (i.e. in addition to Council staff). This is to help understand and communicate it, not defend it. For example, as part of environmental programmes with local schools.	Medium

Recommendation	Priority
17. To improve longer-term understanding between rural and urban communities, Council might consider supporting an educational programme that connects urban schools with rural schools or industries. For example: farm visits associated with urban and rural school studies (primary and secondary schools); or peer to peer school partner programmes between rural and urban schools.	Medium
RECOMMENDATIONS SPECIFIC TO THE CATCHMENT COLLECTIVE MECHANISM	
Ensuring appropriate expectations (everyone is on the same page to begin)	
29. Investigate pragmatic ways of accounting for natural disasters and extreme weather events in addition to narrative recording. This may provide data to supplement and perhaps estimate their impact on formal monitored results.	Medium
Interpersonal risks	
36. Consider working with farming media (e.g. industry magazines or Country Calendar) to document the journey of the pilot collectives and build familiarity with the collective approach across a wider audience. This may help build familiarity and acceptance in the longer term.	Low
38. Council to assess (if possible) where landowners may be absentee landowners within the likely Catchment Collective areas. They are less likely to have heard about the collectives in the community and can be provided more targeted and personalised information.	Medium
39. Consider a direct-marketing campaign targeted at absentee landowners designed to familiarise them with the plan, the mechanisms (particularly the Catchment Collectives) and what they seek to achieve. This would likely involve a number of foreign landowners as well as domestic absentee landowners, so may require specialist support (e.g. language advice) where appropriate. Various industry groups (e.g. Beef & Lamb, Dairy NZ) or government departments (e.g. NZTE) that have regular foreign interactions may be able to provide advice here.	Medium

11 References

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 2006*(3), 77-101. doi:10.1191/1478088706qp063oa

Bryman, A., & Bell, E. (2015). *Business Research Methods (4th ed.)*. Oxford, United Kingdom: Oxford University Press.

Carpenter, J.P. (2007). Punishing free-riders: How group size affects mutual monitoring and the provision of public goods. *Games and economic behaviour, 60*. pp.31-51. doi:10.1016/j.geb.2006.08.011

Casari, M., & Plott, C.R. (2003). Decentralized management of common property resources: experiments with a centuries-old institution. *Journal of Economic Behavior & Organization, 51*. pp.217–247.

Cason, T.N. & Gangadharan, L. (2016). Swords without covenants do not lead to self-governance, *Journal of Theoretical Politics, 28*(1). pp. 44–73.

Cary, J., Webb, T. & Barr, N. (2001). The adoption of sustainable practices: Some new insights - An analysis of drivers and constraints for the adoption of sustainable practices derived from research. Land & Water Australia, Canberra.

Cox, M., Arnold, G., & Tomás, S. V. (2010). A Review of Design Principles for Community-based Natural Resource Management. *Ecology and Society 15*(4): 38. Retrieved from http://www. ecologyandsociety.org/vol15/iss4/art38/

DairyNZ. (2015). *Sustainable dairying – water accord: A commitment to New Zealand by the dairy sector*. Hamilton, New Zealand: DairyNZ.

Dairy NZ & Dairy Companies Association of New Zealand. (2016). *Sustainable dairying – water accord: Three years on… progress report for the 2015/16 season*. Hamilton, New Zealand: Dairy NZ.

Duncan, R. (2015). Ways of knowing – out-of-sync or incompatible?: framing water quality and farmers' encounters with science in the regulation of non-point source pollution in the Canterbury region of New Zealand. *Environmental Science & Policy, 55*, pp. 151-157. http://dx.doi.org/10.1016/j.envsci.2015.10.004

Gluckman, P., Cooper, B., Howard-Williams, C., Larned, S., Quinn, J., Bardsley, A., Hughey, K. & Wratt, D. (2017). *New Zealand's fresh waters: values, state, trends and human impacts*. Wellington. New Zealand: Office of the Prime Minister's Chief Science Advisor.

Hardin, G. (1968). The tragedy of the commons. *Science, 162*(3859). pp. 1243-1248

Hawke's Bay Regional Council. (2015). *Plan Change 6 to Hawke's Bay Regional Resource Management Plan: Tukituki River Catchment*. (SD 15-08 – 4767). Napier, New Zealand: Hawke's Bay Regional Council.

Hawke's Bay Regional Council. (2017). *The TANK Plan: what you need to know about the TANK Plan for the Tutaekuri, Ahuriri, Ngaruroro and Karamū catchments*. Napier, New Zealand: Hawke's Bay Regional Council. Retrieved from https://www.hbrc.govt.nz/assets/Document-Library/TANK/TANK-booklet2017.pdf

Horizons Regional Council. (2016). *It's everybody's business: whole farm plans - a vehicle for implementing policy*. Palmerston North, New Zealand: prepared by AgResearch.

Kaine, G. & Wright, V. (2017). *Rates of adoption and compliance in dairy farming*. Hamilton, New Zealand: Waikato Regional Council (Technical report 2017/06).

Kerr, S. & Dorner, Z. (2013). *Tackling Agricultural Emissions: Potential Leadership from a Small Country*. Wellington, New Zealand: Motu Economic and Public Policy Research.

Segerson, K. (1988). Uncertainty and incentives for nonpoint pollution control. *Journal of environmental economics and management, 15*, pp.87-98.

Malterud, K. (2001). Qualitative research: standards, challenges, and guidelines. *The Lancet, 358*, 483-488.

Ministry for the Environment. (2003). *Review of New Zealand Environmental Farm Plans*. Wellington, New Zealand: prepared by P. Blaschke, & N. Ngapo.

Ministry for the Environment. (2011). *National Policy Statement - Freshwater Management 2011*. Wellington, New Zealand: Ministry for the Environment.

Ministry for the Environment. (2014). *National Policy Statement - Freshwater Management 2014*. Wellington, New Zealand: Ministry for the Environment.

Ministry for the Environment. (2017). *National Policy Statement - Freshwater Management 2014 (Amended 2017)*. (ME 1324). Wellington, New Zealand: Ministry for the Environment.

Ministry for the Environment & Stats NZ. (2017). *New Zealand's environmental reporting series: our fresh water 2017*. (ME 1305). Wellington Retrieved from www.mfe.govt.nz and www.stats.govt.nz.

Organisation for Economic Co-operation and Development (OECD). (2017). *OECD environmental performance reviews: New Zealand 2017*. Paris: OECD Publishing.

Ostrom, E. (1990). *Managing the commons: The evolution of institutions for collective action*. Cambridge, United Kingdom: Oxford University Press

Ostrom, E., Chang, C., Pennington, M., & Tarko, M. (2012). *The future of the commons: Beyond market failure and government regulation*. London, United Kingdom: Institute of Economic Affairs

Owen, W. F. (1984). Interpretive themes in relational communication. *Quarterly Journal of Speech, 70*, 274-287.

Pannell, D.J., Marshall, G.R., Barr, N., Curtis, A., Vanclay, F. & Wilkinson, R. (2006). Understanding and promoting adoption of conservation practices by rural landholders. *Australian Journal of Experimental Agriculture, 46*. pp. 1407-1424.

Parsons, O.J. (2016). *Cooperation, incentives and punishment in common pool resource management* (Masters thesis, University of Waikato, Hamilton, New Zealand). Retrieved from https://researchcommons.waikato.ac.nz/handle/10289/10645

Yin, R. K. (2014). *Case study research: Design and methods (5th ed.)*. Thousand Oaks, CA: SAGE Publications.

Appendix 1. Detailed methodology

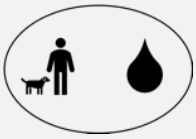
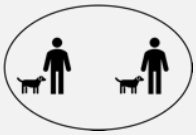
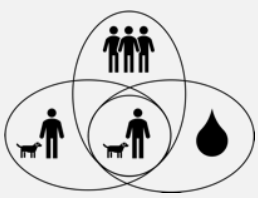
This appendix provides a detailed description of the methodology. It describes both the quantitative and qualitative data analysis undertaken; discusses the sampling method; and talks about some identified limitations of the methodology.

The four areas of data gathering and analysis

As outlined in the Literature Review (section 2.5), a framework was developed for how the survey and interviews would be undertaken. This focused around the areas of: the individual producers' perspectives on their work; the producers' view on the resource (water quality); the producers' perspectives of and relationship with other producers; and the producers' perspectives of and relationship with wider society. Imagery for each of these areas was developed and is shown in Figure A1.

These images will be used throughout this report and provide some visual reference for the data being discussed or analysed.

Figure A1. The four areas of the data gathering and analysis framework

Image	Area of data collection
	**The individual producers' perspectives on their work.**
	**The producers' view on the resource (water quality).**
	**The producers' perspectives of and relationship with other producers.**
	**The producers' perspectives of and relationship with wider society.**
	**A visual demonstration of the four areas combined with the individual farmer at the centre.**

Quantitative data analysis

While the quantitative survey data is a small amount of the data that was gathered and analysed, it remains an important *self-reported* component of the data.

With the exception of data relating to whether producers had an existing farm plan, and the profile data for the producer and their property, all the questions were on an 11-point Likert scale from 0 – 10. A full copy of the survey can be found in Appendix 2.

Some questions used were drawn from the Survey of Rural Decision-Makers (SRDM), a biennial survey run by Manaaki Whenua – Landcare Research in collaboration with other research, governmental and industry organisations[1]. This survey has been run three times, in 2013; 2015 & 2017. Some questions that reflected the interests of this research were drawn from this survey, to enable the possible comparison with a section of that wider national dataset (although this was not undertaken as part of this research).

Some of the survey questions are outlined in the following tables. These indicate what area of the data gathering and analysis framework the questions respond to and whether the questions were original or were drawn from the SRDM.

The majority of the quantitative questions relate to individual producer perspectives (Table A1), this includes a question relating to their individual perspective on their relationship with the resource of water (question 6). Four relate specifically to producers' perspectives of their relationships with other producers (0).

Table A1. Survey questions relating to individual producer perspectives

	**Questions relating to: Individual producer perspectives** **(relevant Likert scale follows each grouping)**	**Source**	
		Original	**SRDM**
2.	How important is being a **highly productive** farmer/forester/grower to your sense of **self-identity**, i.e., your sense of who you are? On a scale of 0 to 10, where 0 means 'not at all important' and 10 means 'extremely important', how do you see yourself?		✓
3.	How important is being a farmer/forester/grower **who takes good care of the environment** to your sense of **self-identity**, i.e., your sense of who you are? On a scale of 0 to 10, where 0 means 'not at all important' and 10 means 'extremely important', how do you see yourself?		✓

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Not important at all										***Extremely important***

[1] More information can be found on the Survey of Rural Decision-makers at:
https://www.landcareresearch.co.nz/science/portfolios/enhancing-policy-effectiveness/srdm

	**Questions relating to: Individual producer perspectives** **(relevant Likert scale follows each grouping)**	**Source**	
		Original	**SRDM**
4.	Are you generally a person who is fully prepared to take risks or do you like to avoid taking risks? On a scale of 0 to 10, where 0 means 'don't like to take risks' and 10 means 'fully prepared to take risks', how do you see yourself?		✓

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Don't like to take risks										***Fully prepared to take risks***

5a.	'I prefer to leave experimenting with new ideas to someone else'		✓
5b.	'I am always one of the first in the district to try something new'		✓
5c.	'When I see new practices and technologies being successfully used by other farmers/foresters/ growers, then I am also likely to adopt the new practice or technology'		✓

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Strongly disagree										***Strongly agree***

6.	How strong do you believe the relationship is between activities that occur on farms/forests/land like yours, and the water quality issues that are being experienced in the TANK catchments?	✓	

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
No connection at all										***Definite connection***

