Rangitāiki Freshwater Futures Community Group

Workshop 9, 20 March: Groundwater

Moemoeā – Vision

E ora ana te mauri o te awa Rangitāiki,

e manaakitia ana e te iwi,

e tiakina ana mō ngā whakatipuranga ō muri mai.

Tihei Mauri Ora

A healthy Rangitāiki River, valued by the community, protected for future generations. Tihei Mauri Ora.

Welcome

- Apologies
- Welcome
  - Rangitāiki River Forum members
  - New attendees (alternates and visitors)
  - Eastern Catchments Team Leader

Housekeeping

- Fire protocol
- Toilets
- Meals
- Recording and sharing notes
- Make yourself at home

Purpose of this group

To help Council implement the National Policy Statement for Freshwater Management:

- confirm values, express preferred objectives
- provide feedback on limits for freshwater quality and quantity within this Water Management Area
- provide input to solutions for managing activities to meet those limits
- advise Council in their decision-making for Plan Change 12

Purpose today

Focus on groundwater quantity management in Rangitāiki WMA. To:

- confirm values and objectives
- clarify issues
- explore options to address issues
- to begin to form recommendations about options

Agenda

1. National and regional updates
2. Rangitāiki groundwater resource
3. Values and uses
4. Current allocation and availability
5. Future demand
6. Management issues
7. Options
8. Community Group recommendations

am tea

lunch

Outcomes sought today

Group members:

- have a common understanding of the groundwater systems in Rangitāiki WMA
- confirm values and objectives
- identify and clarify issues
- give feedback on options.

Council staff clearly understand group members' issues/concern and any preferences/feedback about policy options.

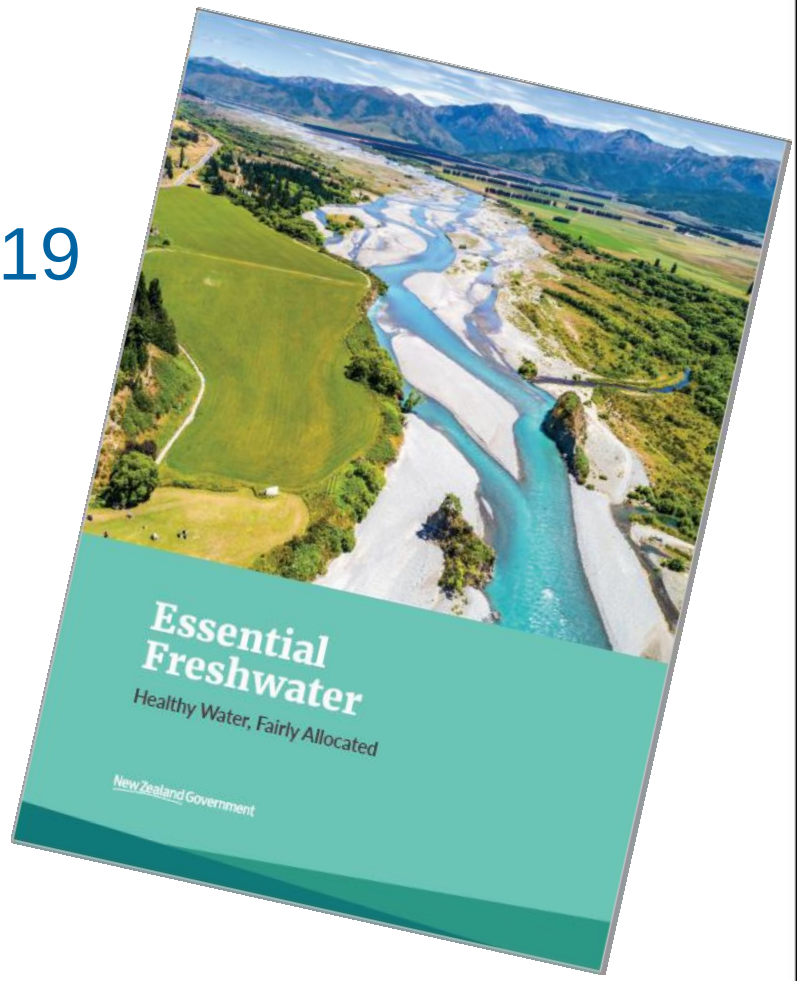
1.
National and regional update

National Update – Essential Freshwater

Public consultation July/Aug 2019

Large policy package to:

- stop degradation and loss
- address past damage
- address allocation issues.



Proposed Plan Change 9:

Region-wide Water Quantity

Environment Court appeal topics

Māori values and relationships	Governance and decision making	Cultural use and economic development	Tangata whenua general
NPSFM, Planning and WMA	Unauthorised dairy takes	Renewable electricity	Limits, flows and levels, over allocation
Rules, consents schedule 7	Municipal water supplies	Rootstock survival water	Transfer of permits

Calendar

Workshop 8: Sept 2018

- Modelling results - baseline and development

Workshop 9: Mar 2019

- Groundwater quantity

Workshop 10: April

- Water quality - Dam lake water quality, good practice modelling results, policy options.

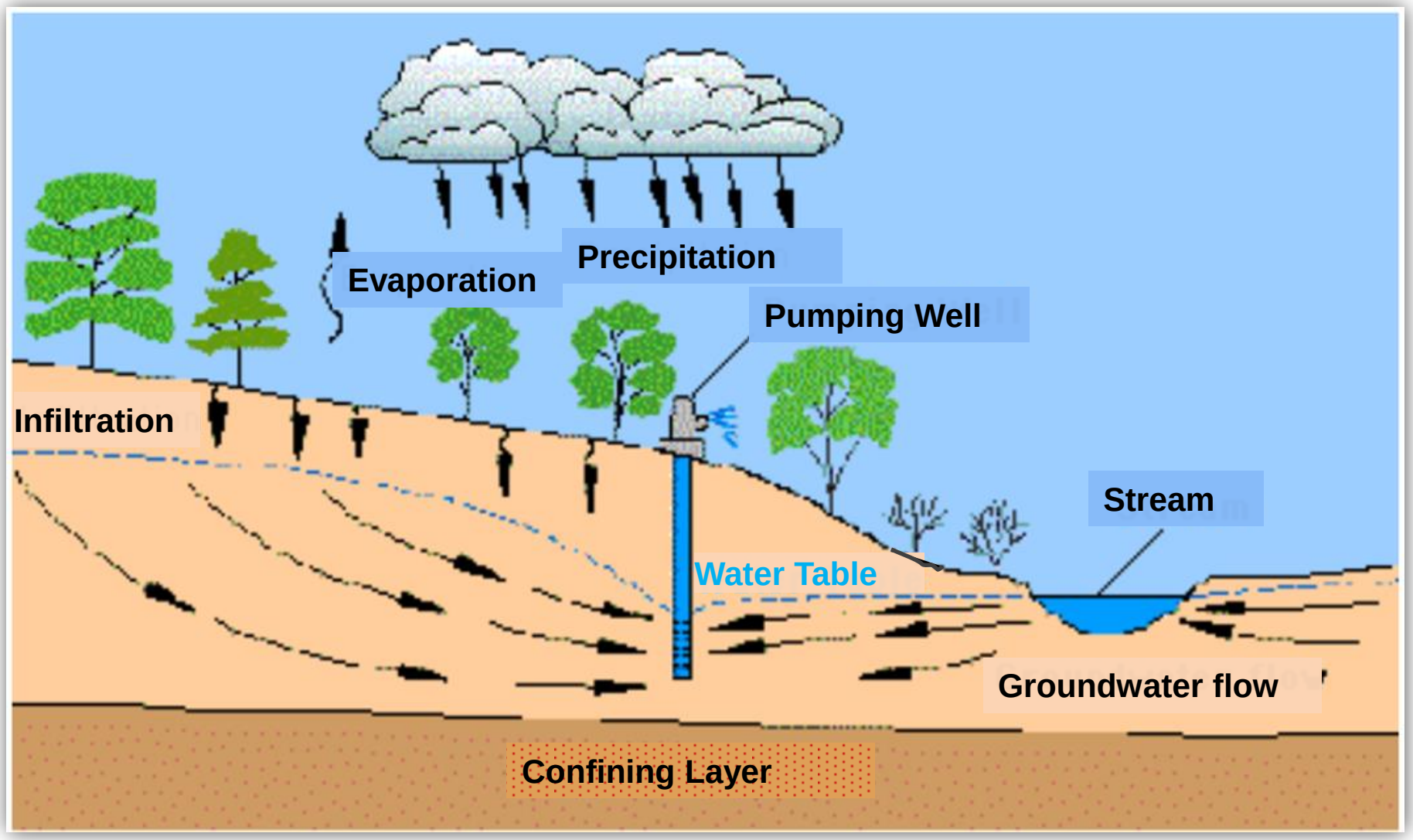
Workshop 11: May 2019

- Surface water quantity

Public engagement

2.
Rangitāiki Groundwater

Groundwater basics



Aquifer Types

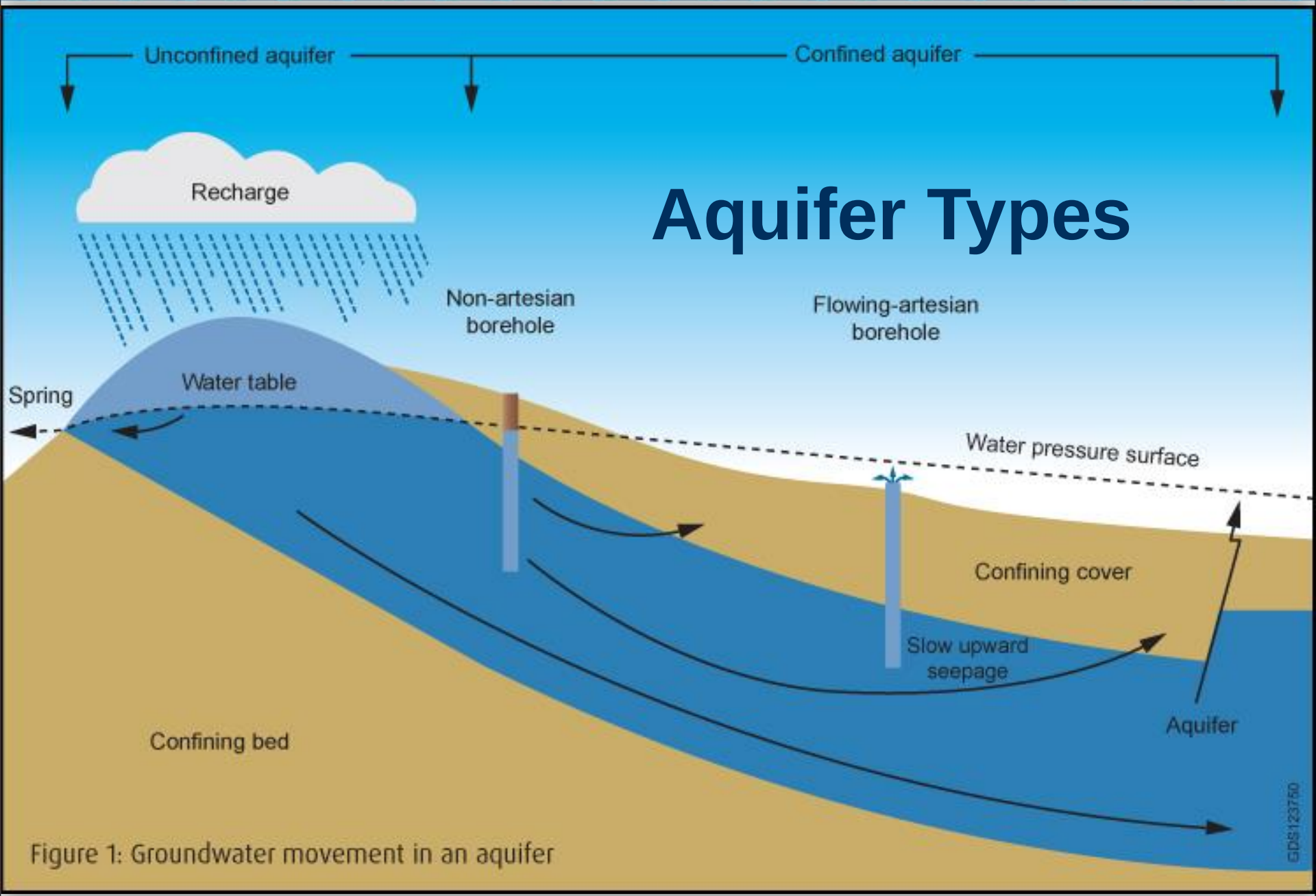
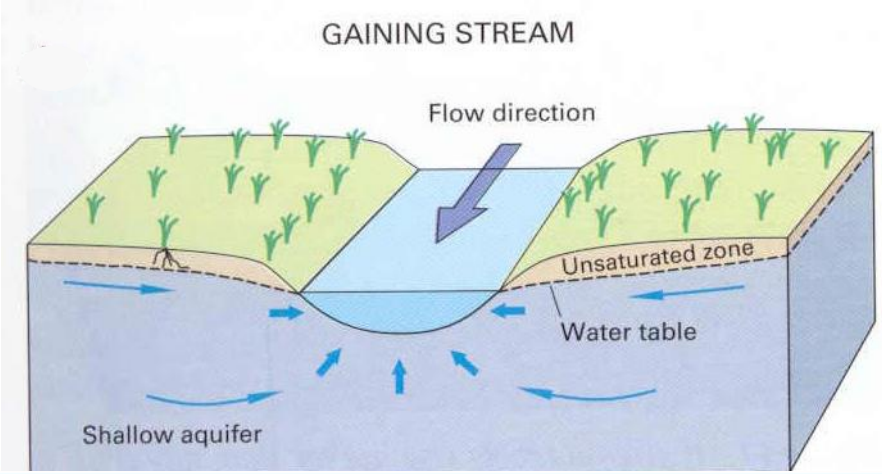


