TANK Collaborative Stakeholder Group

Meeting Thirty-Four Record

When: Wednesday 18 October 2017, 9:30am – 4:00pm

Where: Ellwood Function Centre Hastings

- Note: this meeting record is not minutes per se. It is not intended to capture everything that was said; rather it is a summary of the proceedings with key comments noted. *Text in italics indicates a response from HBRC to questions posed during the meeting.*
- *Where additional information has become available subsequent to the meeting (such as answers to questions unable to be answered in the meeting), this is included in red italics*

Key to text boxes

	Actions required
	Recommendations
	Decisions, agreement/disagreement

Meeting Objectives

1. Review relevant values for water quantity management
2. Understand the effects of surface water takes on water quantity attributes
3. Agree on allocation and minimum flow/trigger flow options for further assessment (for Ngaruroro and Tutaekuri Rivers)
4. Agree on abstraction restriction options for further assessment.

AGENDA ITEMS

1. Welcome and karakia

Robyn Wynne-Lewis invited a TANK member to open the meeting with a karakia.

2. Apologies, housekeeping, Agenda, meeting objectives and notices

- Housekeeping matters covered.
- Apologies were confirmed (see attendance table above).
- The meeting agenda and objectives were outlined.
- Ground rules for observers confirmed.
- Engagement etiquette was covered.
- Open floor for TANK members for notices and announcements.

3. Item # 1: Notices

There were no notices.

4. Item # 2 – Meeting Record 33 and Action points

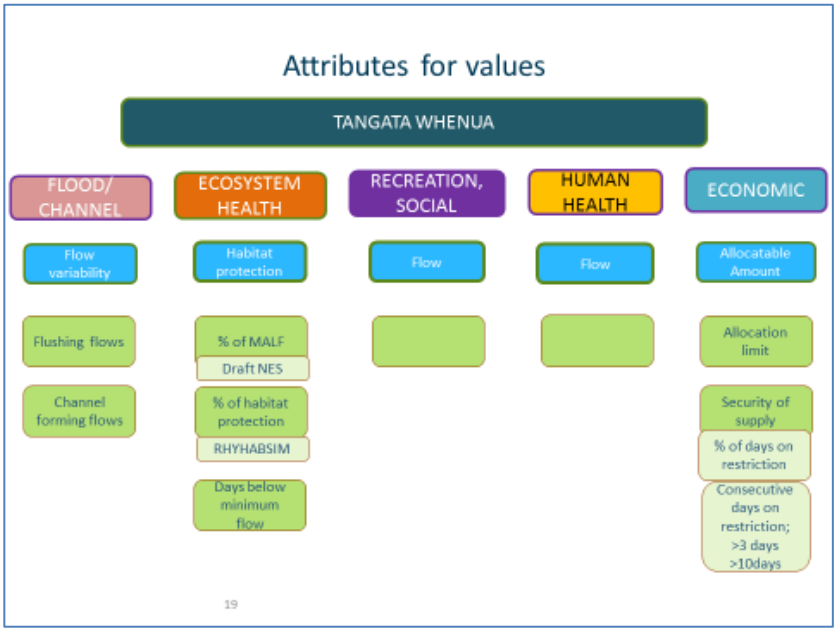
The meeting record from Meeting 33 on 10 October 2017 was not yet complete and had not been circulated.

5. Item #3 – Overview of the day, values and context

Mary-Anne gave the TANK Group a rundown of what was to take place during the day. Under the NPS-FM, the TANK Group must decide on minimum flows, allocations and a flow management regime that provides for agreed values at agreed levels of protection. Today's presentations are intended to provide further information on implications for native birds and fish and other considerations to enable the Group to agree these flow and allocation limits for further assessment.

She reminded the Group of the requirements under the NPSFM in relation to water quantity management including the bottom lines set by the NPSFM requiring life supporting capacity etc. to be safeguarded and for Te Mana o te Wai to be recognised. It was noted that a shared understanding of Te Mana o te Wai or water first was important when applying it to flow and allocation decisions. This has been conveyed numerous times by mana whena members and in the Ngaruroro report.

Mary-Anne revisited the water quantity values the Group hold for the Ngaruroro and Tutaekuri, noting the quantitative and qualitative information that is available on these values and the attributes to assess the values against (see slide 19 below).



The Group's previous position (as per the *TANK Group Report 1 Interim Agreements*, December 2013) to treat all values as important (and not to assign relevant significance) and to assess options for water allocation and minimum flows against all values was revisited and tested in light of the Outstanding Freshwater Bodies (OFB) plan change and the WCO. The OFB plan change will identify outstanding water bodies and their significant values which require protection. The WCO process will go further to consider whether these values are of outstanding value and require national recognition.

Decision:
The Group was asked to decide between the following two options and agreed on option 1.

Option 1: The TANK group agree that all values are equally important in deciding flows and allocation

Option 2: The TANK Group assign significance to values in relation to decisions about flows .

<u>Matters raised by TANK members:</u>

Can you tell us the timeframe for the outstanding freshwater bodies plan change? *It is still in the preliminary data gathering phase and there is some hope that there may be a draft plan change by the middle of next year. The commitment in the Regional Policy Statement (RPS) is that that plan change would be in advance of any other catchment related plan change. So there is an effort to try and align processes.*

If the work is ongoing is this all being done internally by HBRC staff? *At the moment it is a data gathering exercise, internally, but there will be a consultation process.*

In some areas the best knowledge sits outside the Council and it is going to be important that that is tapped into early rather than later. *That is true, noted.*

To clarify the options, when you are talking about significance are you talking about quantifying or just ranking because they are two quite different things, it is far easier to rank than to quantify. *You would have to work out the system by which you ranked be that numbers or some other criteria. We don't have a methodology for that.*

A plea was made to the Group to consider the high flow allocation regime as part of the overall plan change package to enable irrigators to respond to changes in minimum flows and maintain in some way existing activity. A rational decision can't be made without knowing what the high flow allocation regime is.

Before we make decisions about flows we need to understand who will be impacted and the size of what we're dealing with e.g. 1% 2% 3% of the total water being taken and what percentage of groundwater takes will be linked to minimum flows as well as how that differs from consented takes that are currently deemed to be linked? *Some of that will be covered by Rob's presentation later today. Only direct takes and stream depleting ground water takes in Zone 1 (Pawel maps) will be linked to minimum flows, the rest of groundwater takes on the plains won't be.*

Action 34.1: Bring back the Zone 1 map overlaid with existing consents (as presented by the hydrologists at a previous meeting).