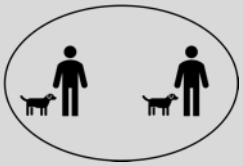
7a.	How complicated do you think it would be set up a **Farm Environmental Management Plan**?	✓	
7b.	How complicated do you think it would be set up an **Industry Programme** on your farm?	✓	
7c.	How complicated do you think it would be set up a **Landowner Collective Group**?	✓	

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Not complicated at all										***Extremely complicated***

8a.	What level of upskilling or additional training would you require to implement a **Farm Environmental Management Plan** on your farm?	✓	
8b.	What level of upskilling or additional training would you require to implement an **Industry Programme** on your farm?	✓	
8c.	What level of upskilling or additional training would you require to implement a **Landowner Collective** involving your farm?	✓	

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Not complicated at all										***Extremely complicated***

Table A2. Survey questions relating to individual producer perspectives

	**Questions relating to:** **Producers' perspectives on their relationships with other producers** **(relevant Likert scale follows each question)**	**Source**	
		Original	**SRDM**
9.	If you were part of a **collective group** that was seeking to improve environmental practice and was **'self-policing'**, **how likely** do you think **you would be** to tell the other members of the collective if **one of your neighbours** did not manage something the way **they** were supposed to?	✓	
0 1 2 3 4 5 6 7 8 9 10 ***Very UNLIKELY, I would not like that at all*** ... ***Very LIKELY, I'm fine with it***			
10.	If you were part of a **collective group** that was seeking to improve environmental practice and was **'self-policing'**, **how likely** do you think **your neighbours would be** to tell the other members of the collective when **you** did not manage something the way you were supposed to?	✓	
0 1 2 3 4 5 6 7 8 9 10 ***Very UNLIKELY, They would not like that at all*** ... ***Very LIKELY, They'd be fine with it***			
11.	If you were part of a **collective group** that was seeking to improve environmental practice and was **'self-policing'**, **how likely** do you think **you would be** to **agree to punish your neighbour**, as part of a collective management agreement? For example, your group may agree a fining system (or some other kind of punishment) for not adhering to agreed practice.	✓	
0 1 2 3 4 5 6 7 8 9 10 ***Very UNLIKELY, I would not like that at all*** ... ***Very LIKELY, I'm fine with it***			
12.	If you were part of a **collective group** that was seeking to improve environmental practice and was **'self-policing'**, how likely do you think **your neighbours would be** to **agree to punish you**, as part of a collective management agreement? For example, your group may have an agreed fining system (or some other kind of punishment) for not adhering to agreed practice.	✓	
0 1 2 3 4 5 6 7 8 9 10 ***Very UNLIKELY, They would not like that at all*** ... ***Very LIKELY, They'd be fine with it***			

Qualitative data analysis

This section outlines how the qualitative data gathered in the semi-structured interviews was coded and analysed.

Acknowledging the subjective frame (bias) of the researcher

As qualitative research is the result of the interaction of people, it is impossible to fully remove the researcher from the process. Consequently, it is important to acknowledge and state the subjective frame, or the inherent bias, of the researcher and what view they are approaching the research from (Malterud, 2001).

The researcher has significant experience in the local government industry where he has been involved with a range of both infrastructure and policy development projects. He has worked on a wide range of freshwater policy development projects like the TANK project. This research comes from an *interpretivist* perspective, primarily seeking to understand participants' *perceived* barriers to the adoption of the mechanisms within the proposed plan change.

Overview of the qualitative coding methodology

The coding of transcribed text is considered a suitable way of analysing these data as it requires searching for and identifying repetition, metaphors, similarities and differences (Bryman & Bell, 2015). Words or phrases are considered important to code when they *recur*; they are *repeated* by the interviewee; or they are used *forcefully* (Owen, 1984).

The coding of the data undertaken was a mixture of deductive and inductive coding. Deductive coding is 'top down'; while inductive is 'bottom-up' (Braun and Clarke, 2006). Deductive coding is undertaken with a certain interest in mind or within a particular theoretical framework – in other words, they are sought out within the data. In this research deductive coding was undertaken around a range of themes within the interview structure outlined earlier. Inductive coding means that themes are identified within – and therefore strongly linked to – the data themselves. In other words, these codes or themes are identified within the data with no preconceptions in mind. The codes used in this research are outlined in Table A3.

Table A3. Codes (or themes) used within this research.

Code (or theme)	Description	Code type	
		Deductive	Inductive
Attitude			
Positive	Positive comments.	✓	
Neutral	Neutral comments.	✓	
Negative	Negative comments.	✓	
Mechanism			
Individual Farm Plan	Relating to the Individual Farm Plan mechanism in the plan change.	✓	
Industry Programme	Relating to the Industry Programme mechanism in the plan change.	✓	
Catchment Collective	Relating to the Catchment Collective mechanism in the plan change.	✓	
1. The Producer as an individual			
1A. General	General comments relating to personal perspectives that do not fit into the other categories.	✓	
1A.1. Demands for action are appropriate	Relating to whether the public demand to act on water quality is perceived as justified.	✓	
1A.2. ROI for managing is appropriate	Relating to the perceived return on investment from managing water quality.	✓	
1B. Relative advantage	To do with the perceived relative advantage that using one of the mechanisms will provide to a producer in their day-to-day decision-making.	✓	
1C. Trialability	Relating to how trialable a mechanism(s) is perceived as.	✓	
Upskilling	Relating to the level of upskilling perceived as being required, or not, for a mechanism(s).	✓	
1D. Complexity	Relating to the perceived complexity of a particular mechanism(s).	✓	
Risk	Relating to the perceived risk of a particular mechanism(s).	✓	
2. The Producer and the resource			
2A. Clearly defined resource	Relating to how well the definition of water quality as a resource (the assimilative capacity of a waterway) is perceived to be understood.	✓	
2B. Ability to monitor resource	Relating to the ability and need to be able to monitor the resource (water quality) in order to be able to manage it.	✓	
Disconnect from data	An *inductive code* that was established to code comments that indicated a distance, disconnect, or general unawareness of the data that was available.		✓

Code (or theme)	Description	Code type	
		Deductive	Inductive
3. Producer to Producer (these codes were designed especially for comments regarding the Catchment Collectives)			
3A. Users influence the institution	Relating to the perceived ability to have an influence over the institution that is established to manage the resource.	✓	
3B. Users clearly defined	Relating to how easy it was to determine the 'users' of the water quality resource. That is, those individuals that use up the assimilative capacity of the water body.	✓	
3C. Monitoring others	Relating to the concept of members of a Catchment Collective **informally 'monitoring'** each other. In other words, passively keeping an eye on each other 'over the fence'. Not in a formal audited way.	✓	
3D. Appropriate punishment for infringement	Relating to the concept of members of a Catchment Collective **formally 'punishing'** each other. In other words, keeping each other accountable via some process or mechanism that is agreed by the group when it is set up.	✓	
3E. Conflict resolution	Relating to the process of internal conflict resolution, within a self-organised group. That is, without defaulting back to council.	✓	
4. Producers and wider society			
4A. Level of permission to self-organise	Relating to the perceived level of permission granted by the overarching institution to allow groups to self-organise to manage the resource.	✓	
4B. Organisations are appropriate and work well together.	Relating to the extent that the different institutions or groups within society are appropriate and work well together.	✓	
Misunderstanding	An *inductive code* that was established to code comments that indicated a perceived lack of understanding or appreciation of the reality of the producer's world (or vice versa) from other groups in society.		✓
5. Other themes			
Absentee owners	Relating to absentee owners or corporate owners.		✓
Accounting for nature/weather	Relating to the ability or need to be able to record, report and account for natural events (such as earthquakes) and significant weather events to be taken into account. This was considered important when monitoring progress on an issue in a waterway.		✓
Appropriate action	Related to making sure that any actions are objective and outcome driven. In other words, is the right thing being done?		✓
Build up slowly	Relating to the need to build up/scale up activity slowly and progressively.		✓

Code (or theme)	Description	Code type	
		Deductive	Inductive
Communication	Relating to communication between the various parties involved.		✓
Cost	Relating to cost.		✓
Desire for monitoring	Relating to the expressed *desire* for monitoring of the resource. This is different to the perceived need for monitoring and is more aligned with a self-professed desire for monitoring, either for or against.		✓
Good work already	Relating to the good work that has often already been undertaken or is being undertaken in relation to actions/practices to improve water quality.		✓
Independence versus guidance	Relating to the tension between the desire to self-organise and take ownership of the problem; and the expressed desire for clear guidance, consistency or direction at the same time.		✓
Keen to own issue	Comments indicating how keen interviewees were to take ownership of the issue.		✓
Leased land	Relating to leased land.		✓
Media	Relating to the media, their reporting and the relationship with the media.		✓
Modelling	Relating to technical modelling undertaken on the TANK project.		✓
My view has changed	Comments indicating that the view or perspective of interviewees has changed from one point to another. Usually in relation to things learned in the TANK process.		✓
One size doesn't fit all	Comments highlighting the belief that 'one size does not fit all'. Similar to but different from the *'independence vs guidance'* code.		✓
Politics	Relating to politics, regional or national.		✓
Rural-Urban equity	Relating to the equity of any action required across the different industries of social groupings involved. For example: rural vs rural (e.g. sheep & beef farming vs forestry); or rural vs urban (e.g. municipal versus pastoral farming).		✓
Still not clear	Comments indicating that some components, concepts or elements are still not clear.		✓
This is more than farming	Comments indicating that the mechanisms proposed in the plan change are not simply just related to farming. They are related to the community fabric of the districts.		✓
Upping Councils game	Relating to perceived areas where Regional Council will be required to improve its performance in light of the improvement that it is expecting from others.		✓

There are also several other important things to note about the coding process. Not all data are coded; codes are not mutually exclusive; and coding *instances* do not indicate the *size* or the *relative importance* of the pieces of data that are coded.

Firstly, not all comments or data are coded. While a mixture of deductive and inductive coding has been used, there are some data that are not considered relevant to the interests of the research and/or do not fall into a deductive code or indicate an important inductive code.

Secondly, codes or themes are not mutually-exclusive, and this should be remembered when reading the other sections and appendices of this report. For example, a comment may be both positive AND relating to Catchment Collectives – in which case it would be coded to both the *positive* and *Catchment Collective* codes. A further example may be that someone makes a negative comment about the cost of all three mechanisms – in which case the comment may be coded to the *negative* code; all three mechanism codes (*Individual Farm Plans, Industry Programmes* and *Catchment Collectives*); AND it may also be coded to the *Cost* code, five in total.

Finally, the *number* of coded instances does not provide a direct indication of the *size* of the coded instances. A single sentence or several paragraphs may both be coded as a single instance of code. This also does not account for the forcefulness or weight that an interviewee may have put on the comment. Therefore, some interpretation of this is required by the researcher when collating final insights.

Sampling and validity

This section outlines the approach taken to sampling as well as discussing validity and reliability

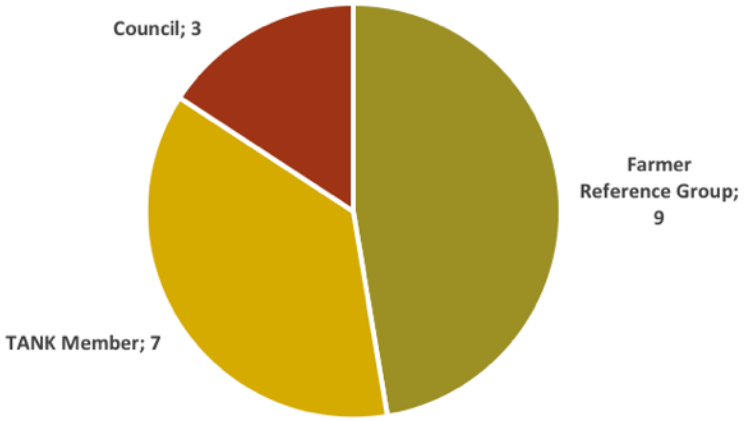
Sampling

The main object of this research is to identify potential barriers to the adoption of the three mechanisms proposed in the plan change: Individual Farm Plans; Industry Programmes; and Catchment Collectives. The Catchment Collective mechanism in particular had its genesis within the Farmer Reference Group and was put to the wider TANK Group as a recommendation. Therefore, the people with a high enough level of familiarity with the mechanisms to be interviewed was limited to the Farmer Reference Group, the TANK Group and some Council staff who had been involved with the project.

