Kaituna / Maketū Freshwater Futures Community Group

Workshop 5 Meeting Notes:

Draft in-river state / Use values / Modelling

The Orchard, 20 MacLoughlin Drive, Te Puke

Tuesday 30 May 2017 commencing at 9.00am

Members present: Barry Roderick (Chair), Jeff Fletcher, Hendrik Metz, Hohepa Maxwell, John Fields, Julian Fitter, Manu Wihapi, Marc Fauvel, Maria Horne, Mary Dillon, Councillor Paula Thompson, Nick Webb, Richard Fowler, Brian Thomas

Apologies: Ian Schultz, Cor Verwey, Doug Hallberg, John Fenwick, Jessica Dean, Maria By de ley, Morgyn Bramley, Murray Linton, Peter Ellery, Warren Webber, Vivienne Robinson.

BOPRC Staff present: Pim de Monchy (Relationship Manager), Kerry Gosling (Facilitator), Janie Stephenson, (Support Facilitator), Nicola Green (Senior Planner – Water Policy), Joanne Watts (Senior Planner – Water Policy), Clarke Koopu (Senior Māori Policy Advisor), Rochelle Carter (Environmental Scientist), Raoul Fernandes (Science Team Leader – Water Quality), James Low (Acting Water Policy Team Leader), Lisa Baty (Planning Coordination Officer – Water Programme), Scott Mahupuku (Regulatory Projects Officer - Compliance), and Nic Conland (Modelling Consultant)

Observer: Rani Dhaliwal (University of Waikato PhD student), George Ford (representing Te Tumu Land Owner together with Jeff Fletcher)

Related documents previously circulated:

1. Workshop Paper – Freshwater futures workshop 5 overview and national update
2. Workshop Paper – Desired in-river state states – have we got it right?
3. Workshop Paper – Issues in the Kaituna -Pongakawa Waitahanui Water Management Area
4. Workshop Paper – Use values

1 Welcome /Updates/Focus of the day

Manu Wihapi opened with a karakia.

New community group member attendees, BOPRC staff, and observers were introduced:

- Jeff Fletcher – Invited to join the group in February 2017. Representative of Te Tumu land owners group.
- John Fields, Tauranga City Council (replacing Campbell Larking)
- James Low – Acting Water Policy Team Leader, BOPRC - New to the water policy team
- George Ford - Observing.

1.1 Agenda, purpose and updates

Kerry introduced the agenda and purpose of the workshop.

Administration:

- There was no opposition to publicly sharing names and photos of community group members on the BOPRC web site.

1.1.1 **Recent flooding in the Kaituna catchment:** Pim shared photos of flooding in the Kaituna catchment as a result of Cyclone Debbie.

1.1.2 **Update on unauthorised water takes**

In response to questions received prior to the meeting about kiwifruit orchards, Scott Mahupuku (BOPRC) provided a brief update as follows:

- BOPRC became aware there may be extensive unauthorised water use in the region and have worked with the kiwifruit industry to encourage unauthorised water users to register with BOPRC that they have an unauthorised water take.
- Zespri drove this registration process, which resulted in c120 persons coming forward.
- In the Kaituna / Pongakawa Water Management Area 40 people have registered that they may have an unauthorised water take, including 33 ground water takes, 7 surface water takes.
- BOPRC Council are working through the registrations. Some meet permitted activity requirements and do not need a resource consent. Others may be able to re-assess their water requirements to permitted levels and would then not require resource consent.
- BOPRC requires the rest to apply for resource consent to take water. Zespri is now encouraging this. Applications lodged will be processed in the same way and under the same rules as any other applicant for a new resource consent for a water take i.e., approval of the application is not a given, particularly in fully/over-allocated catchments.

1.1.3 **Updates** were provided as outlined in the briefing note, including:

National updates:

- Resource Legislation Amendment Act
- Clean Water Consultation

Regional Updates:

- Proposed change to Regional Policy Statement (Change 3; Rangitāiki).
- Proposed Plan Change 9: Region-Wide Water Quantity.
- Proposed Plan Change 10: Lake Rotorua nutrient management; hearings have finished and the decision is pending.
- Kaituna, te taonga tuku iho: expected to be publically notified for submissions on 27 May 2017, consultation period closes on 24 July 2017.