6. Item # 4–- Native birds and habitat and flows, Matt Brady of Department of Conservation

Matt 's presentation gave an overview of birds and habitat, mainly focused on the Ngaruroro River because of the importance of the braided reach as a habitat for birds including several threatened species. Habitat for the birds is affected by low flows. Fewer channels and braids means fewer birds. More flow means more food and less pressure from predators. Hedgehogs, cats, rats, ferrets, stoats and weasels can each decimate nesting bird populations, as do people. Due to extensive private land ownership in upper Ngaruroro reaches, there is no guarantee for long-term habitat security. Of the 100,771 hectares in the Upper Ngaruroro, 1/3 is DOC land and 2/3 is in private ownership. Well-designed storage and recharge lakes can attract diving and dabbling species. The TANK Plan can work in with the Hawke's Bay Biodiversity Strategy 2015-2050, Predator Free 2050 and other plans.

TANK has 3,180 km of waterways, with 83 species of birds on Ngaruroro River, tributaries, estuaries, wetland and riparian margins. Most of the food supply is on the water edge.
52 of these are water species and 15 of these commonly use the braided rivers. 16 of these species are considered threatened, including the Australasian Bittern and the Black-billed Gull – one of the most endangered gulls in the world (70% decline in 30 years). These river birds nest on exposed braids and islands – they don't like weeds – so that predators are easy to spot.

Matters raised by TANK members:

I want to understand a bit more about the predator pressures, how should we think about this, flow is one thing but is there a trade off? *Matt: If you have got a good flow and you are looking down the braided rivers and you have the islands, you are going to have that predator pressure reduced. But there is no doubt that these things need to be tracked as well. In terms of predators, flow will lead them away. Stoats can swim and in fact are good swimmers but will be less inclined to want to swim across a river that is fast flowing.*

I question whether minimum flow is the main driver for the survival of these species: *Matt: You might well be right but it is certainly a factor - you get the flow right and it will help. I don't think that there is one silver bullet, it is a combination of things that is hurting the birds so a combination of habitat protection and predator control is important.*

I am really concerned about people walking and driving down the rivers. Every long weekend when the flow gets lower there are untold number of people, not only walking down but also driving up and down the river. As farmers we get a lot of poachers during long weekends.

Man is the number one predator. Despite calls to council, there is no monitoring going on.

Do you see a need to put some sort of restrictions on this? *Matt: Yes in truth if you asked me I would like to keep people away. Public river access, particularly 4WD and other vehicle access is a significant threat to bird habitat*

Is it an option for TANK to say no vehicles beyond this point, can TANK stipulate that? *Mary-Anne: It is something that we can look into.*

Action 35.2: HBRC to consider how to action TANK's concern about vehicles on braided river systems.

An observation on predation, in the Ngaruroro catchment I have been fortunate to have involvement with Whio Blue duck programmes in the northern Kawekas over a 30 year period. Generally if there is an intensive stoat trapping programme in blue duck country you can get a doubling or even tripling of population. This is well recorded. Whio numbers have increased but also expanded out to occupy habitat that haven't seen them. A

very good example is the Gentle Annie area. *Matt: Stoats are absolutely dynamite on anything, the cleverest most cunning predator.*

Tutaekuri also have black billed gulls. Reducing the flow of the river can reduce braidedness of the river reducing habitat. *Matt: It reduces the habitat but it also reduces the amount of feeding area available, so if you have three braids as opposed to one channel you have six pieces of stream edge basically you have two islands and six bits of stream edge, where the animals feed but also they are protected because predators have issues getting there.*

It seems to me the greatest threat and the low hanging fruit option is predator control. Humane stoat traps are available. Do Black billed gulls feed in these rivers or do they just nest? *Matt: Yes they do feed there as well.*

Is the nesting time July to January for all species? *Matt: That is when they are the most vulnerable but they will be out there at other times. It is not only the eggs that are vulnerable but you have the parents sitting on them. If you are losing adult birds that is not good. It is like the black billed gulls, over the last 30 years, 70% down, so something is going awry.*

Is gravel racking done out of nesting season? *Matt: Gravel racking takes the weeds off the gravel bed so is helpful as long as there is nothing nesting there. We are consulted prior to any racking occurring.*

7. Item # 5 - Aquatic habitat for fish, Thomas Wilding of HBRC

Thomas Wilding gave his presentation "Fish and habitat in the Tutaekuri and Ngaruroro" which described the study design from the new RHYABSIM surveys completed (2009-2012) to inform the TANK plan change. He described the study reach and which fish habitat were modelled in each of the Ngaruroro and Tutaekuri surveys.

The focus area selected for RHYHABSIM surveys for the Ngaruroro was the most flow-altered section, below Fernhill. The river loses 4,000 litres per second between Roy's Hill and Fernhill. The study reach for the Tutaekuri was upstream of Puketapu which loses 800 litres per second to ground. Habitat modelling included working with iwi representatives, the Department of Conservation, Fish & Game, scientists from NIWA and Cawthron.

Matters raised by TANK members:

Is there a chance of putting in Upokororo on the list of fish habitat studied. The river takes its name from it. It is there in spirit. Important to know what was there.

Upokororo: New Zealand grayling, Prototroctes oxyrhynchus - *a small slender fish, silvery, sometimes with a reddish back. Was caught in large numbers and found only in lowland rivers and streams. They spawned in freshwater streams and developing to maturity in saltwater. Their length was between 20 and 40 cm. Although once common in Aotearoa/New Zealand streams, it is now extinct, possibly because of the introduction of trout.*

And also Salmon - hasn't that been found at the Tutae bridge or caught?
F&G: If it has it is a rare event. Iain Maxwell: They used to release salmon in the Mohaka river, years ago.

There is three species of fish less in the Tutaekuri versus the Ngaruroro. We don't see the Upland Bully or the Dwarf Galaxias in the Tutaekuri. *Thomas: probably the Dwarf Galaxias is the more notable one. There is certainly non migratory galaxias found in the Ngaruroro, but there a not many populations north of it. Again presumably volcanic eruptions.*

Is there any chance of doing a RHYHABSIM survey by the Puketapu bridge? It would be helpful to the marae. *Thomas: Not in the near future, however, the intention is to monitor the minimum flow at Puketapu which would sustain flows in the reaches where the RHYHABSIM study was completed. The survey reach was chosen as representative of the values of most concern.*

8. Item # 6 – Considerations for setting flow and allocation limits, Joe Hay from the Cawthron Institute

Iain Maxwell introduced Joe Hay, Freshwater Ecologist from Cawthron Institute and gave a little of Joe's history. Joe was involved in peer reviewing and improving the new RHYABSIM surveys completed (2009-2012) to inform the TANK plan change (presented by Thomas Wilding above).

Joe Hay gave his presentation as handed out in hard copy to the group. He described flow as a defining feature (or master variable) of streams, influencing the shape and depth of channels, the transport of sediment, nutrients, food, the distribution and behaviour of organisms. Flow changes are constant due to varying rainfall and floods, climate and water use. High flow events briefly create more habitat for fish and invertebrates (fish food). They stimulate fish migrations and spawning. Augmenting flow can have a big impact on river dynamics, altering water temperature and other characteristics. Braided rivers are more productive than single thread rivers, offering safer nesting options for nesting birds and more space for fish and invertebrates (bugs and insects) to live.