Because of this purposive sampling was used. The eligibility criteria were a conversant level of knowledge relating to the mechanisms proposed in the plan change; and a range of primary

industries were sought to provide perspectives on the issue from as many angles as possible. The limited pool of available interviewees and the limited time available for the research meant that a sample size of 19 was used. Nine of these came from the Farmer Reference Group, seven from the TANK Group and three from the Council perspective (one person was immediate ex-staff). (see Figure A2)

Figure A2. Make up of research sample from the TANK project



Pastoral farming (Sheep & Beef, Dairying) were strongly represented given the dominance of the sampling from the Farmer Reference Group. Importantly, efforts were made to ensure these representatives were geographically dispersed across the TANK area. An effort was made to ensure that horticulture was also represented by those TANK Group members that were interviewed.

The majority of the sample was male (16), with only three females in the sample.

Validity and reliability

Validity and reliability are important components of any research and there are minor risks with the validity and reliability of this research. These have been mitigated as best as possible in the ways described below.

Firstly, content validity seeks to ensure that the content of the research is appropriate to the objectives of this research. Are the semi-structured interview questions aligned with the objectives of the research? This risk was mitigated by seeking a peer review of the literature review and at the stage of the formation of the semi-structured interview questions. As outlined in the literature review the question structure is strongly aligned with the relevant perspectives from the literature, so this risk is considered to be minimised.

Construct validity seeks to ensure that the perspectives gained from the research are representative of what would be expected if the research was scaled up across a wider range

of people. Given the purposive nature of the sampling and the limited number of people familiar enough with the mechanisms to comment, this was difficult to achieve. This has been mitigated by presenting a draft of the research findings and recommendations to the Farmer Reference Group.

Reliability is ensuring that if a *different* researcher was to carry out the *same* research again, they would reach consistent results (Yin, 2014). The chances of this occurring are increased if the same protocols are followed. Namely, these are to: undertake the interview in person wherever possible; record the interview for accurate transcription; Have the interviewee fill out the survey (around 10 minutes) *before* undertaking the interview (around 1.5 hours); and ensuring that the interview is focused on the three mechanisms of interest by consistently referring back to them and ensuring interviewees are providing answers with these in mind.

Limitations

There are some possible limitations to this research that need to be outlined.

The primary limitations of this research are the limited sample size and the self-selection bias of those involved in the groups from which the research sample was drawn. That is to say, the research could only really interview people who were in the Framer Reference Group, the TANK Group or were Council staff familiar with the project. With the Farmer Reference Group and the TANK Group in particular, it is noted that many of these people have self-selected to be involved in those groups.

In general, they represent a group of people who are more motivated to be involved in such groups and who have been comfortable taking a more proactive involvement in the development of the mechanisms discussed. In other words, as these mechanisms (and the Catchment Collectives in particular) have been developed by the Farmer Reference Group and endorsed by the TANK Group, this research has largely 'interviewed the converted'. This should be recognised as an important limitation and the views and concerns identified in this research should be considered as being from those who are more engaged with the recommendations being made in the plan change.

Appendix 2. Copy of survey

Name: _____ Date: ___/___/_____

FARM PRACTICE

1 What is your experience with some of the practices being proposed in the TANK plan change. Have you already adopted the following practices on your farm/forest/growing operation?

1a Do you currently have a nutrient management plan?

☐ Yes ☐ No ☐ Does not apply to my farm/forest/growing operation

1b Are you currently a member of your industry's environmental programme?

☐ Yes ☐ No ☐ Does not apply to my farm/forest/growing operation

1c If 'Yes', what is the name of that programme?

2 How important is being a **highly productive** farmer/forester/grower to your sense of **self-identity**, i.e., your sense of who you are?
On a scale of 0 to 10, where 0 means 'not at all important' and 10 means 'extremely important', how do you see yourself? *(circle one)*

not at all important ... **extremely important**

0 1 2 3 4 5 6 7 8 9 10

3 How important is being a farmer/forester/grower **who takes good care of the environment** to your sense of **self-identity**, i.e., your sense of who you are?
On a scale of 0 to 10, where 0 means 'not at all important' and 10 means 'extremely important', how do you see yourself? *(circle one)*

not at all important ... **extremely important**

0 1 2 3 4 5 6 7 8 9 10

4 Are you generally a person who is fully prepared to take risks or do you like to avoid taking risks?
On a scale of 0 to 10, where 0 means 'don't like to take risks' and 10 means 'fully prepared to take risks', how do you see yourself? *(circle one)*

don't like to take risks ... **fully prepared to take risks**

0 1 2 3 4 5 6 7 8 9 10

5 The following questions are about your willingess to experiment, innovate and learn from others.
How do you rate yourself against the following statements on a scale of 0 to 10, where 0 is 'strongly disagree' and 10 is 'strongly agree'.

5a 'I prefer to leave experimenting with new ideas to someone else' *(circle one)*

strongly disagree ... **neutral** ... **strongly agree**

0 1 2 3 4 5 6 7 8 9 10

5b 'I am always one of the first in the district to try something new' *(circle one)*

strongly disagree ... **neutral** ... **strongly agree**

0 1 2 3 4 5 6 7 8 9 10

5c When I see new practices and technologies being successfully used by other farmers/foresters/ growers, then I am also likely to adopt the new practice or technology' *(circle one)*

strongly disagree ... **neutral** ... **strongly agree**

0 1 2 3 4 5 6 7 8 9 10

6 How strong do you believe the relationship is between activities that occur on farms/forests/land like yours, and the water quality issues that are being experienced in the TANK catchments? *(circle one)*

No connection at all ... **definite connection**

0 1 2 3 4 5 6 7 8 9 10

COMPLEXITY AND SKILLS REQUIRED

7 The below questions seek to understand how complicated or difficult you think it may be to set up one of the new farm plans, industry programmes, or a landowner collective group:

7a How complicated do you think it would be set up a **Farm Environmental Management Plan**? *(circle one)*

Not complicated at all — **extremely complicated**

0 1 2 3 4 5 6 7 8 9 10

7b How complicated do you think it would be set up an **Industry Programme** on your farm? *(circle one)*

Not complicated at all — **extremely complicated**

0 1 2 3 4 5 6 7 8 9 10

7c How complicated do you think it would be set up a **Landowner Collective Group**? *(circle one)*

Not complicated at all — **extremely complicated**

0 1 2 3 4 5 6 7 8 9 10

8 The following questions seek to understand what level of upskilling and additional training you think **YOU MIGHT NEED** to implement one of the three programmes on your farm/forest/land:

8a What level of upskilling or additional training would you require to implement a **Farm Environmental Management Plan** on your farm? *(circle one)*

No training or upskilling at all — **Significant training and upskilling**

0 1 2 3 4 5 6 7 8 9 10

8b What level of upskilling or additional training would you require to implement an **Industry Programme** on your farm? *(circle one)*

No training or upskilling at all — **Significant training and upskilling**

0 1 2 3 4 5 6 7 8 9 10

8c What level of upskilling or additional training would you require to implement a **Landowner Collective** involving your farm? *(circle one)*

No training or upskilling at all — **Significant training and upskilling**

0 1 2 3 4 5 6 7 8 9 10

MONITORING AND PUNISHMENT - LANDOWNER COLLECTIVE GROUPS ONLY

9 If you were part of a **collective group** that was seeking to improve environmental practice and was **'self-policing'**, **how likely** do you think **you would be** to tell the other members of the collective if **one of your neighbours** did not manage something the way **they** were supposed to? *(circle one)*

Very UNLIKELY, I would not like that at all — **Very LIKELY, I'm fine with it**

0 1 2 3 4 5 6 7 8 9 10

10 If you were part of a **collective group** that was seeking to improve environmental practice and was **'self-policing'**, **how likely** do you think **your neighbours would be** to tell the other members of the collective when **you** did not manage something the way **you** were supposed to? *(circle one)*

Very UNLIKELY, they would not like that at — **Very LIKELY, they'd be fine with it**

0 1 2 3 4 5 6 7 8 9 10

11 If you were part of a **collective group** that was seeking to improve environmental practice and was **'self-policing'**, **how likely** do you think **you would be** to **agree to punish your neighbour**, as part of a collective management agreement?
For example, your group may agree a fining system (or some other kind of punishment) for not adhering to agreed practice. *(circle one)*

Very UNLIKELY, I would not like that at all — **Very LIKELY, I'm fine with it**

0 1 2 3 4 5 6 7 8 9 10

12 If you were part of a **collective group** that was seeking to improve environmental practice and was **'self-policing'**, **how likely** do you think **your neighbours would be** to **agree to punish you**, as part of a collective management agreement?
For example, your group may have an agreed fining system (or some other kind of punishment) for not adhering to agreed practice. *(circle one)*

Very UNLIKELY, they would not like that at — **Very LIKELY, they'd be fine with it**

0 1 2 3 4 5 6 7 8 9 10

DEMOGRAPHIC QUESTIONS

13 How many years do you have working on farms/forests/growing? *(circle one)*

0-5 6-10 11-15 16-20 21-25 26-30 31-35 36-40 41-45 46-50 51-55 56-60 61+

14 What is your age?

☐ <40 ☐ 41-50 ☐ 51-60 ☐ 61+

15 How many generations of your family have been farming in New Zealand.*(circle one)*

1 2 3 4 5 6+

16 What is your highest level of education?

☐ Some Secondary School ☐ Completed Secondary School ☐ Tertiary: Certificate (level 1-6)
☐ Tertiary: Diploma (level 5-7) ☐ Tertiary: Bachelors degree ☐ Tertiary: Post Grad dip/cert
☐ Tertiary: Master's degree ☐ Tertiary: Doctoral degree

17 What is your highest level of formal training in agriculture or business?

☐ Secondary or some secondary education ☐ Post-secondary education in another field
☐ Post secondary education in agriculture

What is your primary role on the farm?