Cr Thompson added:

- Overseer has been tested in Court and is being tested in plan change 10. In the case of Horizons the criticism has been about the way in which models are used and applied which is the key.
- There is public interest in charging for water bottling. Regional Council can charge the reasonable cost of processing resource consents and monitoring but can't charge for the actual water.
- Phase two of the Waitangi Tribunal national inquiry on *Fresh water and Geothermal Resources* is progressing. This is about whether the Crown's resource management reforms adequately recognise and provide for Māori rights and interests in water.
- There are ongoing government conversations regarding Māori interests in water and what this means.

Key message: Freshwater management continues to be an active policy and reform topic nationally. Council staff will keep the community group updated on key changes. The group doesn't need to be burdened with keeping up with all of it.

1.2 Questions / Comments

Re: recent flood events

Q: Was the flooding in the Kaituna catchment a 1:100yr flood? **A:** Flooding in the Kaituna was more than a 1:20 year flood but less than 1:100 year flood. [Note from Pim that subsequent analysis has shown the flood event spanning the period 3-7 April 2017 was a one in five year average return period event in the Kaituna River at Te Matai (Waitangi), with a peak flow of 164 cumecs and a level of 4.189m. The highest flow ever recorded was 377 cumecs in 1962.]

Q: Are we going to have effluent contamination issues in the lower Kaituna from urban development like in Auckland? Is the storm water and waste water separated /contained? The public need to be assured that human effluent isn't being spilled into the Kaituna. **A:** District Council representatives advised: The stormwater and wastewater systems are not combined as they are in the oldest parts of Auckland. Modern reticulation is good and stormwater and wastewater systems are separate. Councils are certainly trying hard to avoid overflows. There are no direct overflows in new development areas. WBOPDC is working to address over flows.by providing the storage capacity at Te Puke water treatment plant and TCC council has increased storage at the Te Maunga wastewater treatment plant. Stormwater and wastewater discharge quality are addressed by resource consents for the discharge.

Q: If climate change means heavy rain events become more frequent what happens to the land? Flooding seems to be happening more often. **A:** Flood management is not the focus of this project. However, a range of options are possible including changing levels of service (scale of event which we seek to protect against), gravity and pump options; land use change etc.

For this project, BOPRC has purchased rainfall and temperature data for future climate change scenarios from NIWA to use in our modelling of implications for water quality and quantity.

Kaituna catchment was also the subject of a key piece of research on climate change futures by NIWA and other research institutes which we will need to consider. Reference: *http://ccii.org.nz/wp-content/uploads/2017/03/RA2-Lowland-Case-Study-Synthesis-report.pdf*

Re: unauthorised takes and permitted activities:

Q: Is BOPRC accepting illegal takes of water? **A:** No. Some activities registered as potentially unauthorised are actually operating within permitted water take rule conditions; some may be able to reassess their water use (or provide on-site storage) and come under the permitted amounts. The rest have to apply for resource consent.

Q: What is a permitted activity water take? **A:** Under s14 of the Resource Management Act 1991, nobody can take water unless: it is for an individual's reasonable domestic needs; it is for the reasonable needs of a person's animals for drinking water; or it is allowed as a permitted activity by a rule in a Regional Plan. Proposed Plan Change 9 has rules expressing how much water is allowed to be taken from surface water or groundwater without requiring a resource consent, subject to conditions. These are called Permitted Activities which means they do not require a resource consent.

For surface water, permitted activity water takes are less than 15 m^3/day.

For groundwater, permitted activity water takes are less than 35 m^3/day for properties that are 5ha or more and 15m^3/day for properties that are less than 5 ha.

See factsheets at: *http://www.boprc.govt.nz/environment/water/freshwater-futures/freshwater-policy-and-plan-change-work/region-wide-water-quantity-plan-change/proposed-plan-change-9-and-other-supporting-documents/*

Q: How many permitted activity water takes are there in the BOP? **A:** We don't know yet. Permitted activities have not in the past been required to be registered or metered. Proposed Plan Change 9 requires all new permitted water takes to be registered with BOPRC and existing ones will need to do so once the plan is operative. We will have to estimate these water takes for modelling purposes.

Q: Do you know the total volume of water allocation in Kaituna? **A:** Yes, we have a report showing total quantum allocated by resource consents and remaining allocation.

See the *Assessment of Water Availability and Assessment of Current Allocation Levels, October 2016* at: *http://www.boprc.govt.nz/environment/water/freshwater-futures/freshwater-policy-and-plan-change-work/region-wide-water-quantity-plan-change/proposed-plan-change-9-and-other-supporting-documents/*

Q: How will you be able to confirm that permitted activities are taking only the permitted amount? **A:** BOPRC can only confirm this if we directly monitor or meter. BOPRC can check property size and canopy ha data and estimate total volume they are likely to need. Where it is clearly mismatched, we can investigate.