A key point made by Joe was that allocation limits need to be considered at the same time as setting minimum flows, and not in isolation because it is the interaction between the allocation at the minimum flow that affects the fish. For a given minimum flow, higher allocation increases the frequency and duration of the minimum flow thereby increasing the likelihood of adverse ecological effects (e.g. by reducing invertebrates or fish food supply and feeding opportunities for drift-feeding fish). It also lowers security of supply for abstractors.

Joe outlined allocation precedents based on the recent studies, standards and advice to other regional councils.

Questions asked during and after Joe's presentation:

Can you please explain substrate to me? *Joe: The substrate index here is used as an input into RHYHABSIM, one of the habitat modelling programmes, it goes from bedrock at 8, 7 is boulders, 6 is large boulders, all the way down to mud at 2 and vegetation as 1.*

Are you talking about direct extraction? *Joe: Well direct extraction or it could be extraction from groundwater that is influencing the flow of the river. Obviously there will be some degree of lag from the time you start taking before it influences the stream flow. The impact depends on distance and climate. It is possible that [stream-depleting] groundwater extraction may not make it back to the stream before the flows change again. If you are far enough away and the period of low flow is short enough.*

What is the critical breeding/migration season for the various fish? We are thinking mainly for torrent fish, trout and fish like that? Are they different? *Joe: They are different, unfortunately, so there are colour-coded timetables for spawning and migration available. I have seen them in HB Regional Council reports and there is also one at NIWA reasonably put together. Or MPI to support the NES on Plantation Forestry. The trouble is that because there is such diversity in the fish fauna you end up with most of the year being coloured in. So you need to prioritise, if you are concerned about a particular species.*

Are fish smart enough to recognise that the environment is under stress? If the temperature goes up are they smart enough to move? *Joe: Yes. There have been studies in Canterbury in the Selwyn Catchment showing that as stream flow declines fish tend to move upstream towards the headwaters to try and stay in cooler water and stay in reaches that aren't drying out. There is a limit to how smart they are. They do not know when they are going to get trapped. They can't necessarily all move out. They also need to have somewhere to go to. If for example you dry out the lower Ngaruroro and all of those fish had to make it out even if they knew that they needed to all get out and go up to the upper catchment the available food resources up there would be under pretty intense competition. But they do move.*

It could be oxygen, it could be temperature. *Joe: Their behaviour regulates their temperature as well, so in the summer time it is quite common for Brown Trout, which are quite temperature sensitive to move into spring fed*

streams that have more consistent pool temperatures, or to get down close to the bottom pools where you might get some degree of thermal stratification and the cool water is down near the bottom of the pools.

In relation to temperature and dissolved oxygen concentrations what would be the bottom limits? *Joe: They are stipulated in the NPS. Dissolved oxygen levels of about 5 or 6 milligrams/litre seems pretty reasonable for maintaining stream health. But 80% saturation is from the older ANZECC guidelines.*

We haven't really talked about birds being an indicator species so does that suggest that maybe instead of just considering/protecting the torrent fish we should also be protecting/considering certain bird species*? Joe: Yes I think the talk this morning from Matt indicated that especially during breeding and up to fledgling that that would be worth thinking about. The tools available to you to achieve that might not be quite as advanced or as available as they are for fish. But I do know that there was work done in the Wairoa River looking at trying to come up with habitat suitability criteria for feeding habitats. There are some guides available but I do not know just how applicable they are to the Ngarururoro.*

What species did other regional councils use in determining MALF? *Joe: Mostly they have used Brown Trout, as it is highly valuable on the ground and highly valued by the community. Brown Trout has very high flow demands compared to native fish species, with the exception of torrent fish. So setting flow based on Brown Trout also caters for native fish species.*

Iain Maxwell: Just to be clear MALF is a flow statistic, that is independent of the habitat relationship. MALF is a flow statistic that is calculated. The proportion of habitat at MALF is the thing that we will be making a choice on.

Grace was said and the meeting broke for lunch.

9. Item # 7 – Habitat requirements, Thomas Wilding of HBRC.

Thomas Wilding presented on the flows needed to achieve a given protection level in the Ngarururoro and Tutaekuri rivers. The take home points were:

Tutaekuri

- Less water use than Ngarururoro
- Even in dry years, there is sufficient flow to maintain a high level of habit protection for adult trout
    - At median flow, water use* had negligible effect on trout and invertebrate habitat
    - At MALF, water use reduced trout habitat from 100% to 93% and 97% for invertebrates.
    - At worst (driest time of dry year – April 2009) water use reduced trout habitat from 94% to 81%

*Water use in this context includes GW and SW estimated actual takes and accounts for cease-takes.

Ngarururoro

- Already drops below recommended protection levels for torrentfish
    - At median flow, water use had negligible effect on trout and invertebrates habitat
    - At MALF, water use reduced torrentfish habitat from 100% to 75% (91% for trout, 83% invertebrates)
    - At worst (March 2013), water use reduced torrentfish habitat from 42% to 16%
- Increased water use would increase risk of measurable effects on fish populations

Questions during and after Thomas's presentation:

Can you clarify how we are measuring water use? We know that water takes from across the aquifer influence the flow in the Ngarururoro so how are we measuring the water takes from the Tutaekuri? *Thomas: The ground water model extends up through the Moteo valley up around Puketapu and estimates the depletion from the Tutaekuri as a result of ground water use. This is in addition to those surface water takes which are handled through the Source model.*

Are the water takes measured or consented? *Thomas: It is not the total allocation limit, it is the estimated actual water use.*

It was agreed to save more detailed questions until after Rob's talk.

10. Item # 8: Modelling: context and overview

Mary-Anne set the context for next session and the decisions being sought of the TANK Group, these being:

Proposals

1. To cap surface water takes allocation to existing use for Tutaekuri and Ngaruroro
2. That the TANK group identifies **two** further management scenarios that **combine minimum flows with restriction regimes** for further modelling/assessment for the Tutaekuri and Ngaruroro

11. Item # 9 – Reliability of Supply for Irrigation– Rob Waldron and Dr Jeff Smith of HBRC

Jeff Smith introduced Rob's presentation and described what is meant by reliability or security of supply and how it is measured. He stressed that it is important to remember that reliability of supply for surface water takes is impacted by ground water takes. In March 2013, there was 1,200L/s flow loss caused by groundwater pumping.

Jeff explained that what we want out of today is a decision on a couple of flow management options to do further analysis noting that the stats that Rob will deliver will not provide the definitive answer. Then there is the opportunity for modelling staged reductions and other metrics.

The reason we are asking TANK members for only two scenarios to model and not more is because it is a really complex process, we have a time constraint and the economic assessment contract with AgFirst is to model three scenarios, one of which is the base case.

Rob went through his presentation which included a series of bar graphs showing a set of security of supply statistics for 6 scenarios (minimum flows) for Tutaekuri at Puketapu and 7 for Ngaruroro at Fernhill. The scenarios use MALF as a benchmark statistic, to base our minimum flow setting.

