

FINAL RWC gold, silver and bronze scenarios

From material reviewed and developed at 10.10.2016 and 25.10.2016 committee meetings. See doc ENPL-6-917 for earlier gold scenario development. Management options associated with lakes will be incorporated into the separate lakes scenario and have consequently been removed from these tables.

RUAMĀHANGA WHAITUA GOLD SCENARIO				
Management options				
	What?	Where?	When?	Notes
Contaminants	Retirement of very steep slopes and afforestation/reversion to bush	Very steep land in Eastern Hill country (the top ~5% of sediment load in source model)	<ol style="list-style-type: none"> Retire land by 2025 Woody vegetation cover achieved by 2040 	Woody vegetation is gorse or planted species, and permanent Excludes argillite and limestone soils
	Space planting on steep slopes	All land of LUC class 6e and above (less top 5%, as above)	All trees planted by 2040	
	Riparian planting	All streams	All trees planted by 2040	10m wide, in native tree species Stream definition is still being confirmed. Draft is: <ul style="list-style-type: none"> - Any water way with a defined channel, or - Channel is ≥1m wide, or - Is ≥30cm deep, or - Is continuously running
	Stock exclusion from water ways	All streams All other Category 1 and 2 water bodies as defined in the PNRP (includes wetlands, estuaries, lakes, water races and large drains)	Exclusion complete by 2025	Exclusion includes fencing or other means Stream means as above Wetlands, estuaries, lakes, water races and large drains identified in BAU scenario In F3 scheduled wetlands in the PNRP all livestock (including sheep) are excluded.
Wastewater	Wastewater treatment plant are discharging only to land	All municipal WWTPs (Featherston, Martinborough, Greytown, Carterton, Masterton)	All by 2025	WWTPS must have storage and deferred irrigation.

Management options				
	What?	Where?	When?	Notes
Water allocation	Minimum flows to meet cultural values	All rivers and streams	Immediately	Minimum flows identified in Royal (2012). Rivers with no cultural flow recommendations will be given an average Allocation amounts are 'default' amounts identified in Tables 7.3, 7.4 and 7.5 of the PNRP (see Attachment 2)
Wetlands	Construct wetlands throughout catchment	To cover 20% of area formerly covered by wetlands (in addition to BAU)	All plants in by 2040	Based on historical extent of wetlands
On-farm mitigations	All mitigation practices from Tiers 1, 2 and 3 good management practice	All dairy, dairy support and sheep and beef farms	Tier 1 mitigations immediately (as BAU) Tier 2 mitigations by 2025 Tier 3 mitigations by 2040	Note timing Tier 3 mitigation package (which includes riparian planting) to coincide with riparian planting option above Reduced fertiliser use incorporated into Tier 2 mitigations

RUAMĀHANGA WHAITUA SILVER SCENARIO				
Management options				
	What?	Where?	When?	Notes
Contaminants	Retirement of very steep slopes and afforestation/reversion to bush	Very steep land in Eastern Hill country (the top ~5% of sediment load in source model)	1. Retire land by 2040 2. Woody vegetation cover achieved by 2080	Woody vegetation could be gorse or planted species, and is assumed to be permanent
	Space planting on steep slopes	All land of LUC class 6e and 7	All trees planted by 2040	
	Riparian planting	All streams	All trees planted by 2080	5m width of planted trees Stream means same a gold
	Stock exclusion from water ways	All streams All other Category 1 and 2 water bodies as defined in the PNRP (includes wetlands, estuaries, lakes, water races and large drains).	Exclusion complete by 2025	NB. This is the same management option as the 'gold' scenario
Wastewater	Wastewater treatment plant are discharging only to land	All municipal WWTPs (Featherston, Martinborough, Greytown, Carterton, Masterton)	60% of volume to land by 2025 100% of volume to land by 2040	Any discharges to water meet the same requirements as the BAU (e.g. flow restrictions on when MDC can discharge to water)
Water allocation	Minimum flows and allocation amounts based on 'default' limits set in Proposed Natural Resources Plan (PNRP)	All rivers and streams	Immediately	'Default' minimum flows are identified in Tables 7.1 and 7.2 of the PNRP (see Attachment 1) 'Default' allocation amounts are identified in Tables 7.3, 7.4 and 7.5 of the PNRP (see Attachment 2)