Some members stated that this is unsatisfactory and we need to meter permitted takes and also curtail unauthorised water takes. A member pointed out that all orchards are registered under on the HAIL list.

Re: Updates

Q: How many water bottling plants in the region? **A:** There are 8 consents for water bottling.
Q: What is the "quantity" allocated for these 8 water takes? **A:** Staff to provide details by email.

2 Progress to date

A brief summary of previous workshop topics and progress (including values, Freshwater Management Units, and acceptability of current state) was given as a reminder and to illustrate where we are up to in the process. See briefing notes and slides. The process of developing objectives was outlined.

2.1 Key comments / questions:

Q: Water Skiing is noted under the freshwater values – is this relevant in this WMA? **A:** It is a value in some other WMAs which is why it is included in the draft regional value set. Water skiing is not necessarily a value in this WMA or suitable /desirable in this WMA.

Water suitable for spraying over horticultural crops should be added as a value. Water has to be below 100 cfu *E. coli* when sprayed on fruit within 7 days of harvest. The kiwifruit industry depend on it, otherwise the fruit cannot be exported.

Action: Ensure Irrigation and Cultivation value accommodates this.

3 Desired In-River State

Draft desired in-river state statements were collated by BOPRC staff directly from community group member feedback worksheets and notes taken at Workshop 4. These were presented for community group feedback to make sure staff had interpreted what had been said in workshop 4 correctly.

The 'Gradients of Agreement' tool was introduced as a decision making tool to help the group to agree on the in-river state statements.Members were asked to consider all of the statements for one FMU and to state where they sat on the Gradients of Agreement scale outlined below:

1= whole hearted support

2= agreement with minor point of contention

3= support with reservations

4= abstain

5= more discussion needed

6= don't like but will support

7= serious disagreement

8= veto

Discussion then focussed on reasons for high/low scores and how these could be further refined by changes to wording of the draft desired in-river state statements. Once agreement/near agreement appeared to be reached and limited further progress could be made, scoring was repeated. Changes to each of the in-river state statements and scoring results are summarised below. Note that these are the community group's preferred in-river states at this point in the process and there will be opportunity to revisit. Use values will be considered before setting freshwater objectives. BOPRC also notes it needs to accommodate feedback from iwi engagement and work through RMA tests and other considerations.

3.1 Overarching statements/comments

Desired in-river state statement reached by Community Group in Workshop 5	Notes/comments
	Simplify wording Remove the word “continues” and replace with the water “will” provide.
	Check the wording aligns with Kaituna River Document now and in the future.
OS1. Several of the desired in-river state for several values will not be met after heavy rainfall events, e.g., swimming, mahinga kai that is safe to eat, cultural and ceremonial activities. The size of rainfall event and length of time afterwards are yet to be specified.	Remove “except after heavy rainfall events” from desired in-river state statements and add an overarching statement acknowledging that the statements may not be achieve after heavy rainfall events. Specific measure should be developed.
OS2: In all FMUs, for all in-river values, there is an expectation of stable or improving values and water quality trends.	
OS3: Mahinga Kai species identified by the community group in these FMUs include Tuna/eels, kākahi/freshwater mussels, kōura/freshwater crayfish, inanga, watercress. Significant indigenous species identified by the community group in these FMUs include: Tuna/eels, giant kōkopu.	Don’t list species in desired in-river state statements but list in overarching statement/table. Note: List of species will be updated in response to ecological survey information and mapping.

3.2 Waiari draft FMU

Preferred in-river state statement collated by BOPRC staff	Desired in-river state statement reached by Community Group in Workshop 5	Notes/comments
1. The water will continue to provide for ecosystem health in the upper and mid reach of Waiari, with no deterioration below the wastewater discharge.	1. The water quality and quantity will protect and improve ecosystem health to pristine condition in the upper and mid Waiari FMU.	Discussion about the use of the word “restore” centred on whether that would be assumed to mean restore to natural condition. Group confirmed desire to use the word “pristine”,