The combined results are in the tables below:

Tutaekuri at Puketapu

Scenario ID	**1**	**2**	**5**	**4**	**3**	**6**
Scenario Name	**Base Case**	**Base Case**	**70% MALF Habitat**	**80% MALF Habitat**	**90% MALF Habitat**	**MALF**
Minimum Flow (l/s)	**2000**	**2000**	**2300**	**2800**	**3300**	**3900**
Modelled Abstraction	**Max Allocation**	**Existing Use**	**Existing Use**	**Existing Use**	**Existing Use**	**Existing Use**
Full Record Statistics						
Record length (Years)	17	17	17	17	17	17
Total % restriction	0%	0%	0.5%	2.3%	5.9%	12.1%
Average no. days restriction per year	0	0%	0.8	3.5	9.1	18.5
Return period for year with period of >=3 consec. days restriction (Years)	-	-	17	8.5	2.4	1.7
Return period for year with period of >=10 consec. days restriction (Years)	-	-	-	8.5	3.4	2.1
Example Dry Year Statistics						
Climate Equivalent to 2008-2009						
No. days restriction	0	0	0	6	35	67
No. periods of >=3 consec. days restriction	0	0	0	0	1	4
No. periods of >=10 consec. days restriction	0	0	0	0	1	2
Climate Equivalent to 2012-2013						
No. days restriction	2	0	20	53	77	102
No. periods of >=3 consec. days restriction	0	0	2	6	6	7
No. periods of >=10 consec. days restriction	0	0	0	1	3	3

Ngaruroro at Fernhill

Scenario ID	1	2	5	4	3	6	NEW
Scenario Name	Base Case	Base Case	70% MALF Habitat	80% MALF Habitat	90% MALF Habitat	MALF	WCO
Minimum Flow (l/s)	2400	2400	3600	4000	4400	4700	4200
Modelled Abstraction	Max Allocation	Existing Use	Existing Use	Existing Use	Existing Use	Existing Use	Existing Use
Full Record Statistics							
Record length (Years)	17	17	17	17	17	17	17
Total % restriction	3.4%	2.2%	4.7%	5.6%	7.1%	8.0%	6.3%
Average no. days restriction per year	5.2	3.3	7.2	8.6	10.9	12.3	9.6
Return period for year with period of >=3 consec. days restriction (Years)	3.4	3.4	1.9	1.7	1.5	1.3	1.7
Return period for year with period of >=10 consec. days restriction (Years)	17	17	5.7	4.3	2.4	2.1	2.8
Example Dry Year Statistics							
Climate Equivalent to 2008-2009							
No. days restriction	12	1	24	28	36	38	31
No. periods of >=3 consec. days restriction	0	0	3	4	3	3	4
No. periods of >=10 consec. days restriction	0	0	0	0	3	3	1
Climate Equivalent to 2012-2013							
No. days restriction	58	52	63	67	73	78	71
No. periods of >=3 consec. days restriction	3	3	4	5	5	5	5
No. periods of >=10 consec. days restriction	2	2	2	2	2	2	2

Questions during and after Rob's presentation:

Note: A lot of the questions pertaining to Rob's presentation were hard to make out on the tape. Many referring directly to specific graphs and too difficult to capture.

One of the factors affecting security of supply is the period in the season that those bans occur. If you decrease the security of supply those bans are occurring earlier in the season, which is affecting the growing part of the season. Ban events for 3 days during March or April don't really have the impact on people but ban events for 3 days occurring in Jan or Feb have a significant impact on primary producers. *Jeff: And that would apply across all land uses not just some?* **Pretty much. As you increase minimum flows the duration, frequency and the timing of bans are impacted.**

I am wondering why we are modelling restriction, when previously we have said that restrictions are not helpful and we actually have to manage the total take rather than the stream depleting take. Are we talking about augmentation? What are we actually talking about when we say number of days of restriction, what does that actually mean? *Rob: This is the number of days of restriction for surface water takes and stream depleting ground water takes that are tied to a minimum flow or a cease take minimum flow.* **Are we still actually considering that as a policy issue?** *Jeff: Yes because when we were discussing the ground water issue and we were looking at different options the question was raised about surface water takes and their reliability. So that is what we are doing today.*

Robyn: But absolutely to answer your question, it is the TANK Group's decision to make on whether to continue with cease takes once a minimum flow is reached.

We are getting very hung up about numbers here when in fact it is not the direction that we are going. *Rob: My presentation is the results from what was previously 10 potential scenarios (now 6-7 scenarios) without augmentation and without staged reductions or any other alternative methods. The next step in the process is to narrow down a number of ways that you could manage the flow above the minimum flow such as stage reductions and what those staged reductions might look like. We could also be looking at the effects of having an augmentation scheme running in parallel in the neighbouring catchment.*

We discovered that actually cease takes don't have any benefit anyway. *Rob: That is only on ground water abstractions because of the time it takes for the effect to come through. Zone 1 stream depleting groundwater takes have a short term effect that could be managed through a cease take or restriction.*

But the proportion of flow that would be returned to the river would be quite modest. *Rob: A couple of different scenarios that Pawel has looked at in relation to the stream depleting effect within Zone 1 for the Ngaruroro show*

about 30L/s and up to around 70 in terms of the benefit coming back to the river within 7 days. Jeff: It is not modest when you consider the surface water takes at over 1000l/s.

How quickly does the river recover if surface water takes go on cease take? *Jeff: Ceasing surface water takes has an immediate response, and given that we are modelling an allocation of 1300l/s that is significant. The ground water takes which we have modelled as Zone 1 are best managed in the same way even though there are not many takes in there now. If they weren't subject to minimum flow restrictions, there is an unintended consequence of people opting to take immediately next to the river which is effectively a surface water take but managed as a ground water take.*

I think you are talking about Meeting 27 when Pawel was talking about the impacts of various reductions on the recovery of surface water …when we were looking at imposing ban events at 2400l/s the river only increased 4% and then it continued to reduce, which is was well within the margin of error. But we would never impose ban on the bulk of our groundwater takes, which is municipal and industrial only ever imposing restrictions on irrigators. *HDC: Just to clarify the HDC Municipal supply consent has restrictions on it depending on river levels. We are required to put in additional demand management controls as flow falls so you will see the little fire signs for water. If it gets to a certain point, we ban watering lawns etc.*

12. Item # 10 – Panel discussion

The meeting reconvened after a break with a panel up in front to answer questions. The panel consisted of Thomas Wilding, Jeff Smith, Rob Waldron, Joe Hay, Mary-Anne Baker.