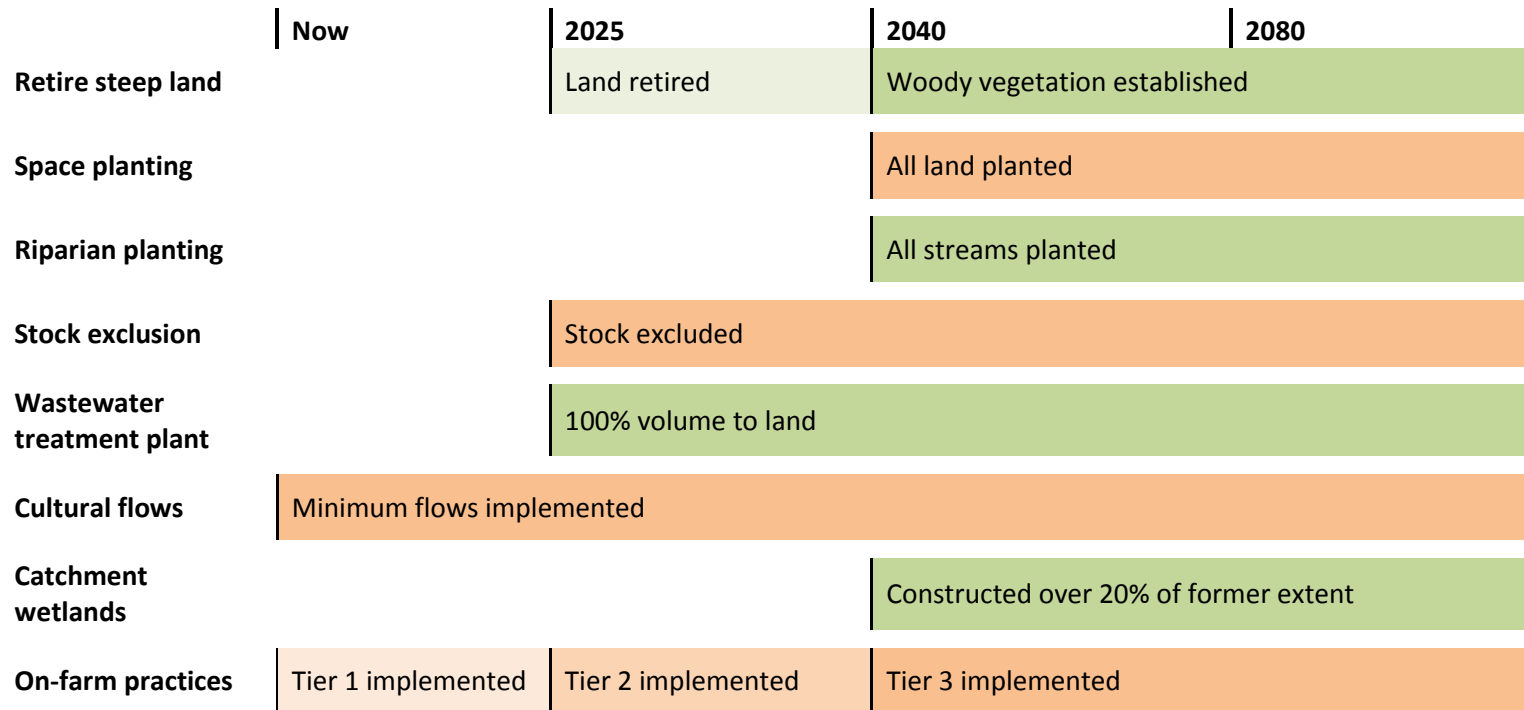
RUAMĀHANGA WHAITUA SILVER SCENARIO				
Management options				
	What?	Where?	When?	Notes
Wetlands	Construct wetlands throughout catchment	To cover 15% of area formerly covered by wetlands (in addition to BAU).	All plants in by 2040	Based on historical extent of wetlands
On-farm mitigations	Mitigation practices from Tiers 1, 2 and 3 good management practice	All dairy, dairy support and sheep and beef farms	Tier 1 immediately Tier 2 mitigations by 2040 Tier 3 mitigations by 2080	