☐ Farm owner/joint owner ☐ Equity partner ☐ Farm manager/corporate
☐ Share milker ☐ Trust representative ☐ Leasee
☐ Other

FARM TYPE, PROFITABILITY AND SUCCESSION

18 What type of farm do you have?

☐ Sheep/Beef ☐ Grazing ☐ Veg/Flower ☐ Fruit/nuts
☐ Dairy ☐ Other stock ☐ Kiwifruit ☐ Forestry
☐ Deer ☐ Arable ☐ Wine grapes

19 What is the apporximate size of your farm? (in hectares)

☐

20 Profitability of the farm over the previous 2 years

☐ Unprofitable ☐ Break even ☐ Profitable

21 Succession planning. Which of the following categories best describes the profile of the successor on your farm:

☐ My own child/children ☐ Family Trust ☐ Other
☐ Another family member ☐ A mix of my own children and others ☐ None identified
☐ Someone who works on the farm but is not related

22 What is the relative percentage of income earned by your household on your farm, relative to off farm? *(circle one)*

0% 0-10% 10-20% 20-30% 30-40% 40-50% 50-60% 60-70% 70-80% 80-90% 90-100%

Appendix 3. Copy of semi-structured interview questions

	Ostrom	Pannell	Possible quant questions	Farm Plans	Industry Programmes	Collective Groups
Individual farmer	2A **The DEMANDS on the resource and FOR MITIGATION are appropriate for the environment**		Perspectives on the individual farmer - How long have you been in farming? - Tell me about your (and your families) connection with farming? - Why were you keen to be involved in the Farmer Reference Group? - What role if any do you believe that council (or other forms of government) should have in the management of resources? - What is your view on where and how that overlaps with the ownership and management of your farm? - What is your view of the current condition of the environment and the issues in the TANK area with water quality? How much of an issue is it? - To what extent do you believe that the activity on farms like yours may be connected to the water quality issues being experienced? How has your view on this evolved over time? - To what extent do you believe that the current demands for action are appropriate? Should water quality be maintained? - How impoant is water quality to the activities on your farm and others like it? - How appropriate are the demands for the management of the resource?	✓	✓	✓
	2B **The RETURN ON INVESTMENT from management is appopriate for the users**	**Relative advantage**	- What is your appetite for risk? - Do you take a short- or a long-term view to investments? Which predominantes? - Are returns in your industry more likely to be short or long term? - What is the perceived relative advantage of doing one of the three new stuctures (farm plan, industry programme or landowner collective) compared to what you are doing now? * explain: When I talk about RELATIVE ADVANTAGE, I mean the benefit to your farm practice of doing the new practice, compared to what you are doing currently. Is that view widely held?	✓	✓	✓
		Trialability	- How trialable are the mechanisms? - Would much farmer upskilling would be required? - What type of upskilling would be required? - How much would potential new structures DISRUPT the current farm system? If so, would this be a dramatic shift in practice?	✓	✓	✓
		Complexity	- How complex do you think the new mechanisms might be? How difficult migh they be to implement? - How risky do you think the proposed mechanisms might be? - How compatible will these potential new structures be WITH existing practices?	✓	✓	✓
			From an individual farmer perspective - what other things may be a barrier to the adoption of one of the three mechanisms for implementing mitigations?			

Farmer to Resource	1B **Clearly defined RESOURCE** 4B **The RESOURCE ITSELF can be monitored**	- How clearly do you think the resource is defined? How clearly is it understood by farmers in the area? - How important do you think is the need to monitor the resource in order to be able to manage it? - How clear is monitoring at the moment? How contentious (or not) is this currently? - How possible do you think it might be to be able to monitor the actual resource (the assimilative capacity of the resource)? - How POSSIBLE do you think it would be to operate one of the three proposed mechanisms WITHOUT clear monitoring? - How COMFORTABLE do you think it would be to operate one of the three proposed mechanisms WITHOUT clear monitoring? What would the challenges be?	✓ ✓	✓ ✓	✓ ✓
		From the perspective of the farmer to the resource - what other things do you think might be a barrier for the adoption of the one of the three mecahnisms for implementing mitigtions?			
Farm to Farm	1A **Clearly defined USERS** 3 **Those involved CAN INFLUENCE the outcome** 4A **USERS of the resource can be monitored** 5 **Appropriate PUNISHMENT for** 6 **CONFLICT RESOLUTION mechanisms**	- How clearly do you think are "users" of the resource are defined? - To what extent do you think that they have influence over the quality of the resource (water quality)? ***THESE NEXT QUESTIONS RELATE TO THE LANDOWNER COLLECTIVES ONLY*** - How comfortable would you be monitoring your peers? Why/Why not? - How comfortable do you think your peers would be with you monitoring them? Why/why not? - How comfortable would you be with imposing punishment ON YOUR PEERS, as part of a collective group? Why/why not? - How comfortable would YOU PEERS be with imposing punishment ON YOU, as part of a collective group? Why/why not? - How would you describe the level of TRUST between YOU AND THE OTHER FARMERS in your catchment/immediate area? - What might make this trust more difficult? - If you were working in a collective group, what support might a group need to help resolve conflicts?			✓ ✓ ✓ ✓ ✓
		From a farm to farm perspective - what other things do you think may be a barrier to the adoption of one of the three mechanisms for implementing mitigations?			
Farm to Society	7 **Level of PERMISSION to self-organise** 8 **Institutions & organisations are appropriate and WORK WELL TOGETHER**	- How woud you describe the relationship between farmers like you and the wider community (wider Hawkes Bay)? - How would you describe your relationship with Council? - How would farmers in the area generally describe their relationship with council? What sorts of things would improve that relationship? From their side? From your side? - How would you rate your level of TRUST with council? - How do you think Council would rate its level of TRUST with you? - How do you think society would rate its level of TRUST with you?	✓ ✓	✓ ✓	✓ ✓
		From the farm to society perspective - what other things do you think might be a barrier to adopting any of the three mechanisms for implementing mitigations?			

Appendix 4. Summary demographic data from interviewees

This appendix includes the results of the farm specific and demographic questions asked in the survey. These are shown in combined table and graph form. For a copy of the survey see Appendix 1.

Q1a: Do you currently have a nutrient management plan?

Yes	No	Does not apply to my farm/forest/growing operation	*n*=
8	6	-	14

Q1b: Are you currently a member of your industry's environmental programme?

Yes	No	Does not apply to my farm/forest/growing operation	*n*=
6	6	2	14

Q13: How many years do you have working on farms/forests/growing?

0-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61+	*n*=
-	-	-	1	-	2	3	2	2	3	-	-	2	15

Q14: What is your age?

<40	41-50	51-60	60+	*n*=
1	3	8	3	15

Q15: How many generations of your family have been farming in New Zealand?

1	2	3	4	5	6+	*n*=
2	-	3	3	4	1	11

Q16: What is your highest level of education?

Education level	No.
Some Secondary School	1
Completed Secondary School	3
Tertiary: Certificate (level 1-6)	3
Tertiary: Diploma (level 5-7)	2
Tertiary: Bachelors degree	3
Tertiary: Post Grad dip/cert	2
Tertiary: Master's degree	-
Tertiary: Doctoral degree	-

n=14

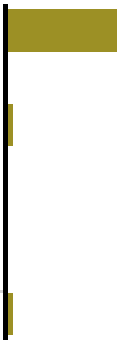
Q17a: What is your highest level of formal training in agriculture of business?

Education level	No.
Secondary or some secondary education	2
Post-secondary education in another field	3
Post seconday education in agriculture	8

n=13

Q17b: What is your primary role on the farm?

Primary role	No.
Farm owner/joint owner	12
Equity partner	-
Farm manager/corporate	1
Share milker	-
Trust representative	-
Leasee	-
Other	1



n=14

Q18: What is your type of farm?

Farm type	No.
Sheep/Beef	**9**
Dairy	**2**
Deer	**-**
Grazing	**-**
Other stock	**-**
Arable	**-**
Veg/Flower	**-**
Kiwifruit	**-**
Wine grapes	**-**
Fruit/nuts	**3**
Forestry	**-**

n=14

Q19: What is the approximate size of your farm? (in Ha)

Farm sizes, where noted, are listed below				
14	43	365	400	500
700	750	870	995	1,200
1,250	1,400	2,956		

Average farm size: 880 Ha.

Median farm size: 750 Ha.

Q20: Profitability of the farm over the last 2 years.

Unprofitable	Break even	Profitable
1	**1**	**11**

Q21: Which of the following categories best describes the profile of the successor on your farm?

Succession plan	No.
My own child/children	7
Another family member	-
Someone who works on the farm but is not related	-
Family Trust	2
A mix of my own children and others	1
Other	1
None identified	2

n=15

Q22: What is the relative percentage of income earned by your household on your farm, relative to off farm?

0%	0-10%	10-20%	20-30%	30-40%	40-50%	50-60%	60-70%	70-80%	80-90%	90-100%	n=
-	-	-	1	-	-	-	1	1	2	7	12

Appendix 5. Detailed results – survey data

This section provides a detailed overview of the results from the survey in two parts: A tabulated overview; and graphed results grouped into related blocks of questions. A summary of results from the semi-structured interview data is in the following section.

Survey results – tabulated overview

The below table (Table A4) summarises the quantitative results from the survey that required an answer on an 11-point numerical scale. The meaning of the scale varied across the questions, as is indicated in the table, with most being Likert-type questions.

Table A4. Summary of questions requiring an answer on an 11-point scale

	Survey question	0	1	2	3	4	5	6	7	8	9	10	n=
		Not important at all										*Extremely important*	
Q2	How important is being a **highly productive** farmer/forester/grower to your sense of **self-identity**, i.e., your sense of who you are?	0	0	0	0	0	0	0	2	8	3	1	14
Q3	How important is being a farmer/forester/grower who takes **good care of the environment** to your sense of **self-identity**, i.e., your sense of who you are?	0	0	0	0	0	0	0	0	2	5	7	14
		Don't like to take risks										*Fully prepared to take risks*	
Q4	Are you generally a person who is fully prepared to take risks or do you like to avoid taking risks?	0	0	0	0	0	1	4	5	3	1	0	14
		Strongly disagree										*Strongly agree*	
Q5a	'I prefer to leave experimenting with new ideas to someone else'	0	2	1	3	0	1	1	2	2	1	1	14
Q5b	'I am always one of the first in the district to try something new'	0	1	0	1	2	0	1	1	6	2	0	14
Q5c	'When I see new practices and technologies being successfully used by other farmers/foresters/ growers, then I am also likely to adopt the new practice or technology'	**0**	1	0	0	0	1	***2***	1	7	2	0	14
		No connection at all										*Definite connection*	
Q6	How strong do you believe the relationship is between activities that occur on farms/forests/land like yours, and the water quality issues that are being experienced in the TANK catchments?	0	1	1	1	1	3	2	4	2	1	0	16
		Not complicated at all										*Extremely complicated*	
Q7a	How complicated do you think it would be set up a **Farm Environmental Management Plan**?	0	1	4	2	1	3	0	3	2	0	0	16
Q7b	How complicated do you think it would be set up an **Industry Programme** on your farm?	1	1	4	0	1	4	0	0	4	1	0	16
Q7c	How complicated do you think it would be set up a **Catchment Collective Group**?	0	0	3	2	1	1	2	2	2	1	1	15
		No training or upskilling at all										*Significant training and upskilling*	
Q8a	What level of upskilling or additional training would you require to implement a **Farm Environmental Management Plan** on your farm?	0	2	2	2	4	3	1	2	0	0	0	16
Q8b	What level of upskilling or additional training would you require to implement an **Industry Programme** on your farm?	0	2	3	1	3	5	1	1	0	0	0	16
Q8c	What level of upskilling or additional training would you require to implement a **Catchment Collective** involving your farm?	0	1	2	0	5	3	2	3	0	0	0	16
		Very UNLIKELY I would not like that at all										*Very LIKELY I'm fine with it*	
Q9	If you were part of a **collective group** that was seeking to improve environmental practice and was **'self-policing'**, **how likely** do you think **you would be** to tell the other members of the collective if **one of your neighbours** did not manage something the way they were supposed to?	1	0	0	0	0	1	1	2	5	2	2	14
		Very UNLIKELY They would not like that at all										*Very LIKELY They'd be fine with it*	
Q10	If you were part of a **collective group** that was seeking to improve environmental practice and was **'self-policing'**, **how likely** do you think **your neighbours would be** to tell the other members of the collective when **you** did not manage something the way **you** were supposed to?	0	1	0	0	0	3	1	2	5	2	0	14
		Very UNLIKELY I would not like that at all										*Very LIKELY I'm fine with it*	
Q11	If you were part of a **collective group** that was seeking to improve environmental practice and was **'self-policing'**, **how likely** do you think **you would be** to **agree to punish your neighbour**, as part of a collective management agreement? For example, your group may agree a fining system (or some other kind of punishment) for not adhering to agreed practice.	2	1	1	0	2	5	0	1	0	1	0	13
		Very UNLIKELY They would not like that at all										*Very LIKELY They'd be fine with it*	
Q12	If you were part of a **collective group** that was seeking to improve environmental practice and was **'self-policing'**, **how likely** do you think **your neighbours would be** to **agree to punish you**, as part of a collective management agreement? For example, your group may have an agreed fining system (or some other kind of punishment) for not adhering to agreed practice.	0	2	2	1	2	3	0	1	2	0	0	13

Note that the number of people that responded to each question varied (see column "n=" in Table A4). Not all participants were landowners – usually Council staff or industry representatives – therefore they did not feel they could answer questions related specifically to an individual style of farm or farming. These tended to be the questions that related to: how importantly productivity or environmental stewardship was to their self-identity *as a farmer*; their appetite for *risk*; or how comfortable they would be *monitoring or punishing other participants* if they were part of a *collective group*.