With regard to the trigger flow summary on page 31, if we were looking at Torrentfish at the current 2400l/s, how does the torrent fish react/behave when the flows increase again? How do fish species respond to flow getting back to normal levels. *Thomas: If you take a given year, and if you knew what the population was doing in that given year and if the flow dropped down to 2400l/s and then came back up again, how would they respond? Well, assuming you're after the recruitment period after the young fish have moved up into the river, then you have got a population that would potentially stay static until the next recruitment period.* **What period of the year is that recruitment period?** *Thomas: Torrentfish is summer I think.*

What does 44% mean for the health of the torrent fish population over time?
Joe: If you draw the habitat down to 44% that doesn't mean that you are going to knock the population down to 44% it means that you have a higher risk of having some impact on the population. But what that impact will be we can't quantify, we don't know how big the impact will be on the torrentfish. Torrentfish are a diadramous species (can live in fresh and salty water) they have a marine phase in their lifecycle. So if you did estimate the population as you suggested in the Tutaekuri river for example then that doesn't mean that the population has to build up only from that river, it could source recruits from other rivers, in the vicinity if they weren't also similarly affected. So recruits could come back in, the following season. I can't recall off the top of my head, exactly when they migrate upstream from the sea. So I don't want to hazard a guess on that. But I can look that up for you. Eels might occasionally feed on torrent fish, and trout might occasionally feed on them but they mostly live in pretty fast water that it would be hard to get at them. If you were drawing torrentfish habitat down to 44% then you were probably drawing trout habitat down to something quite close to that as well. So you were probably also having impacts on the trout population as well. In that case the torrentfish habitat is your indicator. But you would be having impacts on the wider ecosystem by having the flow drawn down to that level. It is not just only impacting torrentfish.

Thomas: We have done some fish monitoring in the river, some at about 3.5 cumecs per second and the surprising thing that stands out for me for the Ngaruroro is that you catch more torrentfish than you do bullies which is unusual. In most rivers when you go fishing you will find more bullies and more eels. It is a bit unusual in the high densities of torrentifish it supports. I haven't done any fishing when it gets down to 1000 or 2000 so we don't understand how many we lose.

Joe: Also the thing to remember about monitoring densities is that numbers per square metre are high if you reduce the area of water during low flow. It may make it look like you have really high densities of fish in there but that's is just because they are being squeezed into the remaining habitat.

Just to pick up on that good point, carrying capacity in wildlife habitat whether it be bird, fish or four million creatures, it is not too much different to the carrying capacity for the farmers. The density is the problem. If you have got double the area, you have got double the habitat. I use that term carrying capacity when I am talking to growers and farmers, the principles are very much the same.

I haven't heard anything that makes it clear to me that any of these regimes that put water back in or preserve water are on a scale to make a difference. No-one seems to be able to say, what are we buying, is there a longer trend line that actually has to be dealt with here?
Joe: I can't put a quantification on how much you are going to be buying. What you achieve by having a step down in your abstraction is effectively something close to a flow sharing arrangement, but it is a stepped one so it is easier to manage. What you are buying there is maintaining the flows immediately above the minimum flows or ones that I have said are now recognised to be of high value to drift feeding fish for their feeding opportunity that they provide. By stepping down irrigation you are slowing the rate of decline in flow to the minimum flow so you don't get there as quickly.

If we leave a certain amount of water (at least not taking out of ground water) what effect will that have on habitat, can we improve it? Need to understand effort vs result in the river itself.
Rob: That is something that we can model, using the data that we have. We haven't done that analysis yet because it is quite involved and we only wanted to do that on a selection of scenarios rather than all of them, as it is a lot of work. The end result is a whole bunch of information on how the water users are restricted. The other side of it is what the resulting modified river flow looks like. And also from that you can get an indication of what the available habitat through that flow regime is. That is something that we are planning to do with the tools that we have. We know it needs to be done and it is coming but we don't want to do it on all 10 scenarios.

If you don't start at the high level nothing you do in that river is going to have an impact in that season.
Rob: Yes with staged reductions the flows and the time between those staged reductions are critical. That is something that we don't know yet. Spread them out more if you want to make a difference.

Staged reduction shows the users that there is a problem, and they can take action. So it is a warning to them that something needs to be done.

The big picture for Ngaruroro, in terms of condition are elevated P, sediment, turbidity and then there is the flow question. Can you give us any kind of guidance on relative contributions potential to aquatic life, particularly in relation to those MALF measures? *Joe: No not really because nutrients aren't really my strong point, more of the habitat and fish communities, but by reducing the flow, you are reducing the dilution potential for phosphorus coming in. But phosphorus is usually down to sediment as well so those two things are presumably hand in hand.*

Are you aware of any seat of knowledge in the country to be able to apportion that? *Joe: There would definitely be the ability to do that if you had some numbers but I haven't seen any. If phosphorus is an issue and is coming in higher flows when the sediment is being transported by the river then maybe they are not that relevant to the low flow.*

In terms of national standards, for guidance around habitat protection, someone mentioned this morning there may be some guidance coming in the draft NES? From what you presented in your paper, there is no national standard. *Joe: There is no national standard, there was a proposed NES on flows and flow setting and those numbers that I showed this morning, from the Beca report that was the support document to that proposal. That was proposed in 2008, and has just languished since then. So that is as close to having national guidance on that as we currently have. Now we have got the NPS telling us that we need to set minimum flows and allocation limits but it hasn't provided any guidance really on how we are supposed to go about going that.*

Just in relation to the NPS and its requirement for us to set minimum flows, I just want to understand in more detail what that actually means, because we are discussing a possible scenario with staged reductions and no minimum flow, is there any precedent for that being acceptable. *Joe: Prior to the NPS, in the WCO for the Motueka River, my understanding is that there is a provision for something like 12% of the instantaneous flow sharing, so 12% out of the river and the rest stays in, and no minimum flow because it is such a small allocation volume. But that was gazetted long before the NSP came out with this ruling that there has to be a minimum flow and allocation limit for every river. I don't know, it is more of a policy question, whether there is leeway to consider something that doesn't have a minimum flow.*

I am a bit nervous about whether that would actually survive the NPS or challenges to a plan change.
Thomas: But bear in mind it doesn't say the minimum flow must be a hard ban, it just says you must set a minimum flow. It is a management flow and it is what you do with it that is important.

Do we have any issues with the low flows above Maraekakaho? It seems like one regime for the whole river, might not be the best approach because it is a different river above Maraekakaho, and then at Maraekakaho we lose a good amount of water into the ground and then the flows change. So if we have a low flow at 2400 at Fernhill what is that flow above Maraekakaho? *Thomas: on average about 4000L/s more.*

It is a very important point, although we are thinking about the Ngaruroro River, the impact that we are having is only a short section. What actually are we protecting as a percentage of the total river? Maybe we should put a red dot where we are seeing that impact of extraction, or water that we are losing to the aquifer through natural processes.