RUAMĀHANGA WHAITUA BRONZE SCENARIO				
Management options				
	What?	Where?	When?	Notes
Contaminants	Retirement of very steep slopes and afforestation/reversion to bush	Class 8 and 7e land	1. Retire Class 8 by 2025 2. Retire Class 7e by 2080	Woody vegetation could be gorse or planted species, and is assumed to be permanent
	Space planting on steep slopes	Class 7 land and above	All trees planted by 2080	
	Riparian planting ¹	All streams identified in Schedule F1 of the PNRP (rivers and lakes with significant indigenous ecosystems)	All trees planted by 2040	5m width of planted trees
	Stock exclusion from water ways ³	All streams All other Category 1 and 2 water bodies as defined in the PNRP (includes wetlands, estuaries, lakes, water races and large drains)	Exclusion complete by 2025	NB. This is the same management option as the gold scenario
Wastewater	Wastewater treatment plant are discharging partially to land	All municipal WWTPs (Featherston, Martinborough, Greytown, Carterton, Masterton)	60% of volume to land by 2025 100% of volume to land by 2040	Any discharges to water meet the same requirements as the BAU (e.g. flow restrictions on when MDC can discharge to water)
Water allocation	Minimum flows and allocation amounts based on 'default' limits set in Proposed Natural Resources Plan (PNRP)	All rivers and streams	Immediately	'Default' minimum flows are identified in Tables 7.1 and 7.2 of the PNRP 'Default' allocation amounts are identified in Tables 7.3, 7.4 and 7.5 of the PNRP

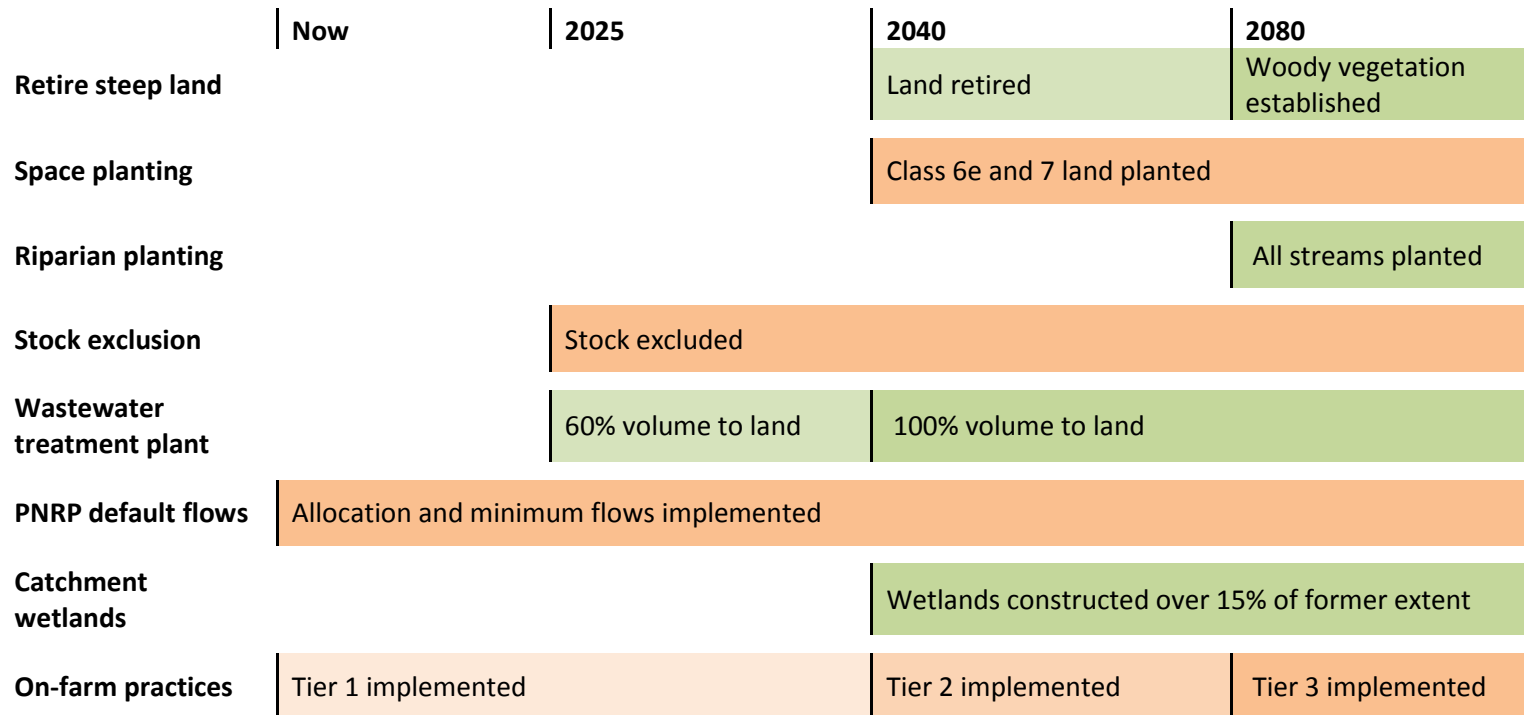
¹ Also has benefits for reducing pathogens and nutrient inputs, and benefits to stream habitat