Preferred in-river state statement collated by BOPRC staff	Desired in-river state statement reached by Community Group in Workshop 5	Notes/comments
		recognising that this is a high standard. Quantity should be maintained, quality improved. Should "pristine" only apply to the headwaters?
2. The water will continue to provide for mahinga kai including tuna (eels), black mussels and watercress that are safe to eat. The water quality and flow will continue to provide a sanctuary for long finned eel and giant kōkopu in Waiari.	2. The water quality and quantity in Waiari FMU will provide for mahinga kai that is safe to eat, and for significant indigenous species.	Specific species do not need to be listed in the desired in-river state statement (or objectives) but still keep a list of them. Fishing (particularly for trout) is not a key value in this catchment.
3. The water will continue to be suitable for swimming above the Te Puke highway bridge (except during winter) without getting sick or being affected by the wastewater discharge nearby.	3. The water quality and quantity in Waiari FMU will be suitable for swimming.	Overarching statement should be added for all statements about swimming after heavy rain. Other than this, the water quality should be safe for swimming all year round.
4. The Waiari has a very strong cultural significance for tangata whenua. The stream water will preferably be free from effluent, and continue to provide for customary swimming and ceremonies (baptisms, cleansing).	4. The water quality and quantity in Waiari FMU will be suitable for customary ceremonial activities.	

3.3 Middle-upper Kaituna

Preferred in-river state statement collated by BOPRC staff	Preferred in-river state statement reached by Community Group in Workshop 5	Notes/comments
1. The water will provide for ecosystem health in the Middle-upper Kaituna, with suitable shade, temperature, stable river bank and	1. The water quality and quantity in mid-upper Kaituna FMU will be maintained and/or or improved to provide for a healthy	Shade, temperature, stable river bank periphyton, nitrogen, phosphorus management are all aspects of achieving the statement, but

Preferred in-river state statement collated by BOPRC staff	Preferred in-river state statement reached by Community Group in Workshop 5	Notes/comments
neutral or improving trends for periphyton, nitrogen, phosphorus.	ecosystem supporting significant indigenous species.	do not need to be listed. Some members sought the word “significant” be removed.
2. The water will continue to provide suitable conditions for fish, tuna (eels), kōura (freshwater crayfish), kākahi (freshwater mussels) and giant kokopu, other indigenous species and watercress and halting the declining trend.	2. The water quality and quantity in mid-upper Kaituna FMU provides for fishing, mahinga kai that are safe to eat.	
3. The water will continue to be good for swimming all year round (except after heavy rainfall) without getting sick.	3. The water quality and quantity in mid-Upper Kaituna FMU will be suitable for swimming.	
4. That water will be of a suitable quality for baptism at places where these have been common practice in the past.	4. The water quality and quantity in mid-upper Kaituna FMU will be suitable for customary ceremonial activities.	
5. The water will continue to provide for navigation for continuing current use of tauranga waka.	5. The mid-upper Kaituna body provides for navigation and current use of tauranga waka that do not impact river banks.	Make it clear that the Group does not support jet boating.

3.4 Draft Lower Kaituna FMU

Preferred in-river state statement collated by BOPRC staff	Preferred in-river state statement reached by Community Group in Workshop 5	Notes/comments
1. The water will provide for ecosystem health in the Lower Kaituna, with suitable temperature, shade, oxygen level and natural river bed.	1. The water quality and quantity will improve ecosystem health.	
2. The water will improve to suitable conditions and good habitats for important indigenous species, and kai species. That means it will continue to provide for a	2. The water quality and quantity will provide for healthy mahinga kai and significant indigenous species.	

Preferred in-river state statement collated by BOPRC staff	Preferred in-river state statement reached by Community Group in Workshop 5	Notes/comments
decent amount of watercress that is safe to eat and kai species coming from the sea; and will be able to provide for eels and īnanga and other expected mahinga kai.		
3. In the next 10 years, the water in swimming spots in the Lower Kaituna will provide for swimming all year round (except after heavy rainfall) without getting sick.	3. The water quality and quantity in Lower Kaituna FMU will be suitable for swimming [by 2027].	Expect improvement within the next 10 years. Debate about whether we should specify a year so as to be accountable. Specify 2027 or "within the next 10 years"? Feels there should be a specific year, not a blanket statement of "within the next 10". We should be held accountable vs. all morning we haven't talked timeframes – why are we trying to do so with this "one".
4. The water will exhibit natural characters in the Lower Kaituna catchment.	4. The natural character of the Lower Kaituna FMU will be improved/restored.	Debate around the use of the term "restore" – does it mean return it to natural, or does it mean gradual/continue improvement towards more natural. Agreed to present both words at this stage. Caution around use of words that may be construed to have a different meaning from that intended. Natural character includes native riparian vegetation
5. The water will provide for wai tapu	5. The water quality and quantity in Waiari FMU will be suitable for customary ceremonial activities [and sites of cultural significance].	
6. The water will continue to provide for navigable good transport and tauranga waka access.	6. The Lower Kaituna FMU provides for navigation and current use of tauranga waka that do not impact river banks.	