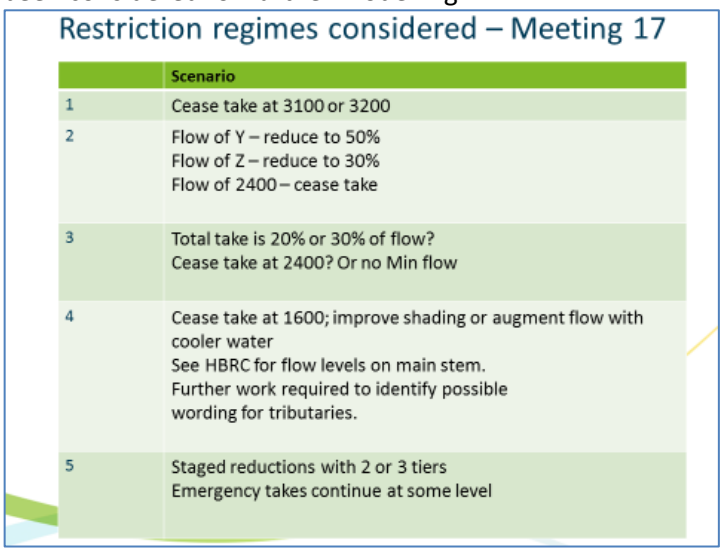
However if you were to bring in staged reductions starting at 5000l/s or 3000 or anything higher than 2400 it would potentially affect those higher reaches. Which at the moment are not being affected because there is only a ban at 2400l/s.

Is there a possibility of different management for different parts of the year, i.e. allocations through the irrigation season as opposed to other parts of the year, is that a possibility? *Mary-Anne Yes.*

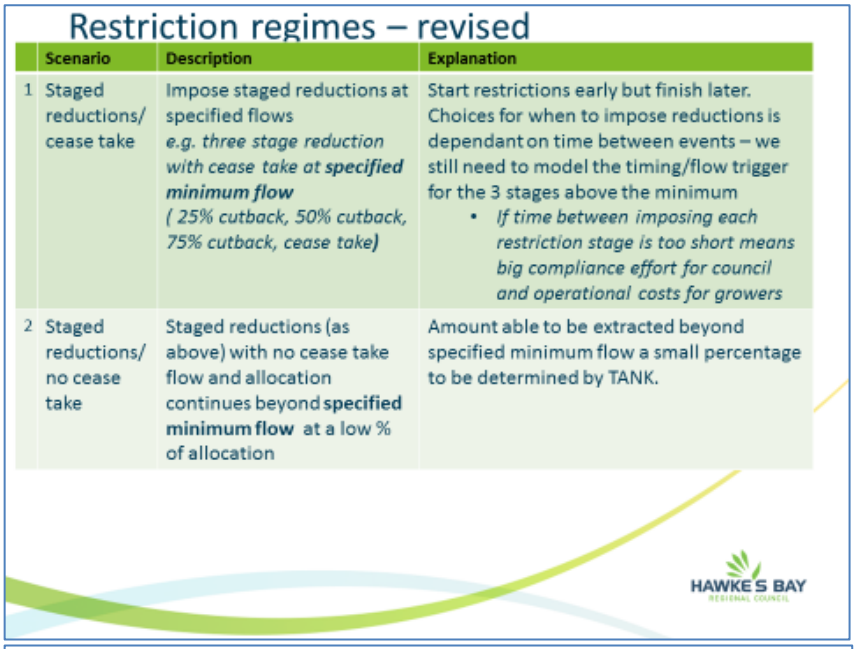
I am concerned that by getting down to individual things like how much fish are still there and how much can we live with, we are forgetting about the overall wider impact on the naturalness of our ecosystem and the life supporting capacity of the awa. Percentages diminish our natural environment and brings down the mana of that awa. We need to look at bigger picture.

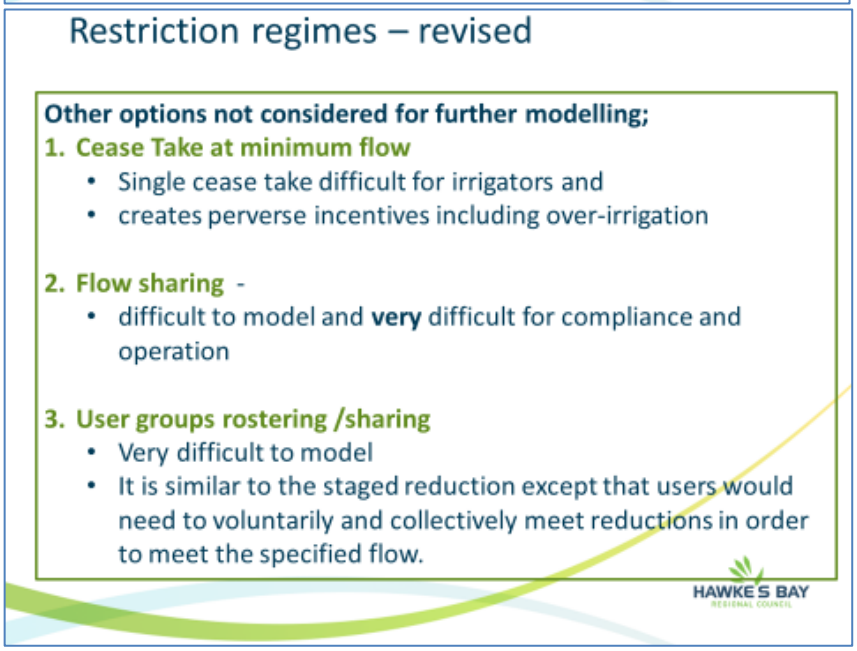
13. Item # 11 - Agreeing management scenarios for further modelling

Mary-Anne presented the five restriction regimes that were considered at meeting 17 (1 Sept 2015). She then showed how these have been reduced down to two main options and explained why the other options have not been considered for further modelling.