Questions that all participants were able to answer were related more specifically to their *perceptions* of the mechanisms or other farmers: how strongly they saw *farming activity connected to water quality*, in general; how potentially *complex* they perceived the different mechanisms; and how much additional *training or upskilling* they thought was required for each of the mechanisms.

Council staff were not invited to answer the survey as they were not producers, but the themes within the survey were consistent with the structure of the interviews, so their perceptions were captured by the qualitative analysis.

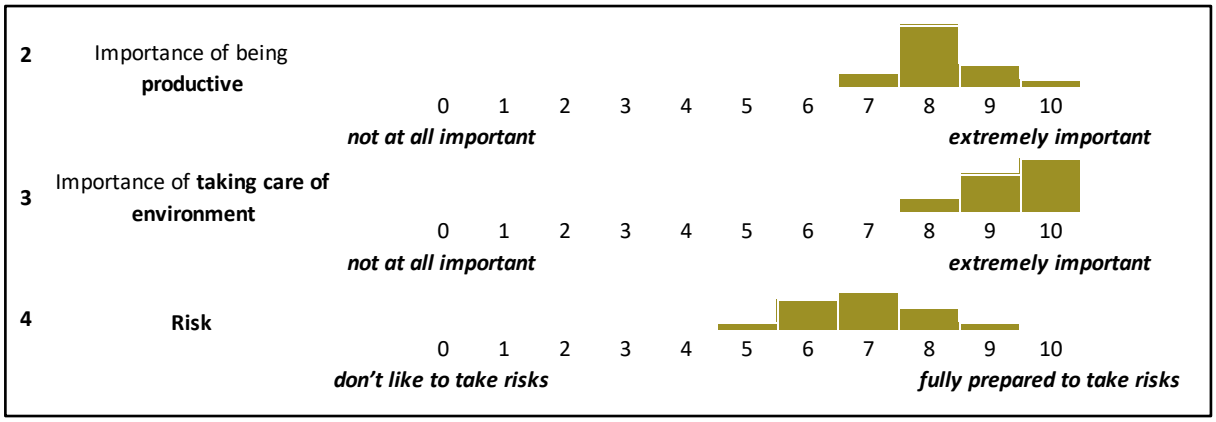
Survey results - graphed

Each are of these results is discussed briefly below and presented graphically. They are in part supported with comments from participants that were made while these questions were being filled out.

Producers Self-identity – productivity, the environment and risk

Questions 2, 3 and 4 provided the clearest results of all of the scale questions (see Figure A3).

Figure A3. Graphed results for questions relating to productivity (Q2); environment (Q3); risk (Q4).



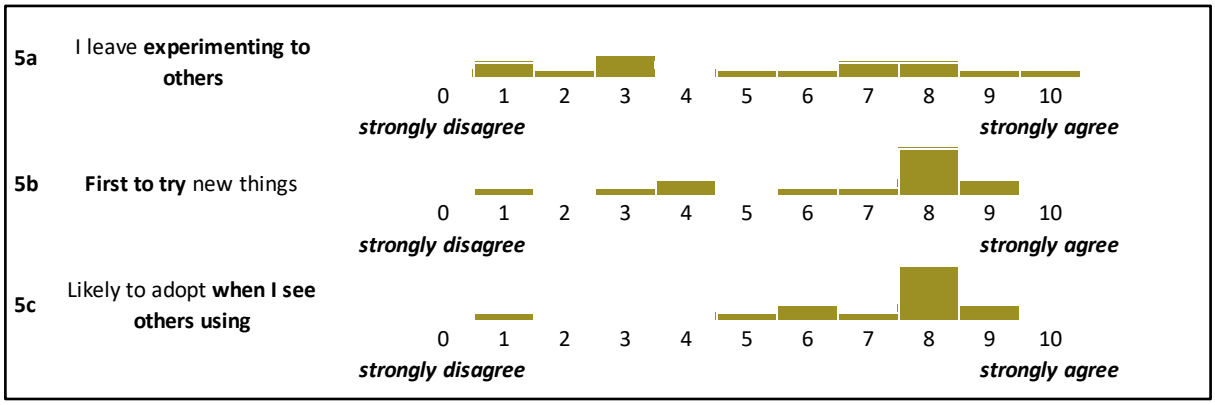
Most people saw being productive as very important (most marking 8) yet interestingly they tended to rank the importance of environmental stewardship to their self-identity higher (with nearly all either 10 or 9, respectively). Comments that were made when participants were filling in these questions related to them perceiving themselves as the current caretakers of the land for the next generation. One or two even noted that while productive farmers, they did not 'push' the land as hard as they recognised that they could, in order to maintain a better environmental result.

Most farmers indicated that they had a reasonable appetite for risk, with most responding in the 6-8 range. When filling this question in, most indicated that they preferred calculated risks. Many also noted that there some risks that were within their control (such as farm decisions) and there were some that were outside their control (such as the climate). This reinforced that a certain amount of risk was an inherent part of being a farmer.

Producers willingness to experiment

With the questions relating to participants willingness to experiment, innovate and learn from others, the results become more distributed and varied (see Figure A4).

Figure A4. Graphed results for questions relating to experimentation and adoption (Q5a-c).



When asked to agree to disagree with the statement that they leave experimenting to others, participants responses ranged fairly evenly from strongly disagree to strongly agree. This indicated that some were much more comfortable experimenting that others.

In terms of whether participants considered themselves the first to try new things in their district, more respondents tended to agree, with a spike of answers around 8. However, there were a couple of notable exceptions towards the disagree end of the spectrum, indicating that at least some preferred to let others be the first to try something new.

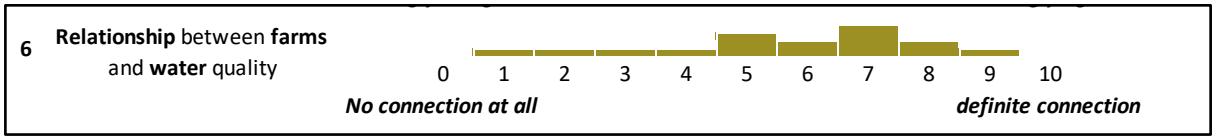
Most participants were very likely to adopt new practices and technologies if they saw them in action, with most answers correlating to the strongly agree end of the spectrum for this statement.

It is noted that there was one notable outlier in this question, with one participant selecting 1, indicating that they strongly disagreed that they would adopt a new technology or practice if they saw others using it. As this is not what was expected, the potential that this respondent perhaps misunderstood the scale and chose towards the opposite end that intended should not be discounted. While the scale of these questions remained the same (0-10), the terms for the different questions often changed and perhaps some people found this confusing.

The perceived impact of activity on water quality

It was important for this research to attempt to determine how strongly farmers and growers felt the activity on farms *like* theirs (in general – not specifically theirs) was related to the water quality issues being experienced in the TANK catchments. Question 6 attempted to do this (see Figure A5).

Figure A5. Graphed results for question relating to the strength on relationship between activity on farms and water quality (Q6).

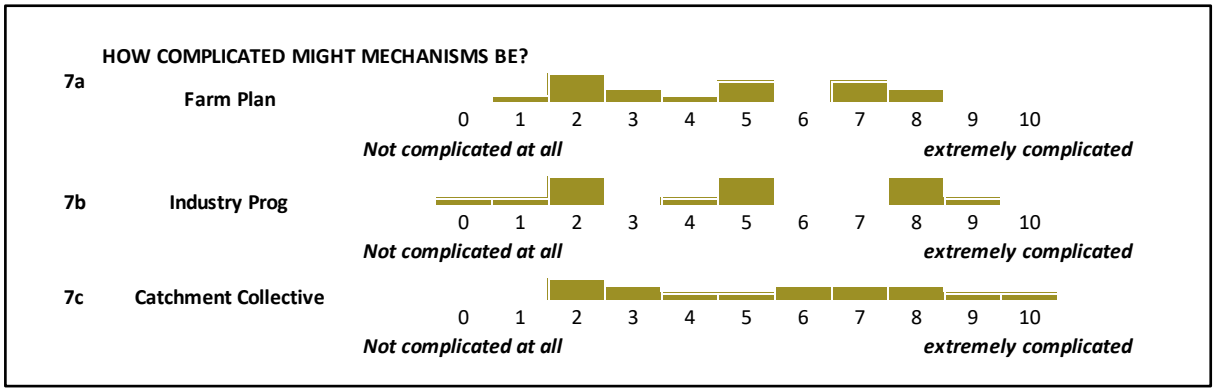


Perceptions were definitely varied in relation to this, with at least one respondent for every step of the scale between 1-9, and multiple respondents for 5 through 8 (with actual numbers for each being 3, 2, 4 and 2 respectively). This indicates that most people at least saw some connection between farm activity and water quality, however comments when people were filling out this question clearly indicated that most felt that while there was a connection, the actual contribution that farming and growing was making was fairly minimal. This was consistent across all industries represented. It should be noted that this question did not seek to *quantify the strength* of that relationship, which was considered beyond the scope of this research.

Perceived complexity of proposed mechanisms

When asked about the perceived complexity of the different mechanisms, responses again tended to range from a perception that they could be quite complicated or quite simple (see Figure A6).

Figure A6. Graphed results for questions relating to the perceived complexity of the proposed mechanisms (Q7a-c).



For Individual Farm Plans, those that saw them as being simple indicated that much of the work required of them was already being done by most farmers (e.g. nutrient budgets or good winter cropping practices). Those that perceived them as potentially complex indicated that they may need to be detailed, requiring skills not available on farm, and that they may become very prescriptive, cumbersome documents. Those respondents that sat in the middle (around the 5 mark) tended to indicate that for the range of reasons already list above they could be complex or not, and that it would depend heavily on the person involved and the nature of their farm.

Responses relating to Industry Programmes tended to be slightly more binary. Those that saw them as being very simple supported this by commenting that they were effectively 'off the shelf' products; that they were made to be easily understandable; and importantly for some people, that they often came with support from the relevant industry body to help complete them (or continue to collect information ongoing). Those that saw them as complex tended to note that, like farm plans, they were likely to be quite prescriptive and perhaps difficult for an individual to work though without support. There were also a few respondents that chose the middle of the scale, commenting that they again thought it would depend on the individual, the industry and the actual environmental problem seeking to be addressed. With the Industry Programmes it is important to note that many respondents perceived them as not being particularly well suited to the environmental needs of the TANK plan change. Rather, they tended to be more focused around the resulting quality of the product rather than the environment.