Figure 1: Groundwater movement in an aquifer

Groundwater Surface Water Interaction

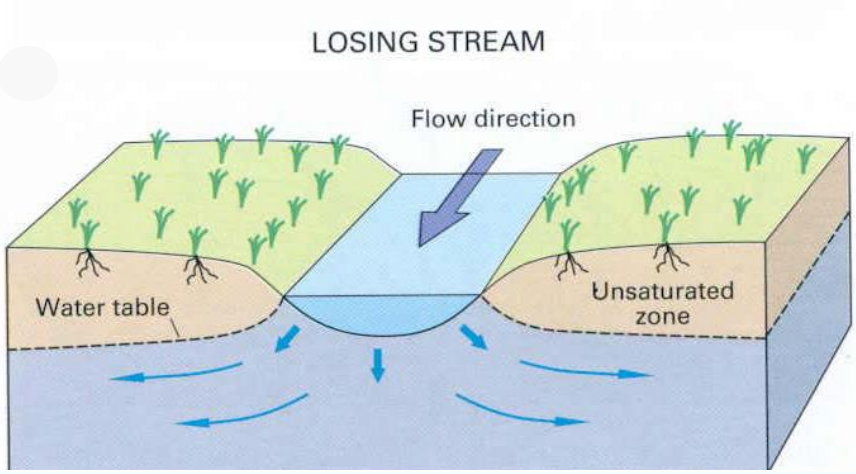
Gaining Stream

- Receive groundwater through stream bed (forms base-flow)
- Groundwater table above stream level



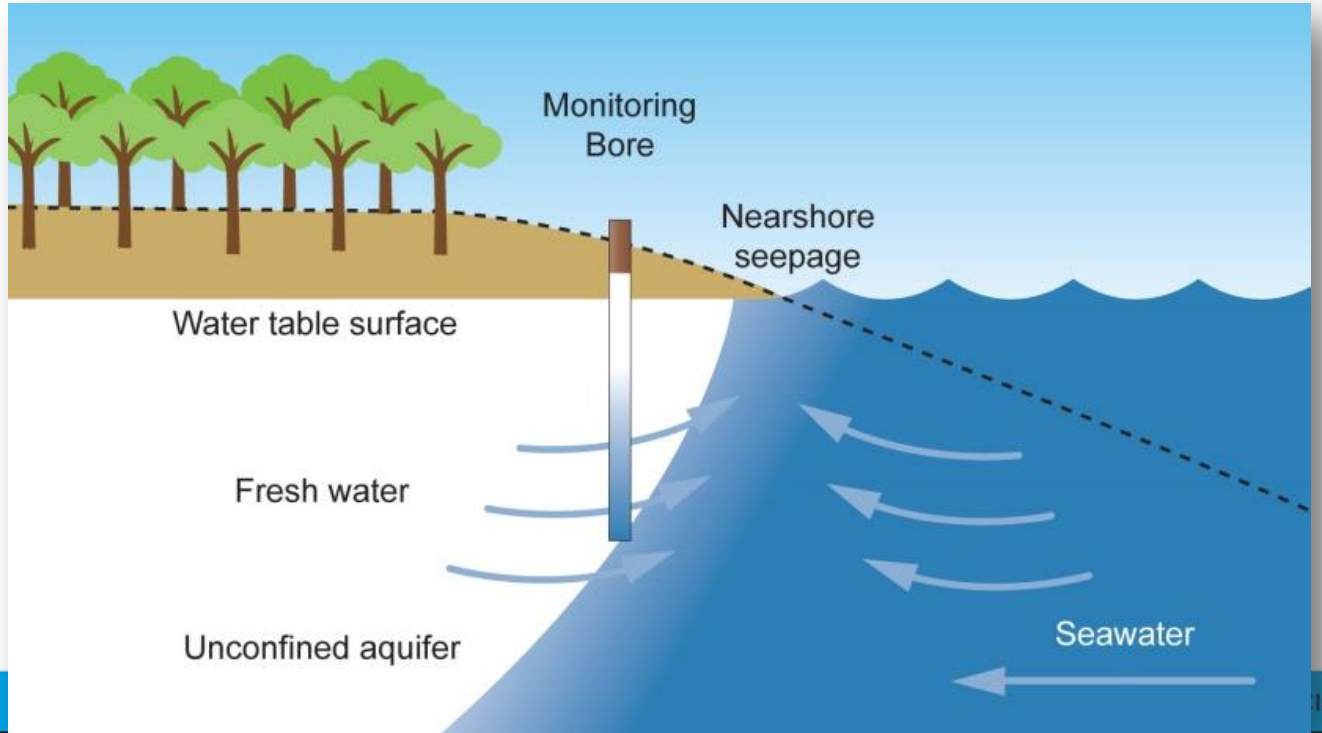
Losing Stream

- Outflow through stream bed to groundwater
- Groundwater table below stream bed

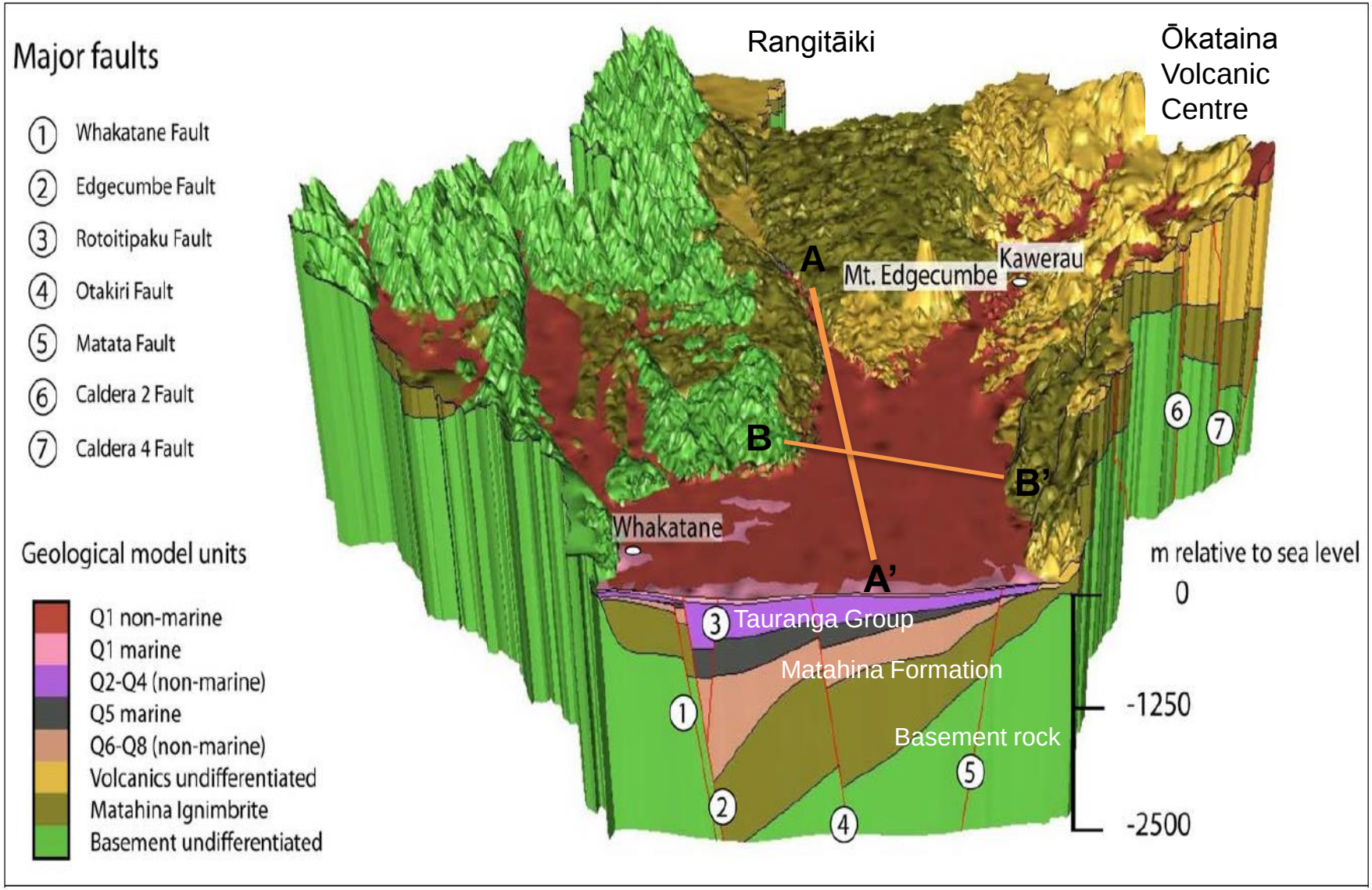


Groundwater and Saline Intrusion

- Fresh water is less dense than salt water
- Maintaining coastal outflow prevents saline intrusion / contamination of the aquifer with salt water
- If too much water is taken the saline ‘wedge’ can move inland



Rangitāiki Plains Geology

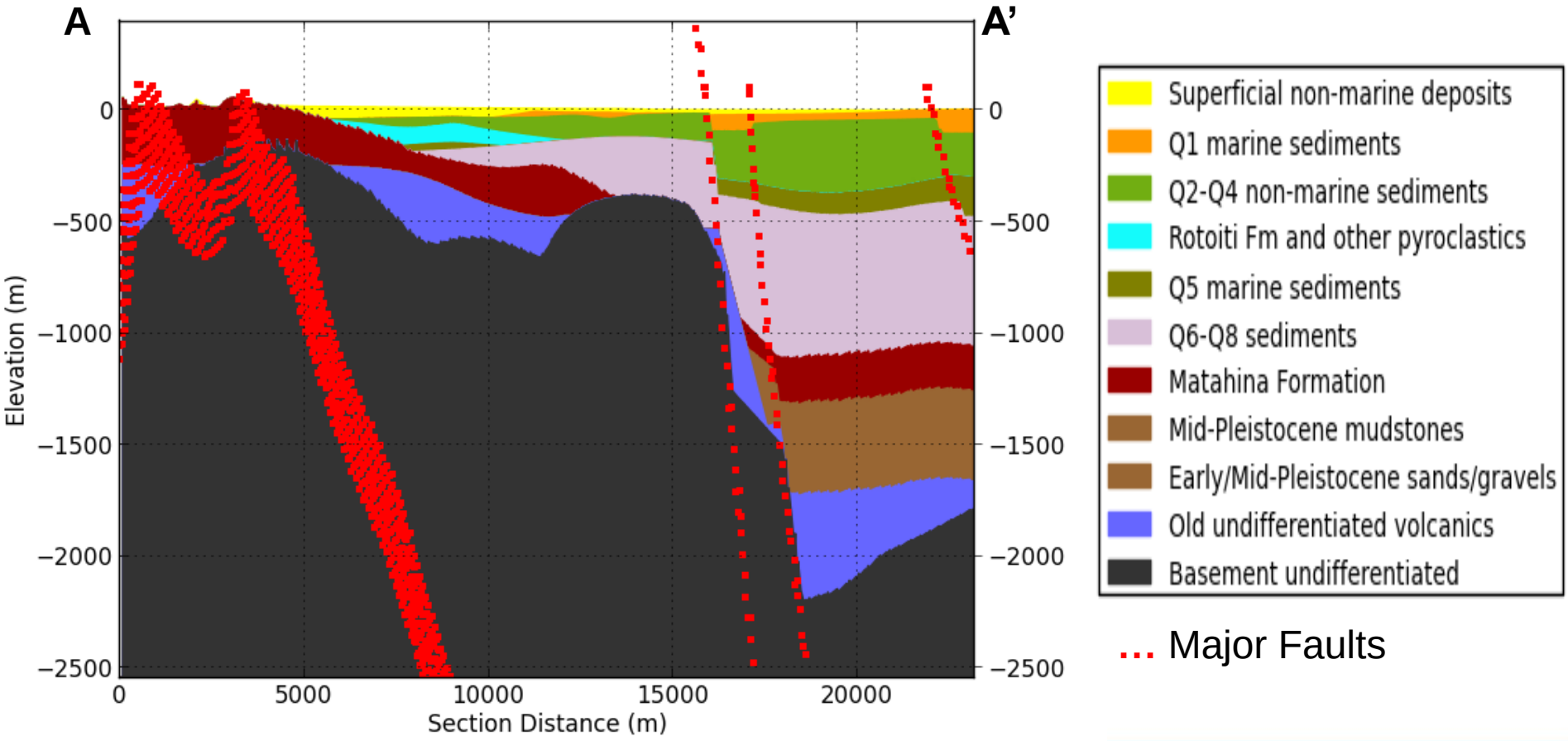


Rangitāiki Plains

Geological Cross Section A-A’