Restriction regimes considered – Meeting 17

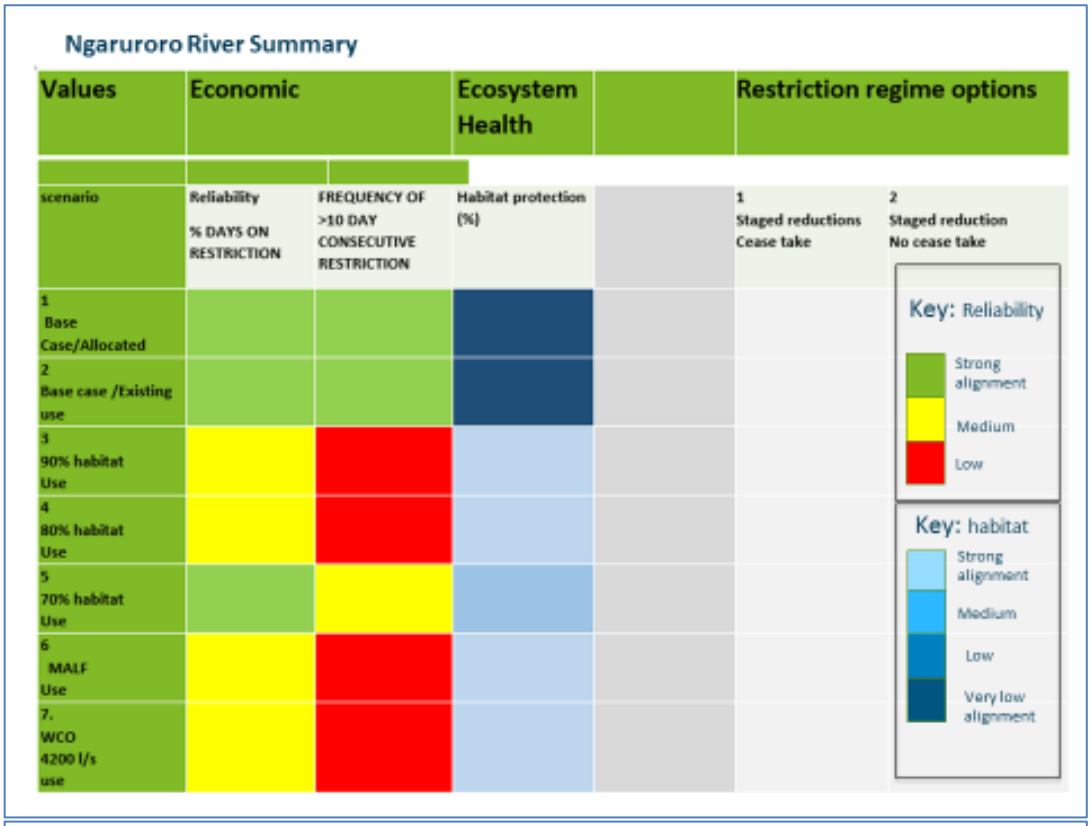
	Scenario
1	Cease take at 3100 or 3200
2	Flow of Y – reduce to 50% Flow of Z – reduce to 30% Flow of 2400 – cease take
3	Total take is 20% or 30% of flow? Cease take at 2400? Or no Min flow
4	Cease take at 1600; improve shading or augment flow with cooler water See HBRC for flow levels on main stem. Further work required to identify possible wording for tributaries.
5	Staged reductions with 2 or 3 tiers Emergency takes continue at some level

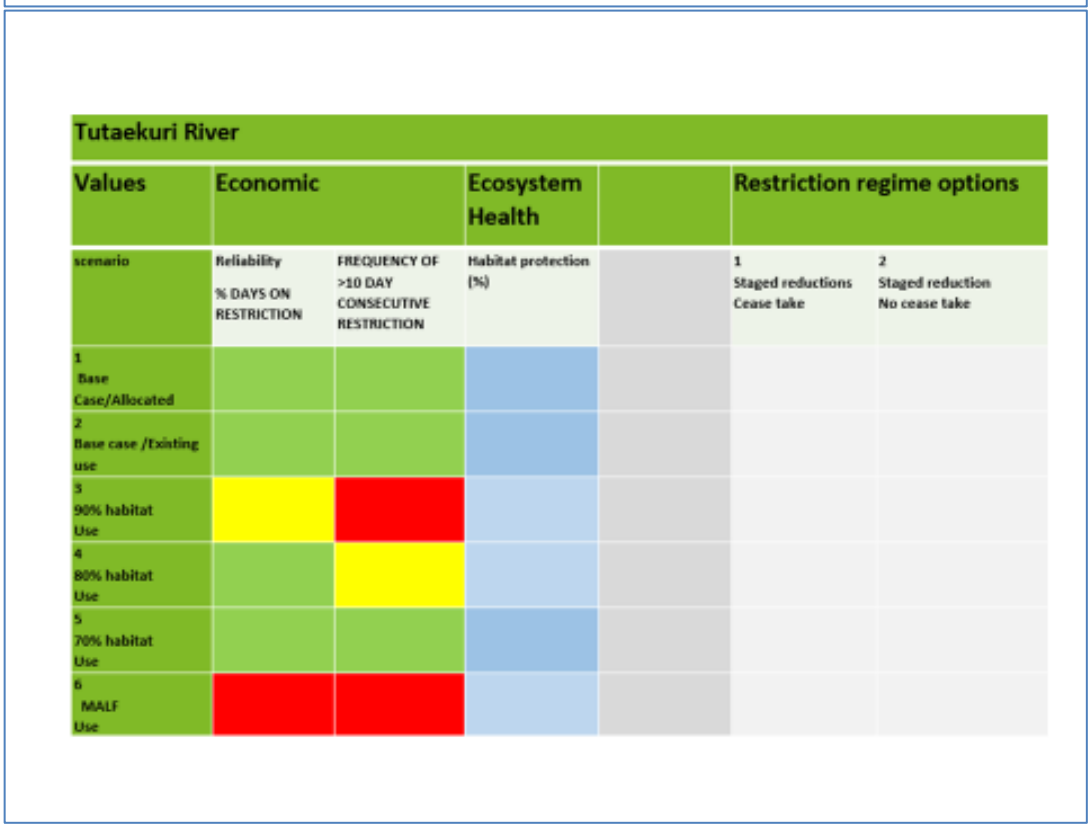




She noted that collective management or user groups rostering/sharing allocations to meet a specified minimum flow it is still on the table but it depends very much on the irrigators as to whether or not this is a model that we progress with in the plan change. Although it can't be modelled, we have heard first-hand about the Twyford experience of a global consent and that it has worked very successfully. So instead of relying on a model, to see if it would work or not, the TANK Group would be relying on actual data/experience. There was also a bit of a trial back in 2011/12 for collective management in the Ngaruroro, but it rained. Others will know more about this and why it didn't persists as a management tool. Feedback from growers is also need on timing of restrictions, i.e. when 25%, 50%, 75% cutbacks are triggered. If the timing is too short, it has a large compliance cost and may not be that helpful for growers.

Mary-Anne then presented a matrix for the Ngaruroro and one for the Tutaekuri that collates all of data and assesses it against attributes to help with decision-making. The matrix is colour coded, to show degrees of reliability and habitat protection. For example, the base case is reasonably good for reliability of supply but quite low minimum flow or habitat protection. On the converse MALF is quite low for security of supply but high habitat protection.





A vote was had on the options for future modelling/assessment for the Ngaruroro and the Tutaekuri. The following decisions for modelling were made.

Modelling decisions for Ngaruroro:

1. The Group voted on which two scenarios should be modelled/assessed in addition to the base case.

Ngaruroro Scenario

	2nd Vote*	Agreed
Number 1 – base case allocated	1	
Number 3 – 90% habitat	2	
Number 4 – 80% habitat	9	✓
Number 5 – 70% habitat	10	✓
Number 6 - MALF	0	
Number 7 - WCO	0	
Eligible voters	**22**	

*A second vote was had after it was agreed to include WCO as a genuine option for the TANK to consider regardless of whether it was being modelled elsewhere.