In relation to both Individual Farm Plans and Industry Programmes, several participants commented that they viewed these mechanisms as potentially being quite 'lonely'. It was perceived figuring out how to do something that was unfamiliar and probably quite paperwork-intensive was seen as something that could be quite frustrating, if done without help. Respondents were describing that these were perceived as isolating, leaving one to figure it

out by themselves rather than as a group. Some indicated that this was also part of the reason they viewed them as potentially complex.

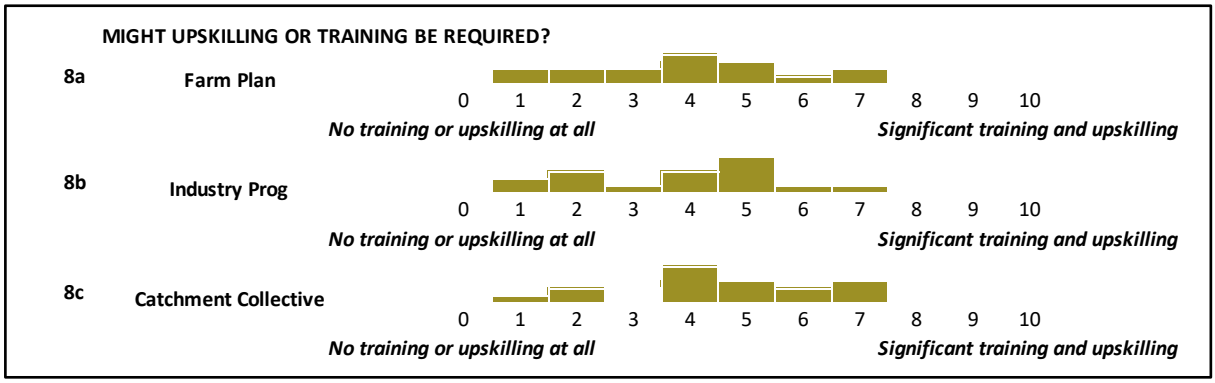
Respondents perceptions of the complexity of the Catchment Collectives was much more evenly spread. There was at least one respondent on every step of the scale from 2-10, with a small cluster around 2-3 (less complex) on the scale and again around 6-8 (more complex). The reasons given for the collectives being perceived as less complex included the view that they would be quite social, unlike the other mechanisms, and that participants would be able to draw on the experience of other farmers/growers, thus making their own challenges easier to deal with. They were also perceived as more pragmatic, activity orientated (rather than developing a plan that would just 'sit in a drawer') and easier to administer. They were perceived as less complex where the respondent considered that their community was a strong community that was functioning well.

Those that perceived them as potentially more complex tended to indicate that this was based on the fact that by nature they have to then deal with a range of other farmers or growers. Where respondents did not feel that they had a strong or vibrant community they tended to see this as potentially more complex. Some also saw them as potentially more complex due to the potential for *conflict* between farmers/growers, and *lack of clarity* around how they would work, and what *level of power* one farmer may have over another, or the governance group of a collective over members of a collective. In other words, while many were happy to work together, it was unclear who may be able to tell who what to do, which was perceived as potentially more complex.

The perceived need for additional training or upskilling

Results relating to the extent that participants saw a need for training or upskilling for any of the three mechanisms were also quite varied. None of the mechanisms were viewed as requiring significant training and upskilling, with the highest response for all only being 7 (see Figure A7).

Figure A7. Graphed results for questions relating to the perceived need for upskilling or training for the proposed mechanisms (Q8a-c).



For Individual Farm Plans the perceptions were fairly evenly distributed from 1-7, with a small clustering of responses around 4-5. While some viewed them as very straight forward (indeed, some respondents already had them), while others suggested that a reasonable level of technical upskilling may be required. This was often seen as either in the administrative side of putting it together (e.g. computer and writing skills), or additional technical knowledge required for specific areas.

Perspectives on Industry Programmes also covered a range from 1-7, with a cluster around 4-5 and a smaller cluster around 1-2. Those that perceived these as requiring little upskilling noted that they were set up to be guided through in quite a straightforward manner. While others noted that they would still likely require a certain level of upskilling, particularly around technical aspects more than the administrative side.

Responses for Catchment Collectives also ranged from 1-7, with the highest score being 4 and a continued cluster through to 7. While several people perceived that this would also be an approach requiring little additional training, others were more cautious and noted that some level of upskilling and support may be required for the 'human' side of this mechanism. The potentially challenging dynamics of the group situation was a common comment.

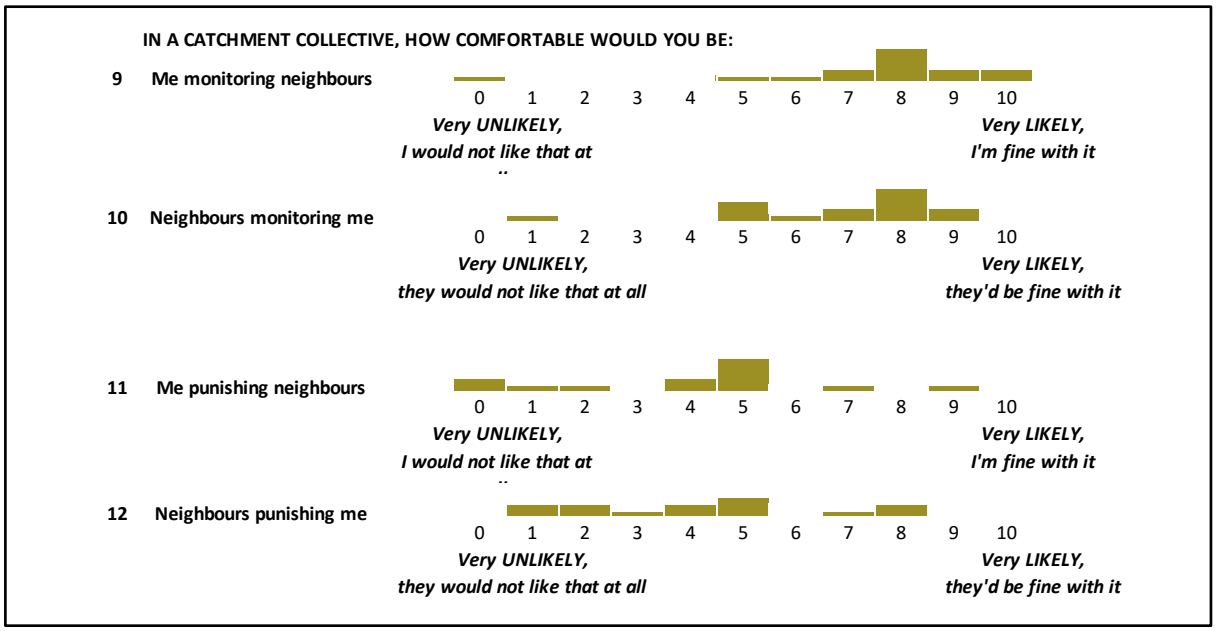
Monitoring and punishment of others in a Catchment Collective

Questions 9-12 all related solely to the Catchment Collective mechanism. These were designed to explore respondent's level of comfort with two things: *passively monitoring* other people in the collective; and *having to punish* them if they did not adhere to the rules (whatever they were for that group). In other words, if people were in a group that was seeking to be 'self-policing', how comfortable were they 'keeping an eye on' each other and potentially holding other members of that group to account if they did not do what had been agreed by the group? (see Figure A8)

These questions definitely generated the most comments and/or discussion when participants were filling in the survey. Many of these comments were revisited and explored in more detail in the discussion that followed and are therefore covered in the subsequent qualitative analysis and coding sections of this document. However, some key points are worth noting.

Firstly, consider the responses to the monitoring questions (9 & 10). Generally, participants were fairly comfortable with the concept of passively keeping an eye on other people in the group – who were likely to be their neighbours – with most responses clustering around 8. The level of comfortable that respondents perceived *others* had monitoring *them* was slightly lower. Although there was still a cluster around 8 with a smaller cluster around 5. It was acknowledged and noted by many that there was often already a reasonable amount of passive monitoring going on and a certain amount of proactive prompting that was already being provided. Several respondents talked about the role that informal social interactions already played, such as 'giving each other stick' at the pub on a Friday night.

Figure A8. Graphed results for questions relating to the perceived comfort of monitoring or punishing other in a collective group (Q9-12).



The punishment questions were read with a much lower level of comfort and clearly made some people quite uncomfortable. It is important to note here that the researcher often took the time to explain these questions so that people were quite clear. Because the question described fining other collective members as an example of how 'punishment' might occur, some participants took this to mean that was literally what was being proposed. The research took time here to highlight that these questions were designed to help determine participants level of comfort with the *concept* of punishment, or holding each other accountable, regardless of how a group may actually determine to do that for itself.

Responses to these questions were mostly spread across the lower range of the scale (0-5) with a couple around 7, 8 or 9. There tended to be a cluster around 5 for both questions (how comfortable they would be and how comfortable they thought their neighbours would be). Most respondents did not view 'punishment' as the role of the collective group and clearly saw this as the role of Council. However, once they understood that the question sought their level of comfort with the *concept* of holding each other accountable, regardless of how that was actually achieved, some respondents could see merit in having some kind of conflict resolution process in place that was pre-determined and agreed when entering into the group.

Appendix 6. Detailed results – coding of semi-structured interview data

This appendix presents greater detail of the thematic coding of interview data. The codes used and an explanation of whether they were deductive or inductive is provided in Appendix 1. Further qualitative data is drawn on in the discussion section. This appendix will: provide an overview of the results according to participants TANK Group affiliations; provide an overview of results by mechanism and attitude (positive, neutral, negative); provide a detailed summary of the deductive coding results by mechanism grouped by the structure of the research framework; and provide a detailed summary of the inductive coding results, by other themes.

Overview results by representative affiliation

This section presents some initial overview perspectives on the coded data according to which TANK group they were affiliated to. While the insight that these data provide into the source and broad nature of many of the comments, this analysis of the coded data should be viewed with a lower weighting than the qualitative comments, given the small sample size.

The relevant TANK groups were: the TANK stakeholder group itself; the Farmer Reference Group; and the Council. While data was also collected by industry type and gender, the small sample size prevents that data being presenting, due to the difficulty of maintaining the anonymity of some respondents. Therefore, only data relating to TANK affiliation is presented.

Firstly, the volume of comments from all affiliations was heavily weighted towards the Catchment Collectives (see Table A5). This is not surprising and is a result of the interview approach. This research was interested in *barriers* to the adoption of the mechanisms, and as discussed in the literature review and methodology sections, one entire part of the interview was focused solely on the Catchments Collectives. Also, given the semi-structured nature of the interview and the fact that the Catchment Collective was the most novel of the mechanisms proposed (Individual Farm Plans and Industry Programmes already have a long history), it is not surprising that a greater volume of the discussion was focused in this area.

Table A5. Volume of comments relating to plan mechanisms by TANK affiliation

	Individual Farm Plan	Industry Programme	Landowner Collective
Farmers Reference Group	56	44	208
TANK Member	37	45	155
Council	21	28	82

While not all comments were coded to a mechanism or a theme, most were coded to an attitude which reflected the tone of the comment (positive, neutral, negative). When only the *attitude* of the comments is tabulated according to TANK affiliation (Table A6) it can be seen that while no single attitude had an overall majority, the bulk of comments were negative (approximately 40%), followed by positive (approximately 35%) and also a large were also neutral (approximately 25%).

Again, it is important to keep these data in context as this does not necessarily mean that the majority of the discussions were negative. The research was interested in *barriers* to adoption so when potential barriers, areas of discomfort or confusion were identified in the interviews, these were discussed further. This was to better understand the potential risk they may have posed. Consequently, it should be expected that a range of negative or neutral comments were identified.