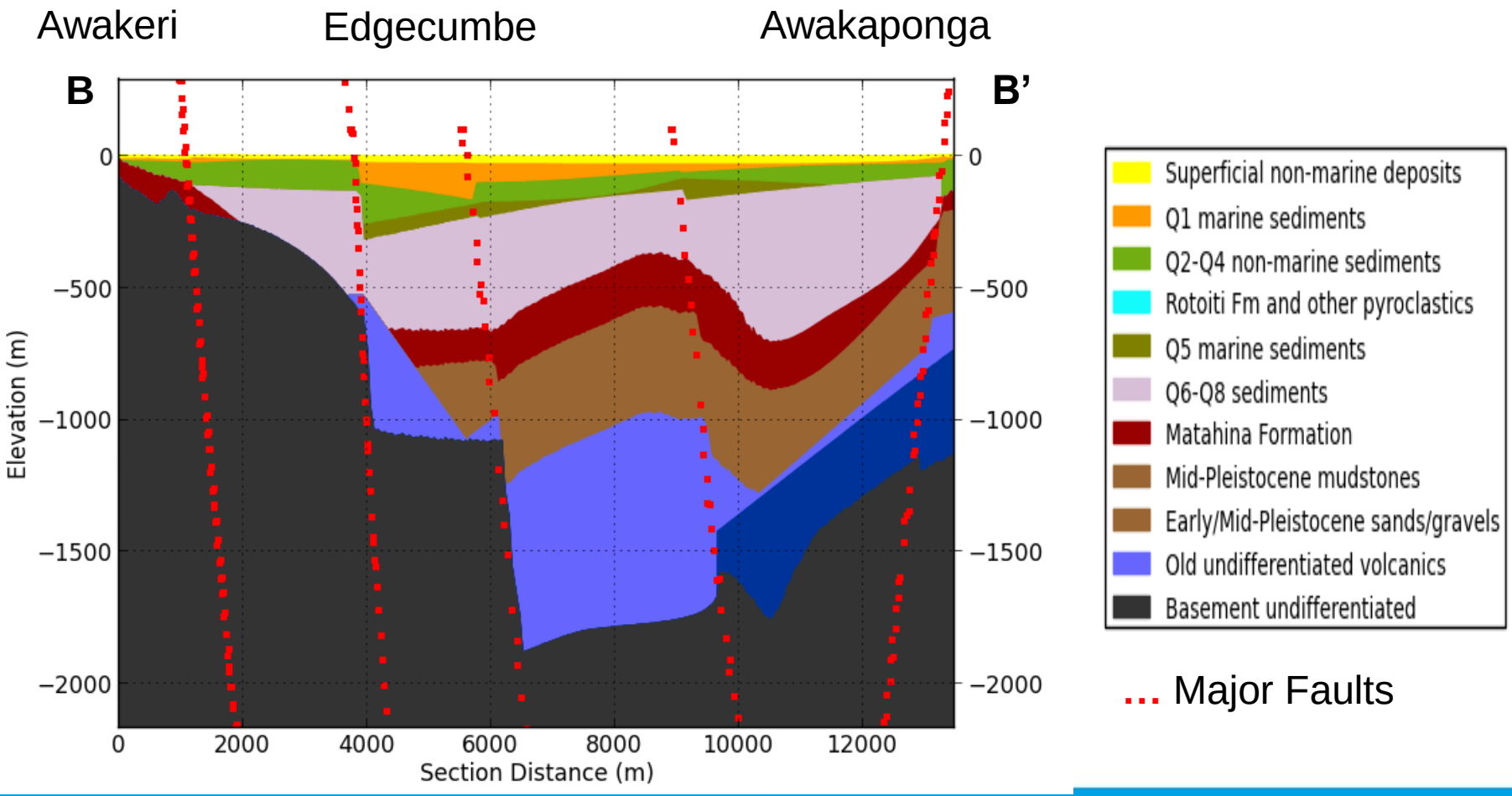
Matahina

Rangitāiki River mouth

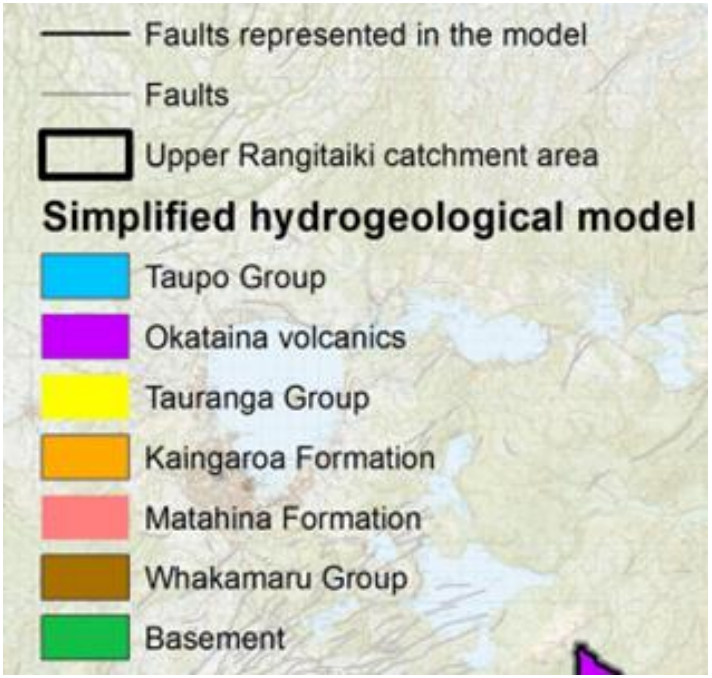


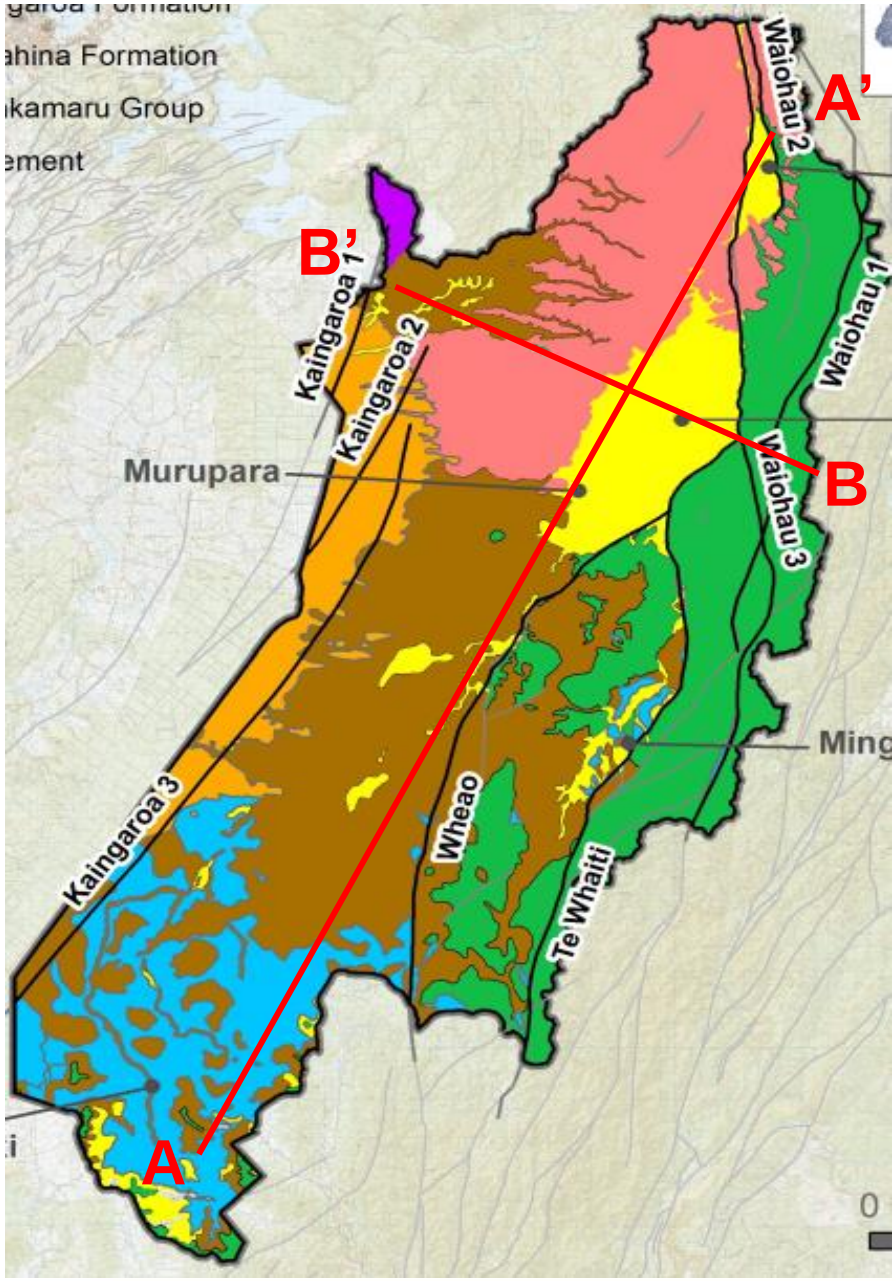
Rangitāiki Plains

Geological Cross Section B-B’