2. The Group voted on whether the modelling should include staged reductions involving a cease take or no cease take.

Restriction Regime

Staged Reduction/Cease Take	11
Staged Reduction/No Cease Take	9
	20

2 - Abstentions

Modelling decisions for Tutaekuri:

1. The Group voted on which two scenarios should be modelled/assessed in addition to the base case.

Scenario	1st Vote	Agreed
Number 1 – base case allocated	1	
Number 3 – 90% habitat	13	✓
Number 4 – 80% habitat	3	✓75% habitat**
Number 5 – 70% habitat	5	
Number 6 - MALF	0	
Eligible voters	**22**	

** On the suggestion of a TANK member, it was agreed to model 75% to give a better range of modelling results given the base case is 2000 L/S.

2. The Group voted on whether the modelling should include staged reductions involving a cease take or no cease take.

Restriction Regime

Staged Reduction/Cease Take	13
Staged Reduction/No Cease Take	9
	22

The Group was asked by the Facilitator, how it felt about the fact that a majority decision (rather than a consensus decision) was made and some TANK Group members were not present today. It was unanimously agreed that this is the decision of the Group in regards to modelling and the information presented on the day was essential for voting.

Matters raised by TANK members

In Twyford, we don't have actual data as such. In the future we will be able to monitor each individual well on a 24 hour basis so everyone will be hooked up to telemetry and then we can really start modelling, in actual real time. So I am quite positive about the future. Rob: We don't have actual use, or particularly good records at the moment. For the purposes of modelling, actual use is what is modelled by Aqualinc. Trying to model a global consent, is very difficult because it all depends on how it is set up and that could differ by catchment.

The growers each Sept/Oct make a decision of what they are going to plant. They can only look at it based on their long range forecasts and their anticipation of whether the season is going to dry, average, wet or god knows what. They can't change their mind in Jan/Feb, they can only make one decision to develop/grow a crop and those are the things that you have got, it is not a statistical change, the more bandaid or a longer bandaid you don't get a professional regression. It is either in or out. The growers make the decisions, just once, to plant or not to plant. Pipfruit people, or viticulturalists, grow or don't grow based on the model data in front of them, at the moment they are electing to work in that environment. You will get situations such as in Gisborne where scarcity of water became an issue and significant growers just up and left Gisborne and went to where there was a more reliable water supply. Bringing the periods of ban events earlier in the season, is taking away one of the management options that growers have, to grow an earlier maturity crop or a shorter rotational crop that can be finished without irrigation in Dec or Jan. That's something growers have been doing in Tukituki, cut peach trees out and apricot trees, and planted cherries something that is finished by Christmas, if we are bringing those ban events earlier in the season then that is another option that growers have as a management tool taken out of the equation. So they will just say, I am not doing it.

Equally, we must remember that some investment decisions have been bad decisions and sometimes against advice at the time.

Irrigators have been shown to have some effect on river levels during periods of low flow but the impact of all water users needs to be considered. This discussion seems to be very focussed on irrigators. If we imposed 25%, 50%, and 75% cutback, cease takes, I would like to have a look at what the effects on the low flow is going to be. Are we going to be achieving anything significant by doing these staged decreases? Are we actually doing something or are we looking like we are doing something? *Rob: We are focussed on irrigators because it is the surface water abstractions that we are discussing at the moment. If we model restrictions under a scenario where there is a cease take or staged reductions ultimately that will have an effect on security of supply. To go with that you also need to know how the river benefits in term of flow and habitat available with those restrictions in place. This is work we are doing and will bring back to you.*

The point has been made in the past that the effect from a cut off is short term then the river drops anyway. The interesting question is how many more days of habitat has that bought before the cold hard reality or a dry HB summer sets in. If you can shed some light on that statistic it would be helpful. *Rob: That actually ties in with the restriction data, the number of days that the river spends at or below the minimum flow is the same data it is just looking at it from a different angle. Thomas: We are going to do what you are asking but only going to do it for two scenarios. So today you have to pick the two restriction scenarios, to be carried through.*

You are asking us about staged reductions but we haven't actually at any stage, seen the staged reductions model. For example, does it start at 5000 or 10000? *Rob: A little while back I put to you three possible scenarios that incorporated some form of staged reduction and flow sharing but the staged reductions in there were pretty arbitrary, I just picked something that might look all right. It was just to promote some thought. So today we are testing your appetite for staged reductions and are seeking your feedback on what that might look like.*

My experience is that my consents give me two staged reduction, so I am already operating at that to a degree.

What about climate change impacts? *Joe: The MALF that you are using for this is being calculated now so it won't be affected by climate change impacts until the next time you re-litigate this in the next plan review.*

What are the implications of capping existing use or not? *Jeff: For the Ngaruroro the implications are that the current surface water allocation is 30% of MALF which as Joe said earlier is regarded as a high flow alteration. If*

you include the combined effects of the groundwater takes in the plains it is 50% of MALF which is a really high flow alteration. So capping the surface water allocation brings it down to what people are actually using which is based on the demand model. This is consistent with the groundwater allocation which is being capped at the moment and looking at being reduced to existing use.

If we make a decision to cap use now what happens outside this room? *Jeff: We go and model it based on existing use rather than allocation. Mary-Anne: In the meantime life go on as normal, people can still make applications and it is just judged against the existing plan.*

There is no way you can use any more water than we are actually using now without storage. If we store we don't create any more problems in the river anyway. *We are talking about low flow allocation here.*

We are only allowed to use that allocated water at a certain time of the year. So when you would store is a totally different time. Take storage out of this, is my suggestion, we are talking about abstraction for irrigation. If you go to what we are actually using right now which in our case is 45% let's see where that sits. It is only a model, and then we can look above or below depending on what the outcomes are. Storage is a totally separate issue. I think as a TANK Group we have a common aspiration to be very responsible during irrigation or extraction periods then during the winter time when we have high flow to investigate storing some of that water. Two different stories/questions. So I would say go for existing use.

Modelling decision for Ngaruroro and Tutaekuri:

The Group unanimously agreed to cap surface water takes allocation to existing use for further modelling.

What percent is used? *Overall it is about 70%, that was during 2012/13 a really dry year.*

What is the time period? Are we talking about peak use or annualised use?
I think the irrigation season is from 1 October till the 28 April. We also have an instantaneous rate of take. Cubic metres is on the 28 days or on the whole irrigation season, but most critical is the litres per second rate of take. That is how we have control of all the water that comes out.

Mary-Anne: Slightly different for surface water.

Just a point of clarification in terms of existing take was there agreement reached of what that actually meant? *Mary-Anne: We have a sub-group looking at that, what formula we use, and how do we allocate so that it is consistent for all extractions. We haven't got the formula yet, in fact I am not even sure if the sub-group has had a meeting. No.* **I think it is going to be important that that decision is brought back to the group.** *Mary-Anne: Absolutely.*

14. Item # 12 – Next meeting- 22 November 2017.

The draft Agenda for the next meeting on 22 November was presented.

The meeting closed at 4.30pm.

Summary of Action Points

ID	Action item
34.1	Bring back the Zone 1 map overlaid with existing consents (as presented by the hydrologists at a previous meeting).
34.2	HBRC to consider how to action TANK's concern about vehicles on the braided river systems.