Table A6. Volume of comments by attitude (positive, neutral, negative) and TANK affiliation

	Positive	Neutral	Negative
Farmers Reference Group	189	155	245
TANK Member	159	101	165
Council	64	58	78

When both mechanism AND attitude are tabulated by TANK affiliation, a clearer picture of the discussions begins to develop (see Table A7). The volume of comments from participants who affiliate with the Farmer Reference Group continue to make up the bulk of the sample, followed by TANK Group members and then Council staff, which is proportionally consistent with the sample. What is of greater interest though is that some other insights become apparent.

Firstly, for both the Individual Farm Plans and the Industry Programmes, there were slightly more negative comments made by members of the Farmer Reference Group and the TANK Group. This may be an indication of a slightly more negative view on these mechanisms by these groups.

Secondly, for the Catchment Collectives, all affiliations made slightly more *positive* comments than *negative* ones. While the negative comments are of interest to help understand potential barriers, it is important to note that there were many positive comments made. This additional layer of granularity in the data is useful, as by only considering the volume of comments or the volume of attitude weighting, it could be easy to assume that the majority of comments were negative.

Thirdly, it is important to note that the Council affiliated respondents were the only one who made more *positive* than *negative* comments on ALL of the mechanisms. While this was only

slightly so for the Catchment Collective (31 positive vs. 30 negative), it would suggest that all were viewed as providing some benefit to Council. Whereas it could be inferred that Individual Farm Plans and Industry Programmes were seen as less appealing by farmers and growers themselves.

Table A7. Volume of coded comments for each mechanism AND attitude (positive, neutral, negative), according to participants TANK affiliation

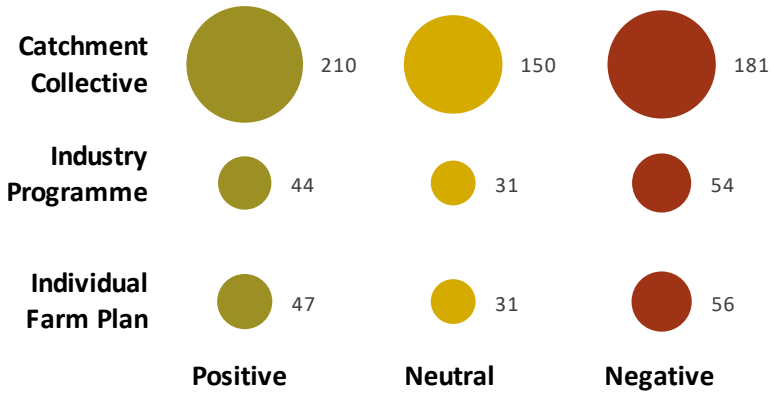
TANK affiliation	Individual Farm Plans			Industry Programmes			Catchment Collective		
	😊	😐	☹	😊	😐	☹	😊	😐	☹
Farmers Reference Group	20	11	27	15	7	25	83	58	75
TANK Member	13	7	20	16	15	17	72	36	52
Council	10	9	3	13	8	7	31	25	30

Overview results by mechanism and attitude

The previous section presented the results of coding according to the affiliation of participants within the TANK plan change process. This section provides an overview of the volume of coded comments for each mechanism according to attitude, independent of industry or organisation affiliation.

By far the largest volume of comments coded related to the Catchment Collective mechanism. For each attitude (positive, neutral, negative), even when the number of comments coded to the other two mechanisms are combined (Farm Plans and Industry Programmes) they only total around 40-60% of the comments coded to Catchment Collectives (see Figure A9).

Figure A9. Proportional number of coded references for each plan mechanism and attitude (positive, neutral, negative)



Numbers beside each bubble indicate the number of comments made.

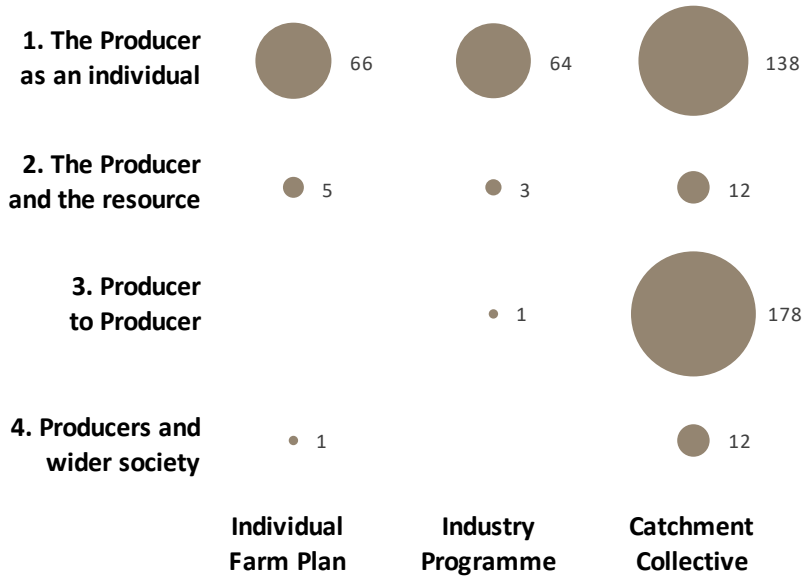
For each of the mechanisms the distribution profile of comments is similar. Neutral comments are the smallest grouping for each mechanism, yet they still make up a reasonable amount of comments. For the Individual Farm Plans and Industry Programmes there are slightly more negative comments than there are positive. For the Catchment Collective there are slightly more positive comments than there are negative comments.

Detailed results by mechanism and interview structure (deductive coding)

The previous section provided an overview of the volume of coded comments for each mechanism according to attitude only. This section presents more detailed results for each mechanism according to codes that reflect the general structure of the semi-structured interviews, and the attitudes that they were coded to. This section is divided into sections that mirror the interview structure: the producer as an individual; the producer and the resource; producer to producer; and producers and wider society.

To begin, the volume of comments coded to the relevant general structure of the semi-structured interviews is shown in Figure A10. When considering this information, it is important to remember the way that this interview structure was arrived at (see the literature review). The first part of the interview structure was designed to investigate potential barriers to all mechanisms, while the subsequent sections, particularly the third section (producer to producer) was designed to more specifically explore the potential barriers to the Catchment Collective mechanism.

Figure A10. Proportional number of coded references for each plan mechanism within correlated with each part of the semi-structured interview structure.



Numbers beside each bubble indicate the number of comments made.

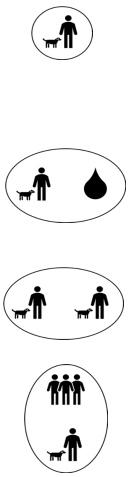
Given this information it is not surprising to see that comments relating to all mechanisms were made in the first part of the interview, which was where issues such as complexity, trialability, upskilling & training and risk were explored. The latter parts of the interview tended to generate much greater comments relating to the Catchment Collectives. The majority of discussion relating to the catchment collectives tended to be in the third part of the interview, where producer to producer relationships were explored. This was where the concepts of monitoring and 'punishing' other members of a Catchment Collective were explored.

The lack of coded comments in the other parts of the interview structure did not mean that general comments were not made, they were just not ascribed to any particular mechanisms. Comments that were made here are likely to be code to 'other themes' discussed later (see *Detailed results by other identified themes, by mechanism (inductive coding)* later in this appendix).

Further insight can be gained if the comments are broken down in more detail by the structure of the interview, the mechanism and the attitude, as shown in Table A8 below.

Table A8. Volume of comments by interview structure, mechanism and attitude

Coded theme	Individual Farm Plans			Industry Programmes			Catchment Collective		
	☺	😐	☹	☺	😐	☹	☺	😐	☹
1. The Producer as an individual									
1A. General	0	0	0	0	0	0	1	0	0
1A.1. Demands for action are approriate	0	0	0	0	0	0	0	0	0
1A.2. ROI for managing is appropriate	1	0	0	1	0	0	1	0	0
1B. Relative advantage	13	5	6	6	4	3	28	7	10
1C. Trialability	9	0	5	12	1	5	12	3	6
Upskilling	4	5	8	6	4	4	23	6	7
1D. Complexity	11	8	14	9	13	15	20	30	30
Risk	3	4	15	2	3	15	7	16	32
2. The Producer and the resource									
2A. Clearly defined resource	0	0	0	0	0	0	0	0	0
2B. Ability to monitor resource	2	1	3	1	0	2	4	3	7
Diconnect from data	0	0	1	0	0	0	0	0	1
3. Producer to Producer									
3A. Users influence the institution	0	0	0	0	0	0	3	0	1
3B. Users clearly defined	0	0	0	0	0	0	0	1	2
3C. Monitoring others	0	0	0	1	0	0	13	11	16
3D. Appropriate punishment for infringement	0	0	0	0	0	0	21	21	46
3E. Conflict resolution	0	0	0	0	0	0	29	15	10
4. Producers and wider society									
4A. Level of permission to self-organise	0	0	0	0	0	0	0	0	0
4B. Organisations are appropriate and work well together	1	0	0	0	0	0	4	2	3
Misunderstanding	0	0	0	0	0	0	0	2	0



The producer as an individual

All mechanisms received more positive comments in relation to their relative advantage than they did neutral or negative. While the volume of comments were made about the Catchment Collective, it is important to note that all mechanisms were seen as having their own relative advantage in some way. For Individual Farm Plans these comments tended to be around it being a discrete piece of work that a farmer could own themselves and be accountable to council to, while also providing valuable insight to their business. For Industry Programmes these comments included the fact that farmers learned more about their business and that there were economies of scale to be gained by being part of a larger group supported by their industry. For Catchment Collectives, there was a very strong skew towards positive comments, these tended to indicate that people saw these a way of both learning about their business like the other options provided, but also learning from each other and gaining from a wider pool of valuable knowledge within their community. There were also strong social benefits perceived with this mechanism if it was run successfully.

All mechanisms had more positive comments about trialability than negative comments. While it was acknowledged that none of the mechanisms might be very trialable for an individual, they were all acknowledged as being trailed in way or another. For example, some viewed farm plans as having been trialed by many different farmers in different regions over time, and in the Tukituki catchment of Hawke's Bay currently. Other suggested that industry plans were being trialed by other people who were implementing them and could be observed on their

farms. Still others suggested that Catchment Collectives could be trailed by a proactive group in a catchment before council required them to be in place. In fact, several participants talked about an actual example of this that they were involved in within the TANK area.

The need for upskilling was seem as more relevant for Individual Farm Plans rather than Industry Programmes or Catchment Collectives. These comments tended to highlight that because farm plans required a wide range of expertise, one farmer was unlikely to have all of that expertise. Also, if an external provider was used to deliver this, the opportunity for an individual farmer to become upskilled would likely be missed. Industry Programmes were seen as being able to access a wider range of industry support, and so slightly more positive comments were seen in this area. For Catchment Collectives, significantly more positive comments were made over neutral or negative ones. There was a strong view among respondents that the Catchment Collectives were seen as a way of sharing best practice and building a wider level of good practice amongst farmers. They were also seen as likely providing a positive influence in the wider community as well through the passive upskilling and social cohesion that could be gained from farmers interacting more with each other. However, the small number of negative comments that were made in relation to Catchment Collectives are worth noting as they tended to relate to the potential areas of conflict between members. Respondents felt that not all farmers would have the skills to deal with such conflicts and that upskilling may be required on how to deal with your neighbours, when this was not something people had experience in. Some also noted that this might come from outside the collective.

In the complexity and risk themes, all mechanisms had more negative comments coded. The complexities of Individual Farm Plans were seen as the need for specialist support, while the predominant risk was seen as the likelihood that a farmer would not fully gain the insights from the plan if it was done by someone else, that it would be too cumbersome to be of any real day to day benefit and would simply become a ‘check-box exercise’ rather than a ‘living’ document. The positive comments made about them tended to focus on the fact that many farmers were already doing much of what was required, so for some they would be quite easy to achieve.