3.5 Maketū Estuary receiving environment

These preferences for the estuary are noted particularly because freshwater objectives must support estuary values. However, only freshwater quality and quantity objectives will be set in the plan change.

Preferred state statement collated by BOPRC staff	**Preferred state statement reached by Community Group in Workshop 5**	**Notes/comments**
1. The water will be swimmable in the upper estuary (at the mouth) like where parts of estuary with tidal flushing now.	1. The water will be swimmable in the Maketū estuary.	You can't swim in the upper estuary but you can in the lower.
2. The water will support estuary ecosystem health and significant indigenous species.	2. Fresh water quality and quantity inputs will protect and improve/restore ecosystem health in Maketū Estuary.	See discussion about "restore" vs. "improve".
3. The water will support retaining and restoring tuna (eels), pipi, cockles (tuangi), flounder and inanga (whitebait) in plentiful numbers and which are safe to eat to provide the very significant mahinga kai source.	3. Fresh water quality and quantity inputs to Maketū Estuary will provide for mahinga kai that is safe to eat, and for significant indigenous species.	Again, suggestion from some members that it should be safe for all indigenous species, not just the 'significant' ones (who chooses whether a species is significant?)
4. Some aspects of the natural character of water will be restored through the re-diversion.	4. The natural character of the Maketū Estuary will be improved through the Kaituna River Re-diversion and other actions.	There was some discussion about whether to include "through the Kaituna River Re-diversion" or just leave it out.
5. Maketū has a very strong cultural significance for iwi. Re-diversion and return of flow is culturally very important for wai tapu, cultural significance and as a customary food bowl. Note that the rock by the diving board is sacred.	5. The very strong cultural significance of the Maketū Estuary is protected. OR 6. Similar wording as for Waiari: 7. Fresh water quality and quantity inputs to Maketū estuary will provide for customary ceremonial activities and waahi tapu.	Maintain the significance of the history of the estuary. The 2 anchor rocks are waahi tapu.
6. The water flow and sediment level will maintain a navigable channel depth through the control of sediment from the water.	8. Water depth and flow is increased, and sediment loads are reduced, to improve navigable channels in the Maketū Estuary.	All tides. Need to address sea lettuce and gut weed too.

	No. of members who selected this score							
	Mid-Upper Kaituna draft FMU		**Waiari Draft FMU**		**Lower Kaituna FMU**		**Maketū Estuary**	
Score	**Initial wording**	**Final wording**	**Initial wording**	**Final wording**	**Initial wording**	**Final wording**	**Initial wording**	**Final wording**
1= whole hearted support	0	2	0	2	1	1	0	3
2= agreement with minor point of contention	1	12	2	6	1	9	5	9
3= support with reservations	6	0	5	4	4	3	5	0
4= abstain	1	0	0	0	1	0	1	1
5= more discussion needed	4	0	5	1*	6	1	1	0
6= don't like but will support	0	0			0	0	1	0
7= serious disagreement	0	0	1		0	0	0	0
8= veto	0	0	1	1*	0	0	0	0
* will revisit when they see final wording written up								

4 Use values

Consented water takes and discharges were presented in maps and tables, along with a high level summary of economic value of land use industries. Refer to briefing notes.

4.1 Key Questions / Comments

Q: Is Waiari consent (for Tauranga City municipal water supply) included? **A:** Yes, it is included as it is consented even though it is not yet being taken.

Q: Do we have information on the volume of water discharged in association with discharge consents? **A:** Because of the range of different discharge consent types, it is tricky to summarise in a meaningful way. Also, the volume of water discharged does not relate directly to amount of contaminants.

Comment: Estimated horticulture economic value/employment is totally inaccurate/miles out. **A:** This is based on 2012/13 input-output tables from StatisticsNZ. It is the most recent data we could get hold of that allowed us to compare economic value and employment impacts of different industries in the WMA using the same yardstick. We acknowledge that individual industries would have more recent and accurate data, but those are not necessarily comparable with each other. The horticulture estimate would be underestimated because it assumes an equal distribution of horticulture across the region, which we know is not the case as kiwifruit is concentrated in this WMA. BOPRC is currently refining these estimates by separating kiwifruit from the overall horticulture figures and expects to update our figures. [We have also received the recently released economic study from Zespri: https://www.zespri.com/Documents/Waikato-Uni-Kiwifruit-GDP-Report.pdf].