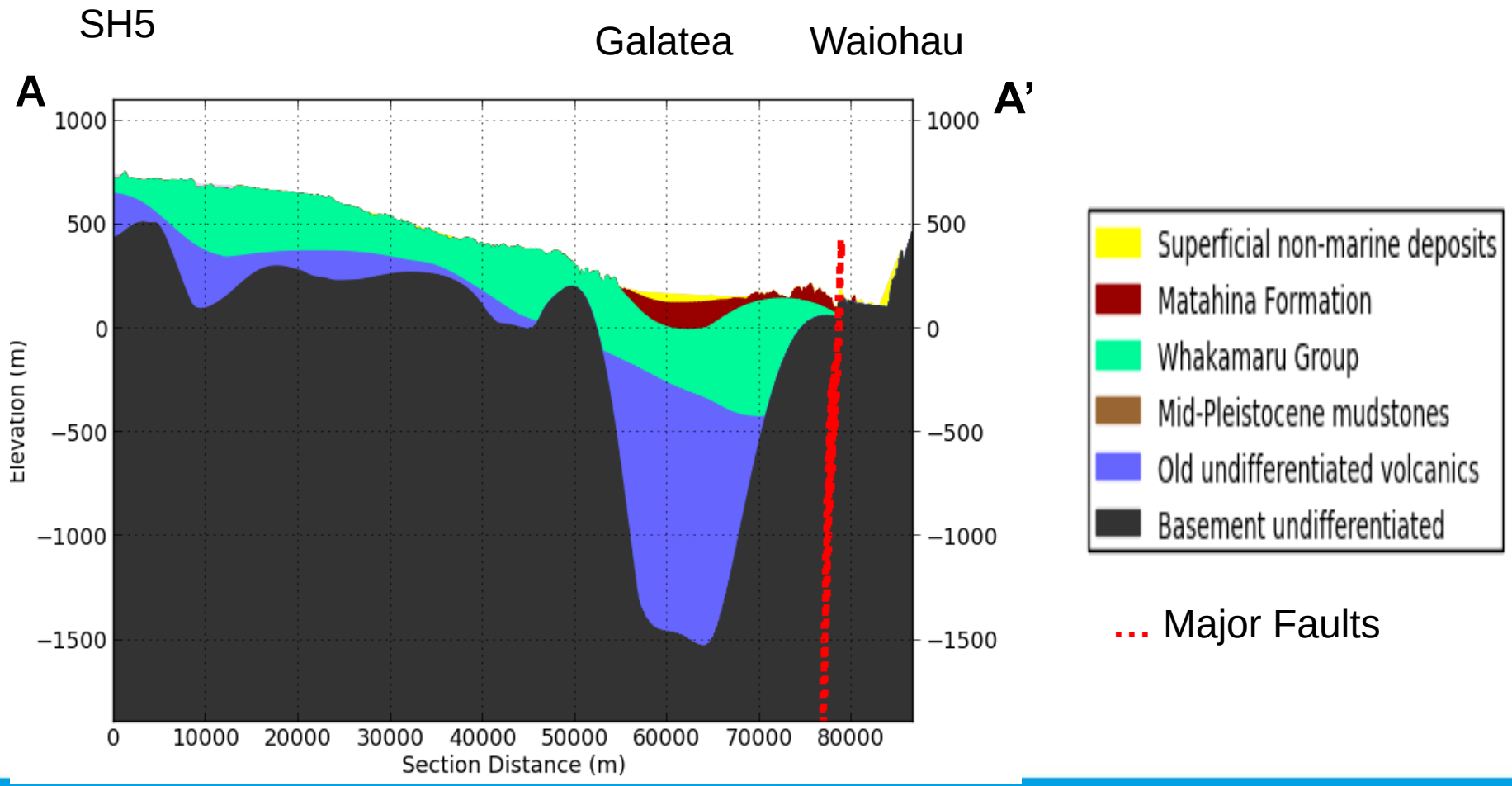
Mid-Upper Rangitāiki Geology





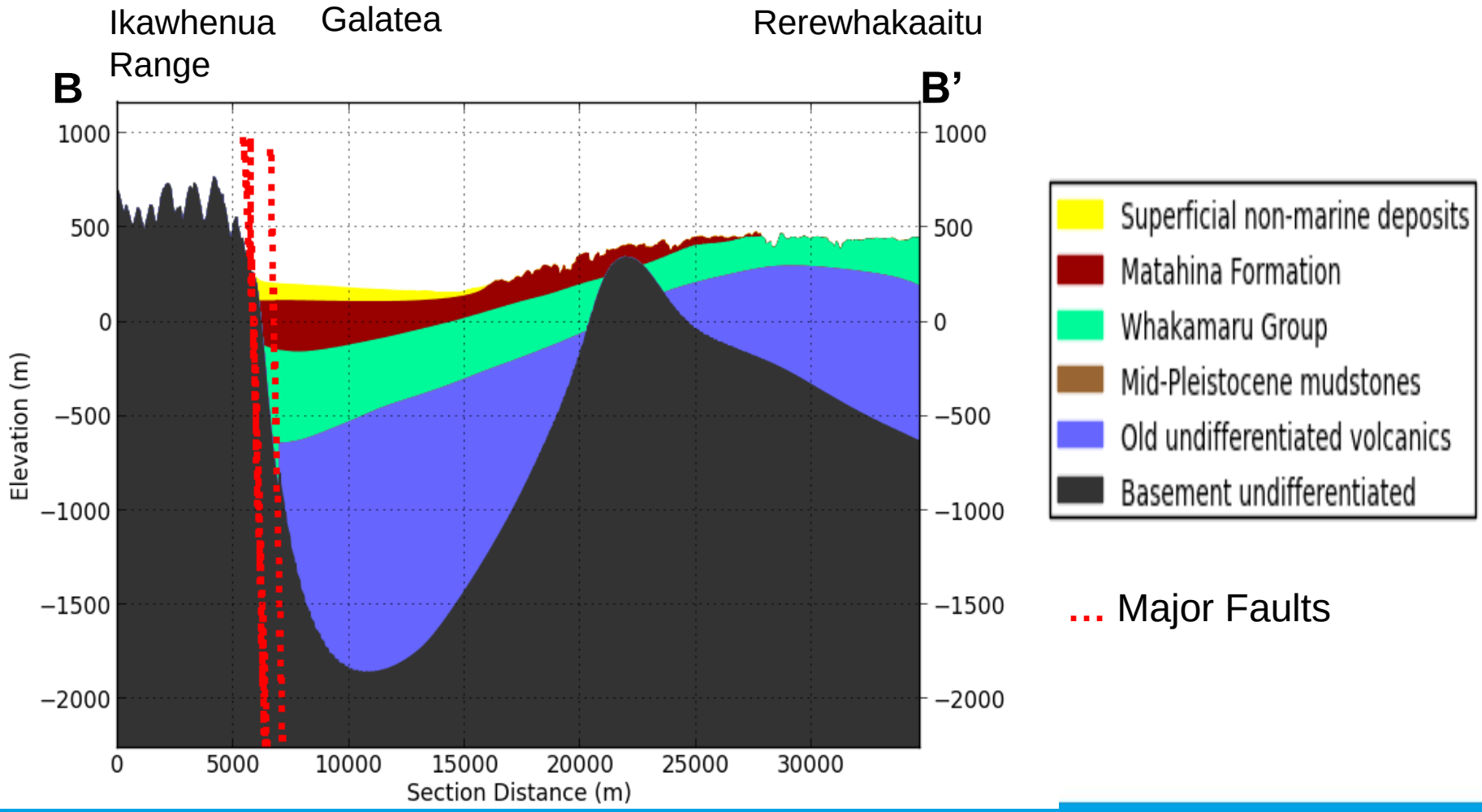
Mid-Upper Rangitāiki

Geological Cross Section A-A’



Mid-Upper Rangitāiki

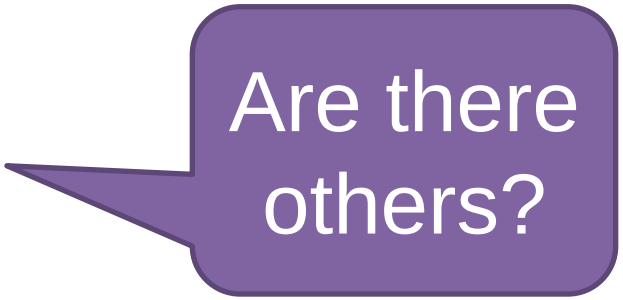
Geological Cross Section B-B’



3.
Groundwater Values Uses and Objectives

Providing for Values and Use

- Springs and base-flow to rivers
- Wetlands
- Quality (saline intrusion)
- Mauri
- Use
  - Irrigation
  - Commercial and industrial uses
  - Water supply (animal drinking, domestic, municipal)



Potential Effects of Groundwater Use

- Reduce groundwater levels
- Reduce flows/levels in surface water bodies
- Saline intrusion
- Effect may be spread over a large area and long-period (years), or localised and more immediate
- Groundwater takes have less effect on surface water bodies than a take directly from a surface water body

Groundwater Objectives

Appropriate?

Maintain groundwater levels – no sustained decline

Safeguard spring flow, base-flow, connected wetlands – no sustained decline

Prevent saline intrusion – protect water quality

Sustain Mauri

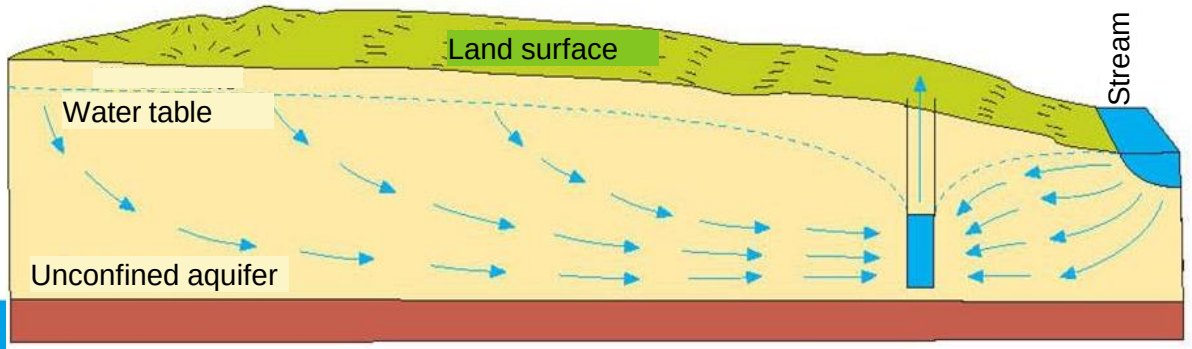
Groundwater limits

Groundwater is available for use, *subject to the above*

Others?

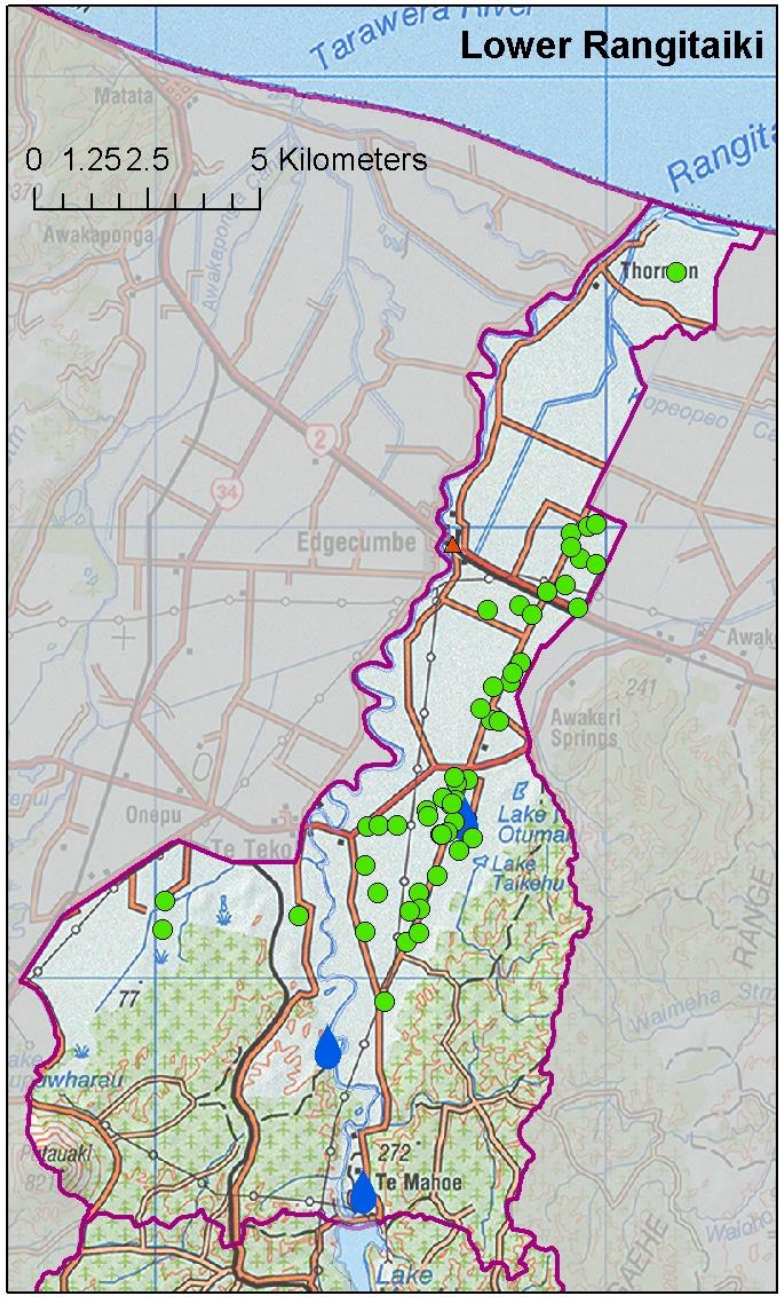
Groundwater Limits

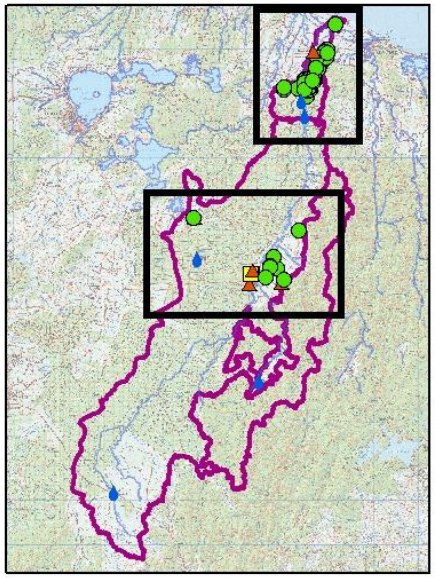
- Different approaches to sub-regional and local effects
- Allocation limit:
  - is the maximum amount of water that can be taken from a whole resource (or unit of it) by all users
  - safeguards the resource as whole
  - safeguards stream base flow/spring flow & connected wetlands
  - doesn't address local effects of individual water takes.
- Resource consent conditions:
  - address local effects of individual water takes
  - e.g., effects on wetlands, springs, rivers, water quality