Industry Programmes were seen as also being quite complex, and the main risks associated with them was that they were not appropriate enough to achieve the desired environmental outcome. The positive comments related to these talked about their potential ease of implementation because of their off-the-shelf nature. Further, likely implementation support provided by an industry organisation was perceived, which would help make the implementation much easier.

Catchment Collectives were seen as potentially very complex and highly risky. Comments here tended to highlight the fact that the way that people would work together in a catchment may make it quite complex, little was known about exactly how they fitted together with the other mechanisms, and whether they would or could replace them. For example, some people talked about already being in an industry programme or having large parts of a farm plan done, yet how they would work in conjunction with a Catchment Collective was not clear (this also features in the 'still not clear' theme in the 'other themes' section). Other risks included interpersonal risks from those involved with the collective, and for many the existing level of cohesion with a community was seen as a strong predictor of how successful a catchment collective was likely to be. Potential conflict within a community was definitely seen as a key risk, a theme that also recurs in the 'this is more than farming' theme in the other themes section.

The producer and the resource

While a reasonable volume of general comments was coded to the themes in the Producer and the resource section, few were coded in relation to specific mechanisms.

Of those that were coded there were slightly more negative comments than positive ones. These generally highlighted the need for accurate monitoring of water quality as a resource so as to be able to measure the impact of any action that was undertaken with these mechanisms.

Producer to producer

After the producer as an individual section, most comments were coded to the producer to producer section. As this was one of the sections designed to explore the Catchment Collectives specifically, most discussion and comments were focused around how a group would interact, specifically the passive monitoring of others; the potential punishment of others; and conflict resolution.

As indicated in the survey results, while not all producers were comfortable with passively monitoring each other, most were more comfortable with this than punishment. While there were slightly more negative comments, there was a comparable number of positive and neutral comments also. These ranged from a reasonable level of discomfort, to discussion and acceptance that some kind of monitoring would be required, to the acknowledgement that a lot of inter-producer comparison and passive monitoring already goes on anyway. The researcher went to lengths to point out that 'monitoring' did not mean any formalised form of

auditing of each other, but that it as a passive practice of “keeping an eye on each other over the fence”.

The discussion around potentially ‘punishing’ a neighbour as part of a collective group generated 2-3 times as many comments. There are two main reasons why there are so many comments in this area. Firstly, respondents were prompt at making comment on this as it was one of the more controversial parts of the interview. Secondly, because the literature indicates that ‘punishment’, or holding each other accountable, is key in self-organising groups, the researcher probed this area of conversation more, exploring it as much as possible to gather as much information.

Comments in this area were predominantly negative. Most participants were uncomfortable with the prospect of potentially having to hold each other accountable, seeing this instead as the role of the Council as the regulatory body. Most negative comments in this area linked strongly with the fact that farming/growing wasn’t just a business, but a way of life, and that to ‘punish’ a neighbor in whatever form, may have negative impacts on the wider community and social cohesion. It was perceived that not only might such action be disruptive to farmer-to-farmer relationships, but wider community relationships also. For example, children of potentially conflicting farmers at school. Some of these comments were also coded to the ‘this is more than farming’ code in the other themes section.

Yet while there was strong discomfort with the concept of punishment, it is also important to note that nearly half of the comments were neutral or positive. Neutral comments tended to highlight the still unknown components of how this mechanism might work. While many viewed the potential power of a collective working together as useful, there was the acknowledgement that if one member was not ‘pulling their weight’ the collective had a role in trying to ensure that person did their part. Some people recognised that the concept of punishment would be important, but they were not sure how that could or should be carried out. Most suggestions provided by respondents for improving the performance of others in a group were more proactive and passive, rather than reactive. For example, they described quiet or anonymous support and ‘getting alongside’ others as more useful approaches than fining people.

The question in the survey provided an *example* of how someone might be punished by providing the example of a fine. It is worth noting at this point that some respondents perceived this as an *actual mechanism* that was being proposed by council. The researcher went to lengths to reassure respondents that this was not the case, but many respondents did seem to have the concept of fining in their minds when this issue was discussed, which may have strengthened their opposition to the *concept*, rather than the *actual mechanism* that might be used.

It is also important to note that there were a similar number of positive comments relating to punishment as there were neutral ones. The positive comments highlighted that some people did see it as important for a collective group to hold its own members accountable. Others highlighted that while they were not keen on fining per se, they did see the collectives as providing an informal mechanism for punishment. It was noted by a couple of people that holding each other accountable was important because there was an existing feeling amongst some farmers, who HAD undertaken a lot of environmental improvements, that they were frustrated when others were not held to the same standard as they were, which in itself caused some frustrations within the community.

The final grouping of comments in this section related to conflict resolution. By far the majority of these were positive and neutral, with the least being negative. The positive comments highlighted that many people saw conflict resolution as an important element of a collective group. Many saw the need for some kind of third-party facilitation support, either just to facilitate or particularly for conflict resolution. There were mixed views over whether this could or should be provided by Council or not. Certainly, the benefit of clear conflict resolution processes was expressed. The neutral comments tended to highlight the lack of clarity that some people had around how some of these processes might work. While again the benefit of clear conflict resolution processes was acknowledged as important, whether they sat with council or the group and how they were funded tended to be the main points of discussion. The negative comments highlighted that the lack of clarity around how conflict resolution might occur could be a problem. They also highlighted that some saw this role as sitting with council, while others saw council paying for it, regardless of where it was resourced from.

Producers and wider society

The final section of the interview was focused on the wider relationships between producers and other parts of society such as wider society, and in particular, council as an organisation. While only a few comments were coded in this area, specifically to Catchment Collectives, they were a mixture of positive and negative. The positive comments tended to focus on the opportunity that existed for council to support and/or be part of the collective groups that were established; while the negative comments tended to focus on the Councils track record of not punishing people previously for bad practice, and that they would need to do this better in the future. This was also a feature of the ‘upping council’s game’ theme in the ‘other themes’ section.

Detailed results by other identified themes, by mechanism (inductive coding)

The previous section presented the results of the coding analysis according to the deductive codes determined by the interview structure, the relevant mechanisms and the attitude of the comment. This section will summarise the *inductive* codes developed from the analysis of the data, according to the mechanism and the attitude of the comment (see Table A9). The predominant areas to be discussed are: appropriate action; build up slowly; communication; cost; the desire for monitoring; independence versus guidance; keen to own the issue; still not clear; and this is more than farming.

Table A9. Volume of comments by other themes, mechanism and attitude

Coded theme	Individual Farm Plans			Industry Programmes			Catchment Collective		
	☺	😐	☹	☺	😐	☹	☺	😐	☹
Other themes									
Absentee owners	0	0	0	0	0	0	1	0	2
Accounting for nature-weather	0	0	0	0	0	0	0	0	0
Appropriate action	2	2	4	2	2	2	9	8	5
Build up slowly	0	0	0	0	0	0	1	6	1
Communication	0	0	2	0	0	0	23	10	2
Cost	1	0	2	1	0	1	7	3	8
Desire for monitoring	0	0	0	0	0	0	2	2	5
Good work already	1	0	0	3	0	0	2	0	0
Independence versus guidance	0	1	0	0	0	0	5	5	0
Keen to own issue	0	0	0	0	0	0	13	1	0
Leased land	0	0	0	0	0	0	0	1	2
Media	0	0	0	0	0	0	0	0	0
Modelling	0	0	0	0	0	0	0	0	0
My view has changed	0	1	0	1	1	0	2	1	1
One size doesn't fit all	0	1	3	1	0	4	3	0	1
Politics	0	0	0	0	0	0	0	0	0
Rural-Urban equity	0	0	0	0	0	0	0	0	0
Still not clear	3	3	2	2	1	5	12	33	28
This is more than farming	0	0	0	1	0	0	5	3	6
Upping Councils game	0	0	0	0	0	0	0	1	2

The appropriate action theme was coded across all mechanisms but predominantly the Catchment Collectives. This related to ensuring that any action was appropriate and a targeted response to help achieve a desired outcome, rather than an action simply being taken for the sake it. This was seen as necessary across all mechanisms and likely to be provided by an appropriate risk-based assessment of the issues on each individual or group of farms. This was particularly seen as a positive component of the Catchment Collectives, where risks could be determined at a catchment level where they were more likely to be able to be dealt with in a coordinated and impactful way.

The need to build action up slowly was seen as important. Many participants made the comment that farmers and growers don't adopt things immediately, and often need to consider things for a while before they adopt them, often after others around them have.

Accommodating this in the implementation was seen as quite important, as was a potential staged roll out of the various mechanisms across the wider TANK area, simply to help make the pure volume of work required more manageable.

Good communication was seen as a very strong benefit and enabler of the Catchment Collectives. The comments in this area were overwhelmingly positive, with a number of neutral comments. The positive comments tended to see this as a key benefit and feature of this mechanism, while the neutral comments tended to note its importance and relevance, not necessarily that it was a skill that was already well developed.

There were a few comments that were coded to the cost theme for Catchment Collectives, with a fairly even split between positive and negative. The negative comments tended to note that Catchment Collectives were likely to incur some administrative costs (such as a facilitator) and that people expected council to pay for, or at least support in paying for, those costs. Neutral comments tended to highlight that the funding mechanism for administrative support was not clear. Positive comments tended to focus on the potential resource and cost savings that Council was likely to realise if most people went into collectives, due to the reduced number of farm plans that would need to be developed and monitored. Some people also noted that they could be cost efficient for the Catchment Collectives themselves too.

A small number of comments were coded to the desire for monitoring. These tended to highlight that there was a strong desire for a highly detailed level of monitoring to be able to support the Catchment Collectives.

The code called independence versus guidance was established to capture comments relating to the level of prescription that should come from council (guidance) versus the level of independence and innovation that the Collectives should generate themselves (independence). This related mostly to the level of prescription that any potential terms of reference for a group might have, or their governance structure, reporting requirements etc. There was a high level of expectation that much of this would be prescribed by council. Yet when the potential conflict between whether a high level of prescription was consistent with the desire of groups to self-organise was raised, many people noted that this was potentially a contradiction, and that while consistency was important, it may only need to apply to certain components or outcomes.

One code where there was a very clear dominance of positive comments was in the code called ‘Keen to own issue’. This captured a range of comments that all indicated the strong desire and high level of enthusiasm that has already been developed by the Farmers Reference Group to be proactive in their ownership of the issue. For many this was not just seen as a good environmental outcome to be proud of, but also a way of proving themselves

to a wider community, whom many viewed as untrusting. Either way, it reflected a high level of social capital that had already been developed in this area.

The most populous theme in all the other themes, was ‘Still not clear’. This was a theme that captured comments from all mechanisms, although predominantly the Catchment Collectives, that highlighted where things were not clear or needed further development. Predominantly these were neutral comments, indicating that people did not yet view this lack of clarity as good or bad, simply that it was a lack of clarity. There were more than double the number of negative comments relating to a lack of clarity than there were positive comments. This would suggest that there remain a larger number of risks in this area than there are opportunities. The types of things that were identified as not being clear included: how all the mechanisms fitted together – whether someone could be in several at once; the size of the catchment collectives; the most appropriate governance and reporting structures; conflict resolution processes; where funding would come from; and whether membership of Catchment Collectives would initially be compulsory or not.

The final theme in this section to be discussed is ‘This is more than farming’. A balance of positive and negative comments were coded to this theme, which tended to reinforce that while these mechanisms (particularly the Catchment Collectives) were being viewed as impositions on a business, they were actually an imposition on a community. While some viewed this as positive others viewed this as negative, likely upon reflection of their experience of their own communities and what the likely impact on them might be.