Q: We need more economic data. How will the s.32 be done? **A:** More detailed economic and social analysis will be done to assess implications of potential management options when we have clarified objectives and narrowed down management options that may achieve them, after we have the outputs from catchment modelling. The data presented at the last workshop is just to start the conversation. BOPRC would welcome industry data.

Q: Estimated employment - Does this only include permanent staff? Is it total number of staff or total full-time equivalents? **A:** Full time equivalents. As noted above, the estimates are based on grouping all horticulture for the region together, and estimating Kaituna-Pongakawa-Waitahanui employment based on land area. This will underestimate the kiwifruit industry in the WMA. BOPRC has requested that data providers do some further data separation for us.

Q: No slide on recreational land use, i.e., land uses that people do because they prefer the lifestyle or others enjoy as well? How do we value where and how people want to spend their time? [**A:** this is a gap in our information at the moment. We are looking into some existing information, including a request to Fish & Game, but would welcome members' feedback.]

Q: Where/how is the honey industry represented? [**A:** would the honey industry be a large water user?]

Further information on water metering requirements (not discussed at the workshop):

Proposed Plan Change 9 introduces a requirement for all consented water takes, and some permitted water takes, to have a water meter. For consented takes that don't already require meters under the national regulations[1], the proposed Plan Change 9 requirement would only apply on consent renewal and for any new consents.

The table below summarises the percentage of water take consents by draft Freshwater Management Unit in the Kaituna-Pongakawa-Waitahanui WMA that require a water meter under the national regulations, and the current level of compliance. Discrepancies could be due to non-compliance, or situations where water is no longer abstracted (e.g. a historical consent which is no longer exercised and the consent holder has no pump or irrigation equipment).

[1] Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 require all consented takes greater than 5 litres per second (or equivalent) to have a water meter.

The table does not show compliance with reporting requirements. BOPRC is working on compiling metered water use information and hopes to report back to the Community Group shortly. Because of the range of reporting methods and frequencies, it is challenging to summarise the information in a concise and meaningful way.

Water metering requirements under the national regulations and current level of compliance

	Surface water		Groundwater		Overall total	
Draft Freshwater Management Unit	**Required**	**Installed**	**Required**	**Installed**	**Required**	**Installed**
Kaituna - lowland	73%	47%	79%	42%	77%	44%
Kaituna - middle and upper	64%	41%	57%	46%	59%	44%
Pongakawa-Waihi - lowland	100%	90%	64%	55%	81%	71%
Pongakawa-Waihi - middle and upper	86%	73%	71%	64%	75%	66%
Waiari Water Supply	56%	44%	67%	67%	58%	50%
Waitahanui	100%	87%	75%	25%	95%	74%
Total by Water Management Area	**77%**	**59%**	**66%**	**53%**	**70%**	**55%**

5 Catchment Modelling

Nic Conland gave a brief outline of the catchment modelling being progressed. See the information sheet circulated with the briefing notes.

A key input into catchment modelling is land use. A land use map developed for this purpose was presented to members and feedback on its accuracy is requested through the following website:
http://boprc.maps.arcgis.com/apps/webappviewer/index.html?id=53e38e0f72b94ed582e5a50e57756b66

5.1 Actions

Raoul Fernandez referenced the Earth Beneath Our Feet web-site, where you can see diagrams and cross sections of geological layers in Bay of Plenty. Reference:
http://data.gns.cri.nz/ebof/www.ebof

5.2 Key Questions / Comments:

Q: How do we account for spring-fed vs. lake-fed streams? **A:** Raoul noted springs monitoring work that has been initiated to better understand spring fed flows.

Q: Can we run social / cultural / economic implications discussions with the community group before/irrespective of the catchment modelling? **A:** We need the catchment modelling to support us in determining the amount of change in contaminants we need to achieve, the water quantity limits we need to achieve. But we do intend to undertake discussions with members of the community group to inform the scenarios that will go into the catchment modelling.

6 What's Next

A brief introduction was given about upcoming work on scenarios and management options. See briefing note and slides.

Members were invited to add to brainstorm lists/diagrams of potential options for managing *E.coli*, Nitrogen, Sediment, Phosphorous and water quantity. The brainstorm is not prioritised, assessed or reviewed in any way at this stage – it is simply all ideas on the table.

Workshop ended at 2.30pm with a karakia.