4.
Availability and Current Allocation

Groundwater Use: Consents Locations

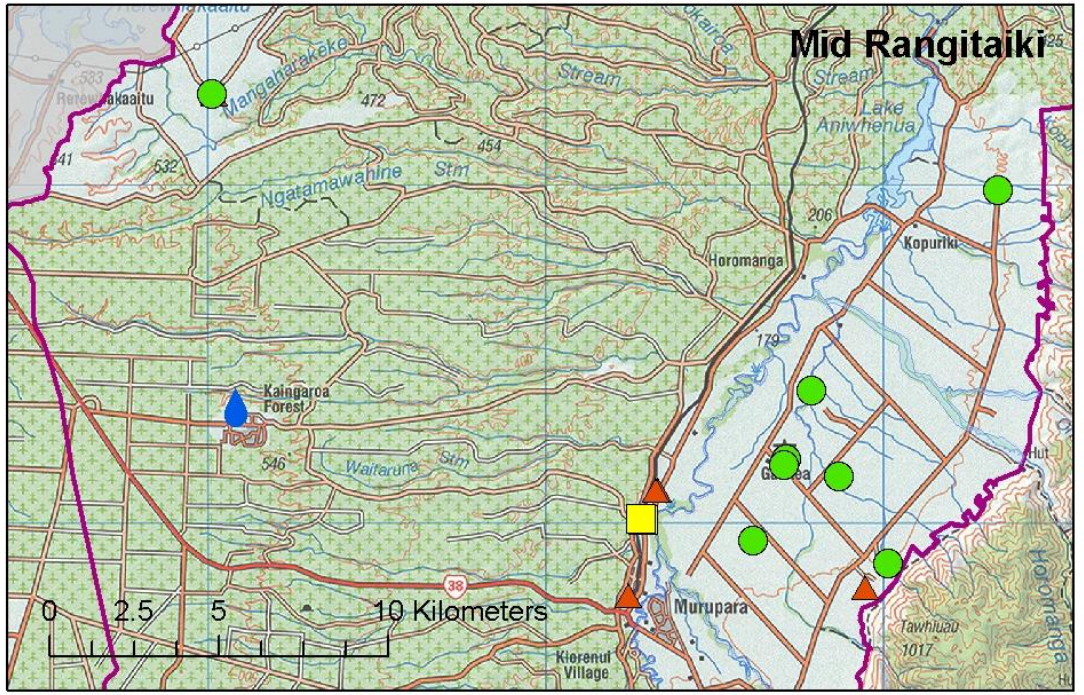




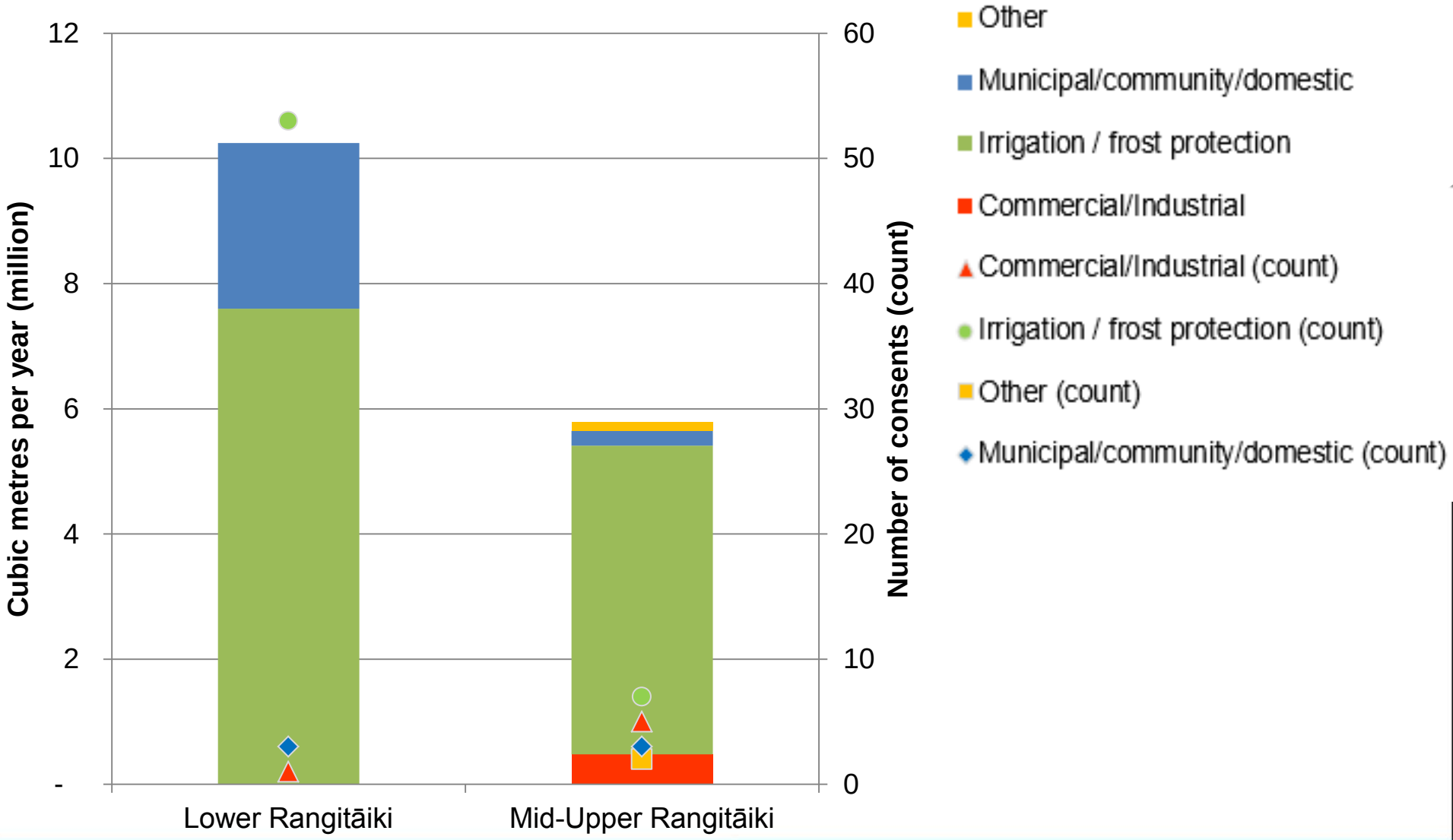
Legend

Purpose

- Commercial/Industrial
- Irrigation / frost protection
- Municipal/community/domestic
- Other

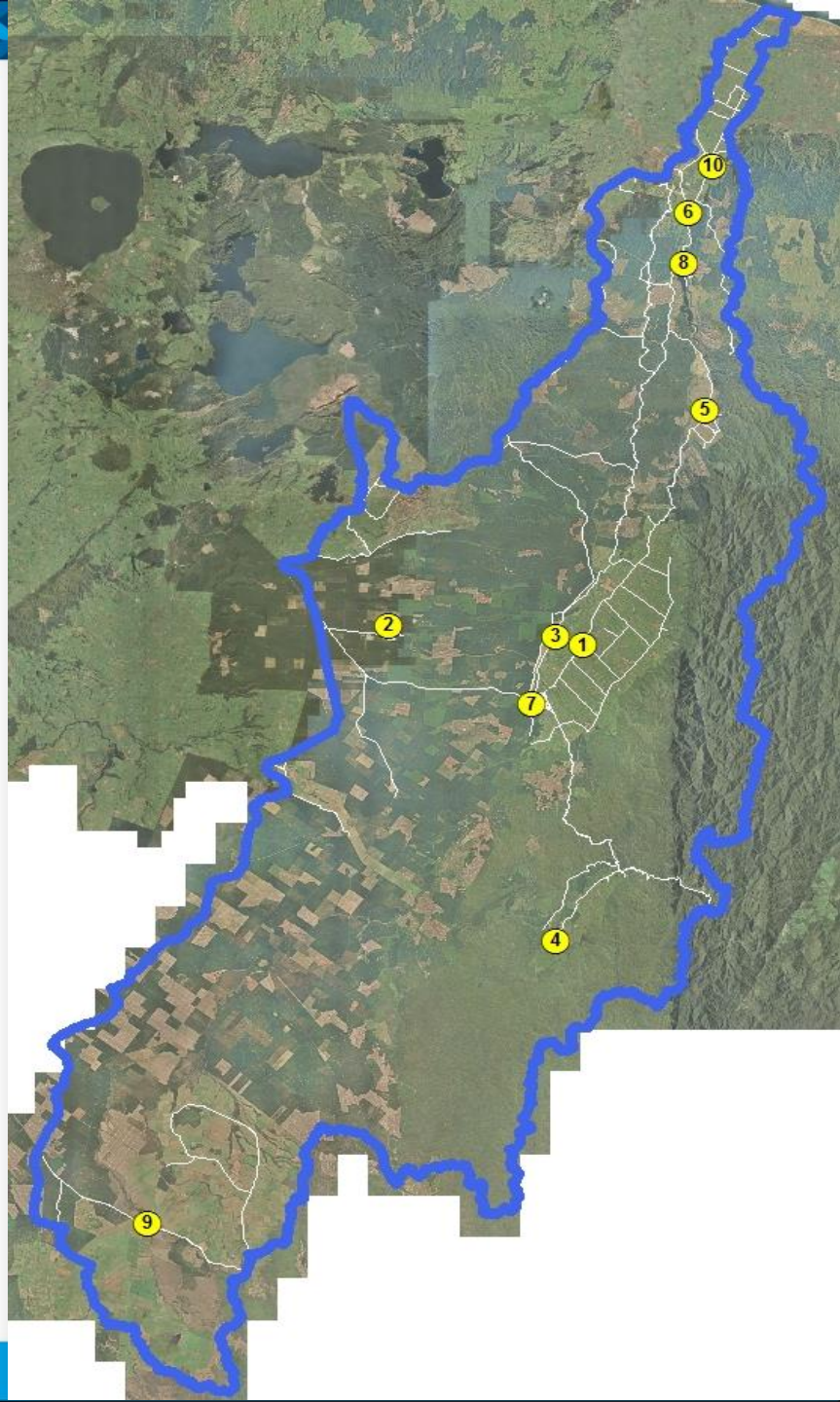


Groundwater Take Consents (Allocation)



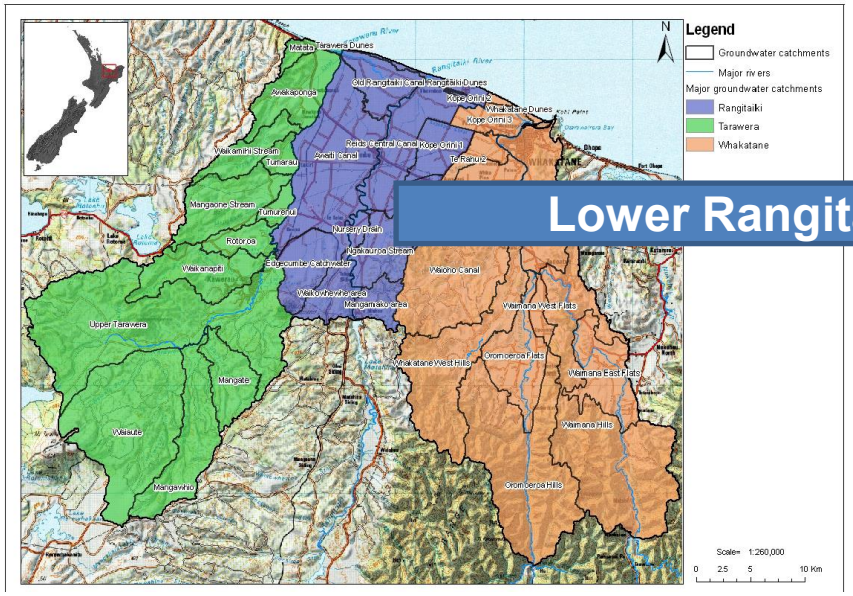
Drinking Water Supplies (Groundwater)

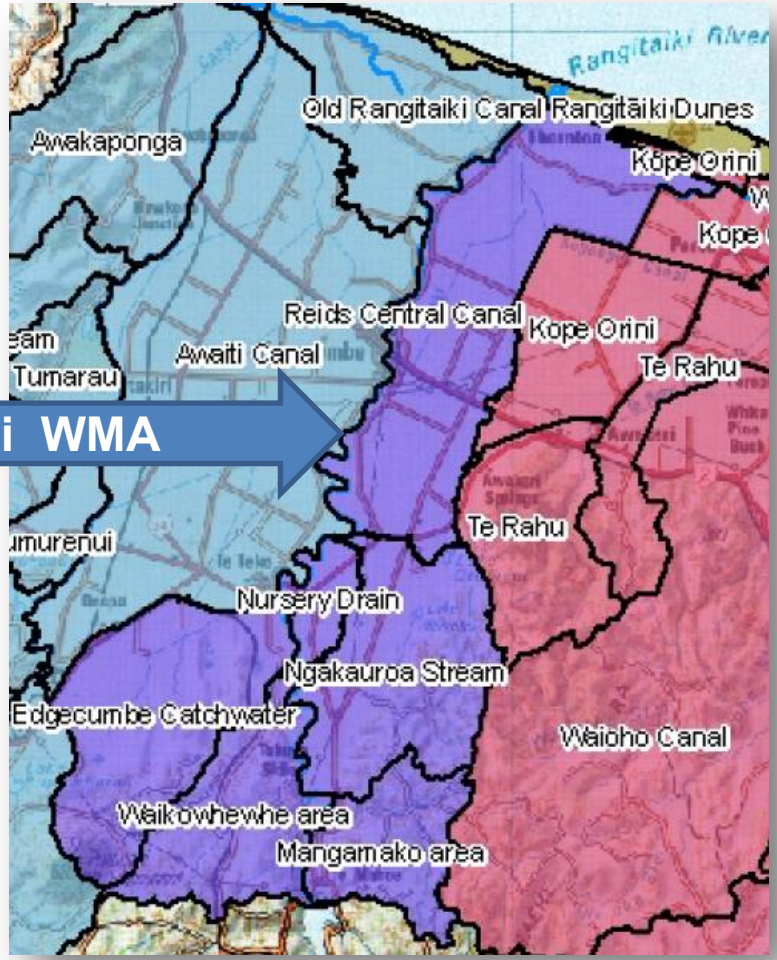
Supplier	Location
1 Galatea School	Galatea School
2 Kāingaroa Forest Village Papakāinga Trust	Kāingaroa
3 Moewhare Marae Trust	Moewhare
4 Ngāti Whare Trust	Minginui
5 Waiohau School	Waiohau School
6 Whakatāne District Council	Galatea Road Supply
7 Whakatāne District Council	Murupara
8 Whakatāne District Council	Te Mahoe
9 Rangitāiki School	Rangitāiki School
10 Whakatāne District Council	Paul Rd, Te Teko



Rangitāiki Plains
Groundwater Management Zones

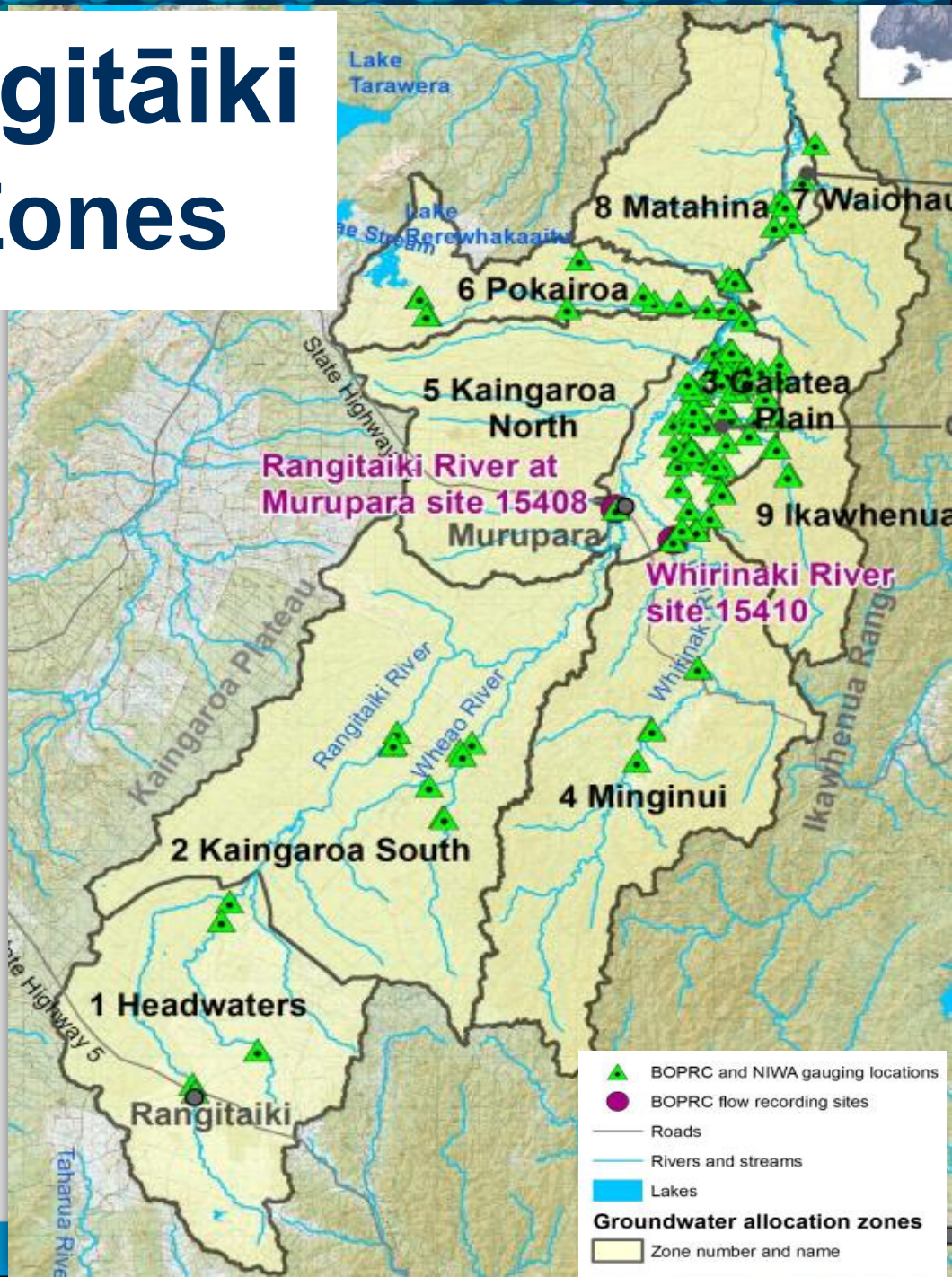
- Limits are set for each zone





- Assumes that groundwater does not move between zones – this is a simplification

Mid-Upper Rangitāiki Management Zones



Groundwater Balance

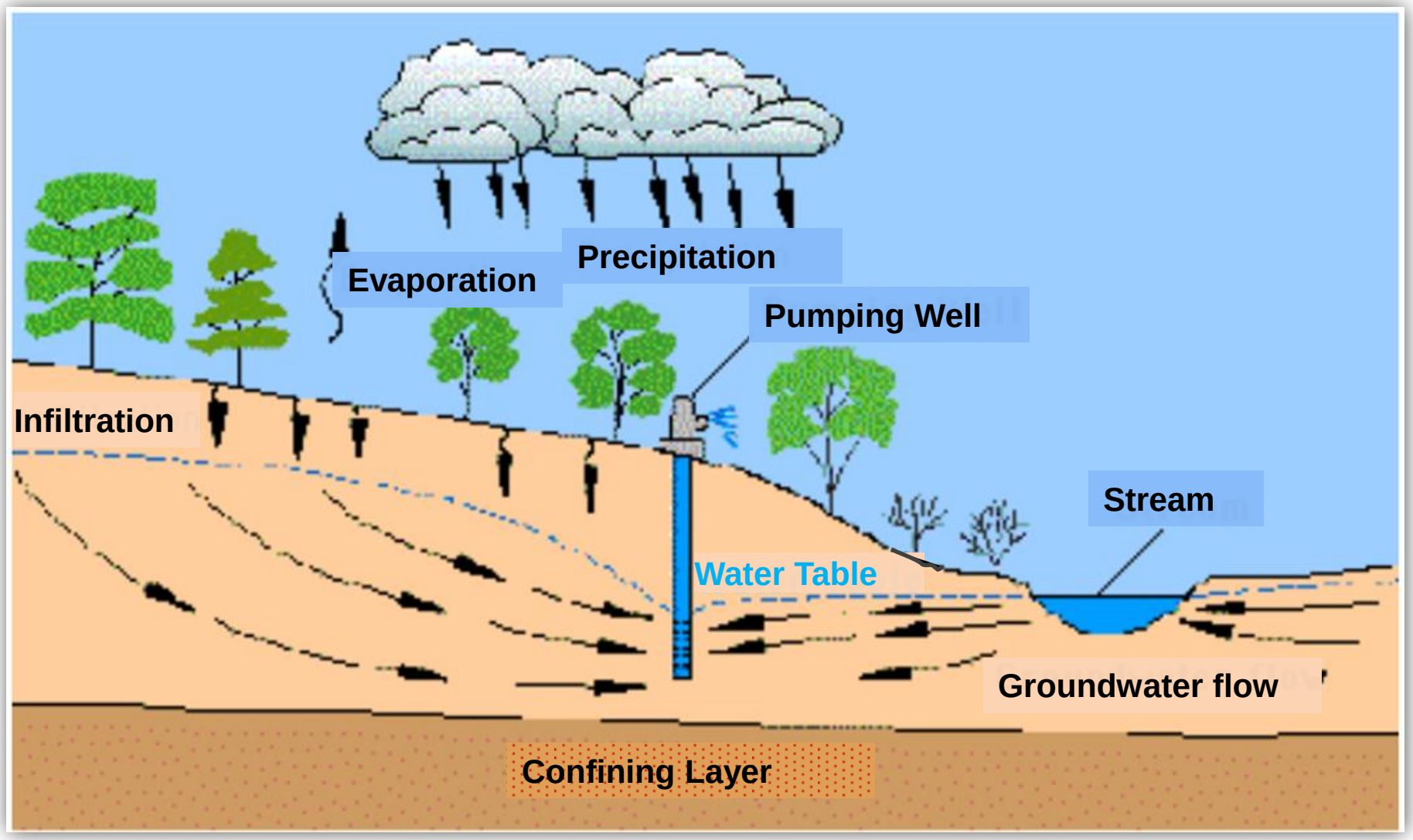
Recharge: rainfall – evapotranspiration – run-off

Residual recharge: recharge – baseflow to streams

Current Limit: 35% of **residual recharge**

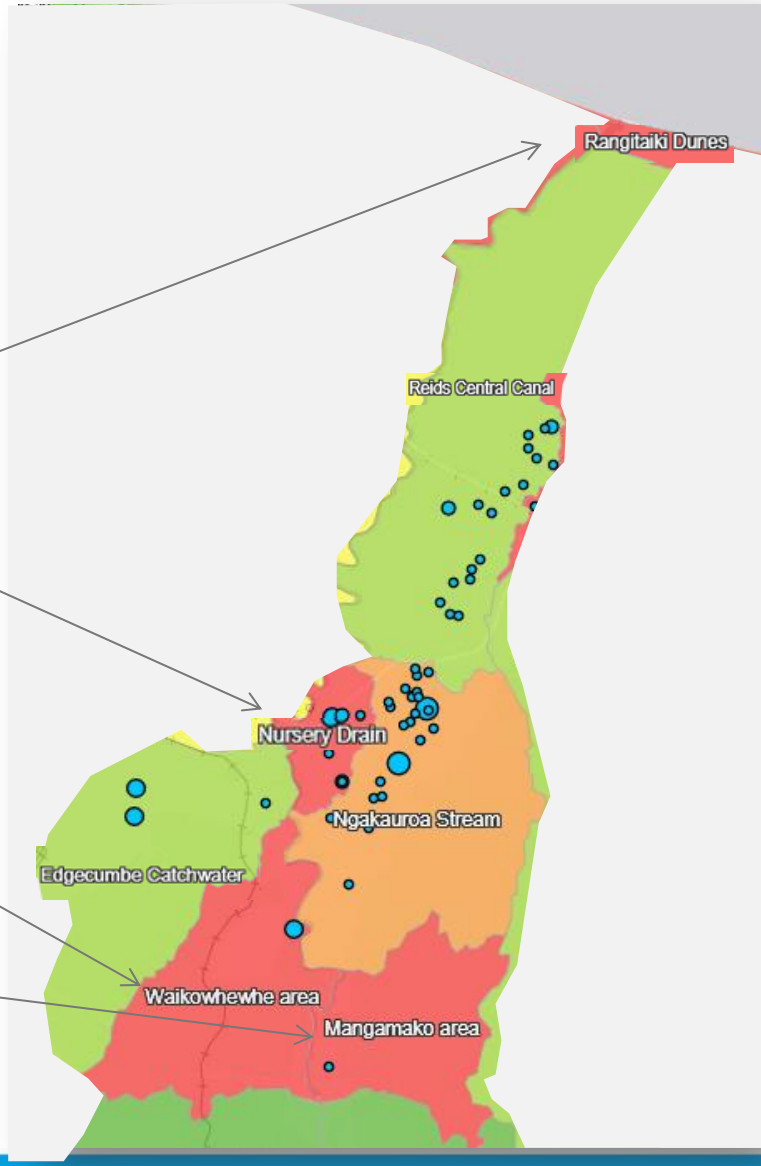
Conservative to broadly protect base flows etc … but this is not measured/modelled.

Groundwater basics



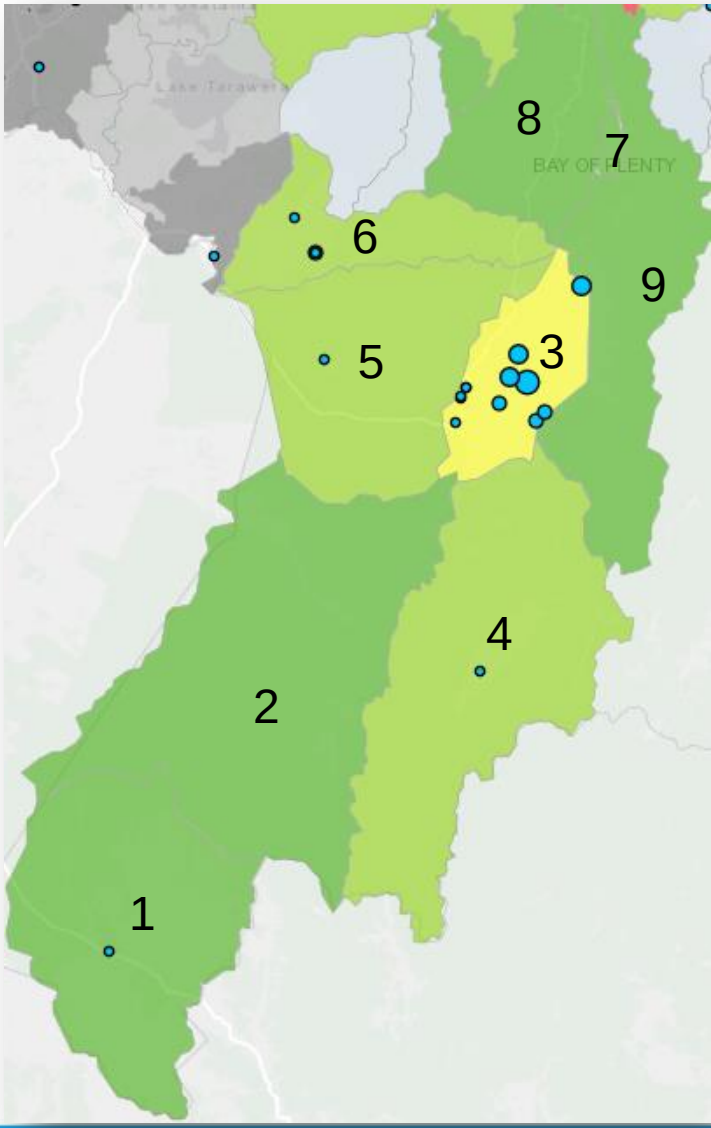
Lower Rangitāiki Allocation

Management Zone	Interim Limit m^3/year (35% of Residual Recharge)	Consented Allocation m^3/year	Remaining Allocation m^3/year
Rangitāiki Dunes	0	116,250	-116,250
Reids Central Canal	5,750,590	1,881,966	3,868,624
Nursery Drain	143,489	1,561,668	-1,418,179
Ngakauroa Stream	4,845,506	4,754,449	91,057
Edgecumbe Catchwater	3,355,430	1,402,914	1,952,516
Waikowhewhe	0	702,720	-702,720
Mangamako	0	18,250	-18,250
Total	14,095,015	10,438,217	3,656,798



Mid-Upper Rangitāiki Allocation

Management Zone	Interim Limit m^3/year (35% of Residual Recharge)	Consented Allocation m^3/year	Remaining Allocation m^3/year
1 Headwaters	35,320,320	1,460	35,318,860
2 Kāingaroa South	44,150,400	0	44,150,400
3 Galatea Plain	8,830,080	5,218,454	3,611,626
4 Minginui	45,254,160	80,520	45,173,640
5 Kāingaroa North	26,490,240	155,855	26,334,385
6 Pokairoa	15,452,640	526,308	14,926,332
7 Waiohau	1,103,760	0	1,103,760
8 Matahina	16,556,400	0	16,556,400
9 Ikawhenua	23,178,960	0	23,178,960
Sum	216,336,960	5,982,597	210,354,363



Constraints

- Granting new consents above Matahina is constrained if connected to surface water
  (also where other surface water catchments are over-allocated)
- Lower Rangitāiki over-allocated in 4 of 7 management zones
- PC9 provides for renewal of expiring consents and reallocation – subject to efficiency
  (s.124-s.124C)
- Limits don’t address local effects

Availability and Allocation

Check Understanding

- Groundwater allocation zones
- Water balance
- Lower Rangitāiki allocation
- Mid-Upper Rangitāiki allocation

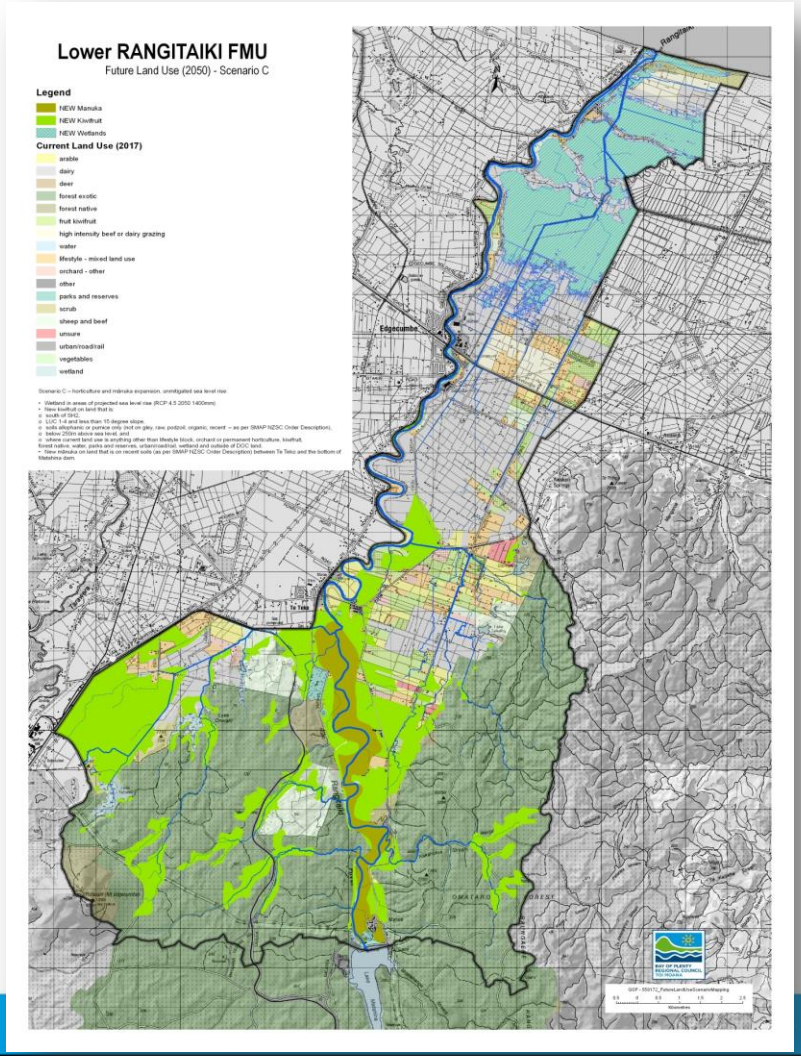
5.
Future Demand

Lower Rangitāiki
Possible Future Land Use

Developed with land managers, industry, CNI & Community Group

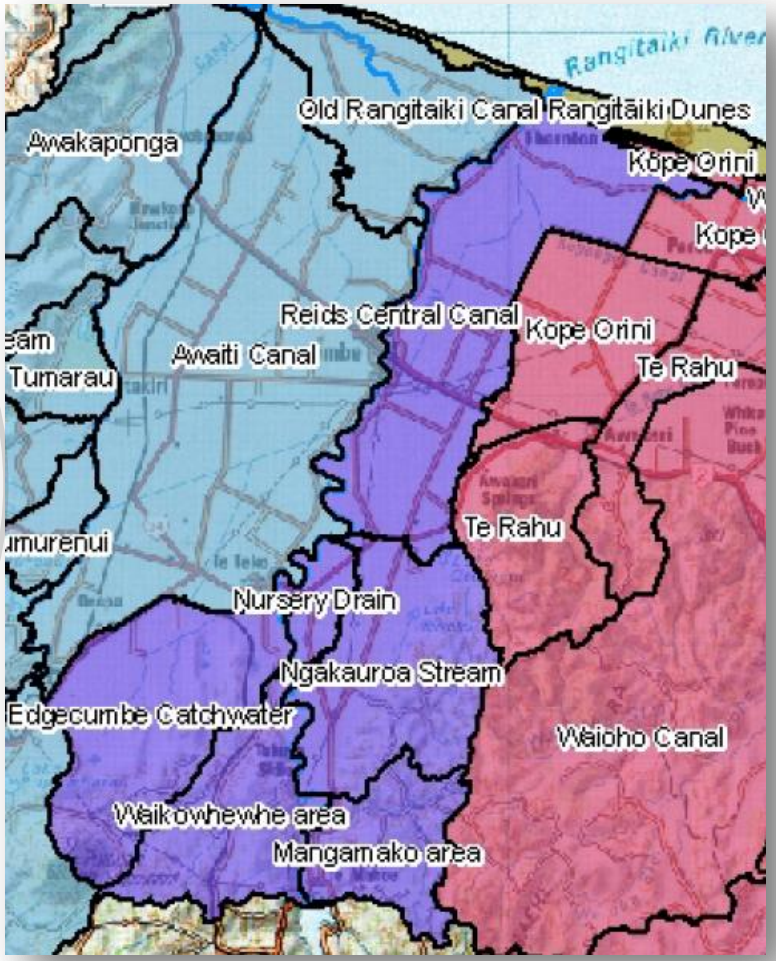
Kiwifruit
+1,600 ha

Dairy
-1,300 ha

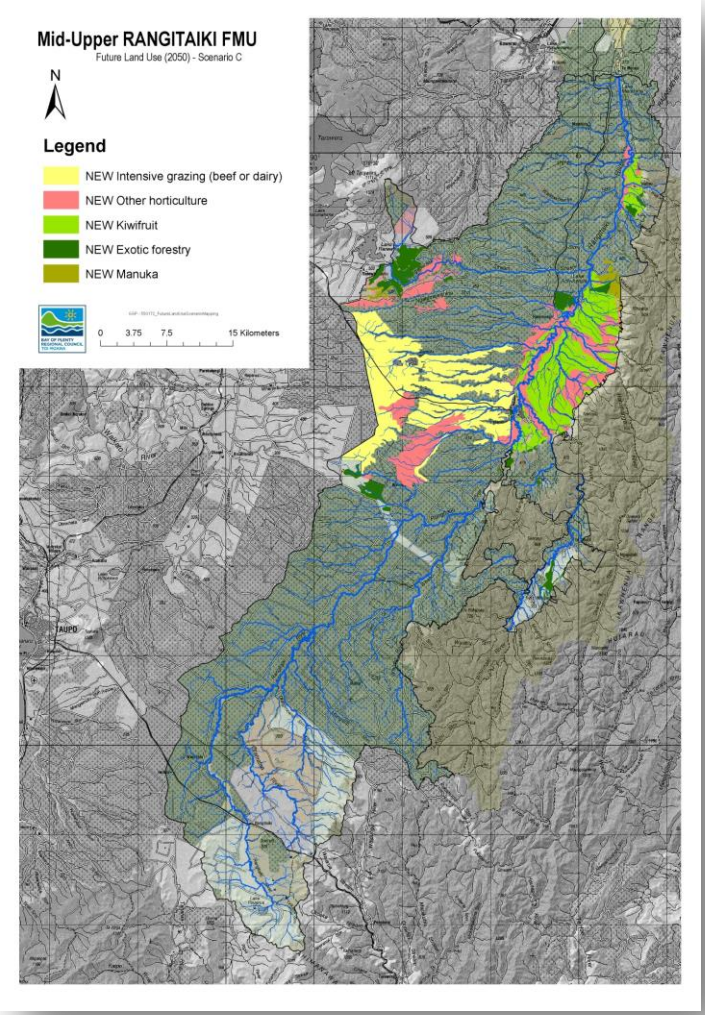


Lower Rangitāiki
Estimated Future Water Demand

Zone	Interim Limit m3/y	Estimated Increase m3/y	Total with Land Use Change m3/y	Remaining Allocation m3/y
Edgecumbe Catchwater	3,355,430	1,180,899	2,583,813	771,618
Mangamako area	0	439,197	457,447	- 457,447
Ngakauroa Stream	4,845,506	921,920	5,676,369	- 830,863
Nursery Drain	143,489	361,754	1,923,422	- 1,779,933
Rangitaiki Dunes	0	0	116,250	- 116,250
Reids Central Canal	5,750,590	178,879	2,060,845	3,689,744
Waikowhewhe area	0	828,906	1,531,626	- 1,531,626
Total	14,095,015	3,911,555	14,349,772	- 254,756



Mid-Upper Rangitāiki
Possible Future Land Use



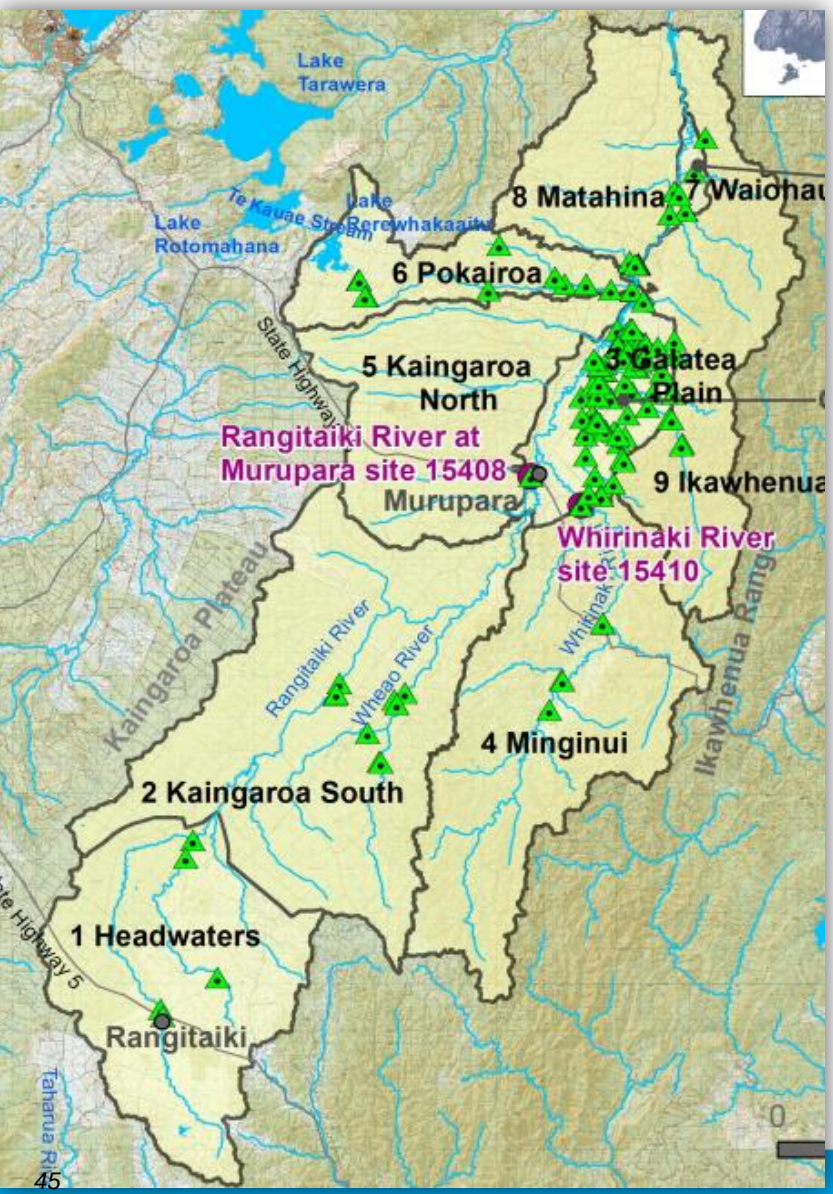
Developed with land managers, industry, CNI & Community Group

Kiwifruit
+8,500 ha

Horticulture
+8,850 ha

Dairy
-13,000 ha

Mid-Upper Rangitāiki Estimated Future Water Demand



Zone	Interim Limit m3/y	Estimated Increase m3/y	Total Demand with Land Use Change m3/y	Remaining Allocation m3/y
1 Headwaters	35,320,320	3,206	4,666	35,315,654
2 Kaingaroa South	44,150,400	1,035,977	1,035,977	43,114,423
3 Galatea Plain	8,830,080	18,213,654	23,432,108	- 14,602,028
4 Minginui	45,254,160	45,062	125,582	45,128,578
5 Kaingaroa North	26,490,240	5,190,642	5,346,497	21,143,743
6 Pokairoa	15,452,640	195,324	721,632	14,731,008
7 Waiohau Basin	1,103,760	1,762,328	1,762,328	- 658,568
8 Matahina	16,556,400	251,658	251,658	16,304,742
9 Ikawhenua	23,178,960	1,061,898	1,061,898	22,117,062
Total	216,336,960	27,759,750	33,742,347	182,594,613

Future Demand

Is significant land use change in the Lower Rangitāiki likely?

Is increased demand for groundwater in the Lower Rangitāiki likely?

Is significant land use change in the Mid-upper Rangitāiki likely?

Is increased demand for groundwater in the Mid-Upper Rangitāiki likely?

Fist of 5

0 - Not at all likely

1 - Slight possibility

2 - Possibly

3 - Likely

4 - Highly likely

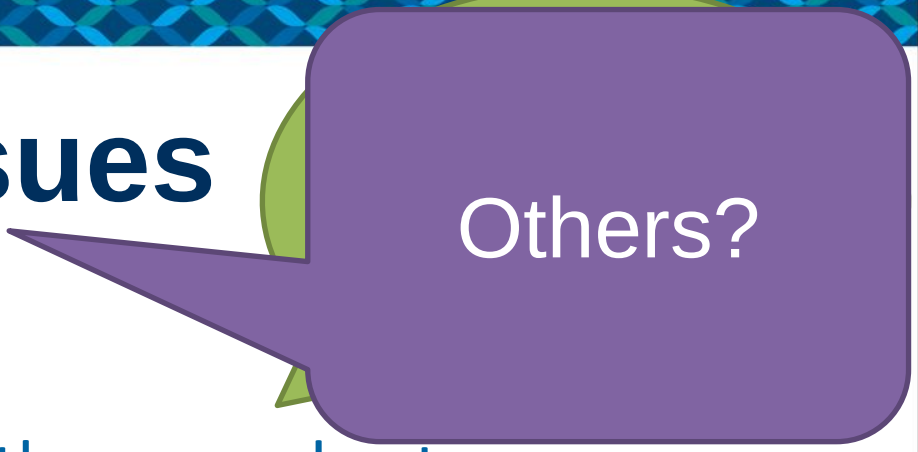
5 - Certain

If so…

what?

6.
Management Issues

Groundwater Issues



- **Limited information:**
  - effects of water use on the groundwater resource, springs and wetlands;
  - groundwater-surface water interaction - we assume they are connected
- Greater potential for land use change **IF** water can be made available
- Potentially available groundwater cannot be allocated above Matahina if connected to surface water

7.
Options

Improve Information and Monitoring

Review allocation limits when computer based groundwater modelling results are available in 3-5 years

Collect seasonal groundwater level changes over a number of years (inform model)

Collect water use data over a number of years to determine actual water use (inform model)

Improve spring / wetland mapping and collect flow monitoring data

Make More Water Available

… explore options

thoughts-gaps?

Option 1: Increase / change allocation limits?

Option 2: Amend management zones

Option 3: Improve allocation efficiency – renewals and more accurate estimates

Option 4: Share water?

Option 1: Increase Allocation Limits

PC9 limit: 35% of **residual recharge** (recharge – baseflow to stream)

Possible alternative: 50% to 100% of **residual recharge**

The more water that is taken, the more likely it is to affect connected surface water bodies and / or coastal discharge

Option 1: Increase Allocation Limits - Risk

Lower Rangitāiki					
Allocation Limit		PC9 - 35% Residual	50% Residual	75% Residual	100% Residual
Risk	Low				
	Medium				
	High			NES (Proposed)	

Mid- Upper Rangitāiki					
Allocation Limit		PC9 - 35% Residual	50% Residual	75% Residual	100% Residual
Risk	Low				
	Medium				
	High				NES (Proposed)

NES – National Environmental Standard

Advantages and disadvantages

	PC9 limit (35%)	Increase limit to 75%
Advantages	• Low/medium risk • Maintains status quo • Accommodates existing take consents except for 4 zones in Rangitāiki Plains • Minimises allocation clawback potential	• Accommodates existing takes except for 4 zones in Rangitāiki Plains • Less development constraint in the short-medium term
Disadvantages	• Does not accommodate Rangitāiki Plains 4 zones • Greater development constraint • Cannot allocate the water if it takes away from existing consented surface water takes	• Higher risk • Increases risk that clawback will be needed medium-long term • Cannot allocate water if it takes away from existing consented surface water takes

Option 2: Amend management zones

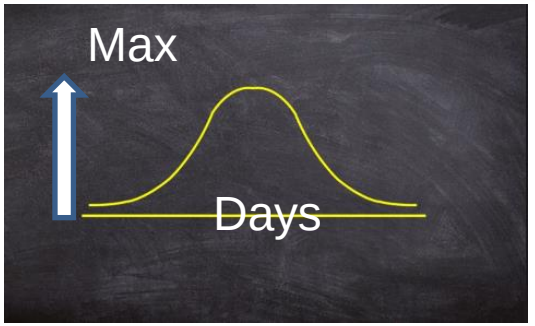
Current small Lower Rangitāiki zones:

- More conservative; local base-flow protection
- Sometimes results in no water allocation

Combine some Lower Rangitāiki zones:

- Same total amount of water available over wider area
- Some water available where there was effectively and an ‘exclusion’ zone
- Less conservative; base-flow addressed during consenting

Option 3: Efficiency Gains



Availability and allocation are defined in m^3/year

Some consents have no annual allocation, only a maximum daily

More recent practice is to set an annual volume based on number of days of use

There may be ways of reviewing the allocation of existing groundwater consents e.g. to meet the limits in a plan

Rangitāiki Zone		Potential Irrigation & Frost Reduction (m^3/year)
Lower	Ngakauroa Stream	297,110
	Nursery Drain	486,050
	Rangitāiki Dunes	52,500
	Reids Central Canal	420,495
Mid-Upper	Galatea Plain	1,320,200

Option 4: Share water

- Practical when limits are reached
- Dependant on parties finding a mutually beneficial solution
- Could involve assigning use at certain times (seasonal, temporary, permanent)
- Potential for water allocation to change from surface water to groundwater
- Potential for water allocation to change to higher value uses

Activity – Options

- Consider option how it might work:
  - **pros and cons (different hats)**
  - **further questions**
  - **recommendations**
  - **OTHER options**

- Rotate to next group
- Feedback

8.
Summing up key messages

Make More Water Available?

- Allocation limits:
  - **do/do not increase ?**
  - **change /combine some zones?**
- Consider consent review for groundwater allocation efficiency?
- Explore water sharing options?

What's Next?

Where we've been today

1. Understanding groundwater
2. Rangitāiki geology
3. Groundwater values and use
4. Availability and current allocation
5. Possible future demand
6. Management issues
7. Options
8. Recommendations

Next steps

- Water quality discussion with Community Group April/May
- Engagement with the public about groundwater (and other topics) after June onwards
- Surface water quantity June
- Plan drafting

Engagement

- Discussion document
- Continue Iwi and Hapū engagement
- Community/public engagement – after June
- Plan drafting

Summary

- Key areas of agreement
- Notable points of disagreement
- Actions
- Any burning questions still unanswered?

Thanks once again

- In closing…
  - Any feedback to us on this session?
- Next session
- Talk to others ……