RUAMĀHANGA WHAITUA BRONZE SCENARIO				
Management options				
	What?	Where?	When?	Notes
Wetlands	Construct wetlands throughout catchment	To cover 10% of area formerly covered by wetlands (in addition to BAU).	All plants in by 2040	Former wetland cover based on FENZ wetlands historic typology
On-farm mitigations	Mitigation practices from Tiers 1, 2 and 3 good management practice	All dairy, dairy support and sheep and beef farms	Tier 1 immediately Tier 2 mitigations by 2040 Tier 3 mitigations by 2080	

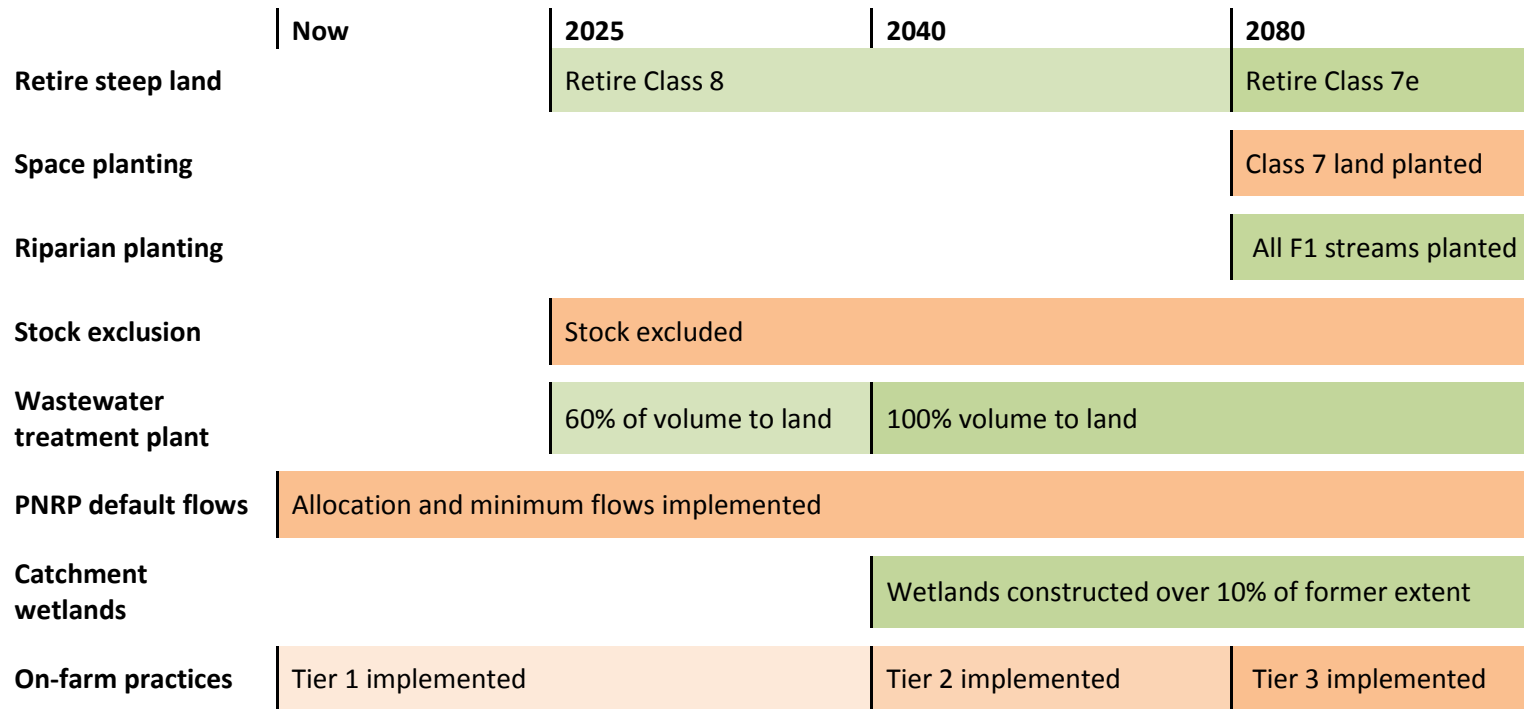
Time line of gold scenario:



Time line of silver scenario:



Time line of bronze scenario:



Hold onto for policy approaches

Incorporates material from tables that is either a management option not possible (or efficient) to model, or is a policy option. It is proposed that these items are dealt with by recommending a policy solution in the WIP.

		Policy approaches			
		What?	Why not in the model?	Any other analysis useful?	Notes
Sediment		Restriction of cultivation of steep slopes	Too difficult		
		Management of sediment from cultivation of medium slopes	Farm-scale mitigation, but not part of mitigation packages modelled by Richard Muirhead		
		Sediment traps	Too difficult to identify where to place in catchment and load reduction factor		
Wastewater and stormwater		Manage onsite wastewater (septic tanks) discharges	Not enough data to model meaningfully.		Existing PA rule in plan may be sufficient, but lack of compliance big issue
		Separate stormwater and wastewater	Not able to be modelled, insufficient data		
		Manage stormwater discharges	Not able to be modelled, insufficient data. May be possible to model pathogens and sediment but not metals and hydrocarbons		Check existing policy position in PNRP
		Solids separation of agricultural effluent	Farm-scale mitigation, but not part of mitigation packages modelled by Richard Muirhead		

Policy approaches				
	What?	Why not in the model?	Any other analysis useful?	Notes
Water allocation	Efficient use of water	Not able to be modelled within CMP model, but analysis will be required		
	Water metering on all users, including urban			
	Clawback water where over allocated			
On-farm mitigation	Farming to land use capacity	Policy approach. Will look into nutrient allocation options following scenario modelling	Analysis of impacts of allocation options (for nitrogen only)	
Lakes	Growing macrophytes	Policy approach. Too fine a scale option to model	The model will be able to identify conditions at which growing macrophytes could occur	
Other	River bed level management to maintain aquifer recharge	Not enough data at this stage		
	Land compaction improvement	Policy approach		

Attachments

Attachment 1 – ‘Default’ minimum flows from Table 7.1 and 7.2 of the Proposed Natural Resources Plan for the Wellington Region 2015 (PNRP)

Table 7.1: Minimum flows for rivers in the Ruamāhanga River and Lake Wairarapa catchments

River	Management point	Minimum flow (L/s)	
Kopuaranga River upstream of the confluence with the Ruamāhanga River	Palmers	270	
Waipoua River upstream of the confluence with the Ruamāhanga River	Mikimiki Bridge	250	
Waingawa River upstream of the confluence with the Ruamāhanga River	Kaituna	1,100	
Parkvale Stream upstream of the confluence with the Ruamāhanga River	Renalls Weir recorder	100	
Mangatarere Stream	upstream of Belvedere Road Bridge	Gorge recorder	240
	Between the confluence with the Waiohine River and the Belvedere Road Bridge	Gorge recorder	200
Waiohine River upstream of the confluence with the Ruamāhanga River	Gorge recorder	2,300	
Papawai Stream upstream of the confluence with the Ruamāhanga River	Fabians Road recorder	180	
Upper and Middle Ruamāhanga River upstream of the confluence with the Waiohine River	Wardells	2,400	
Otukura Stream upstream of the confluence with Dock/Stonestead Creek	Weir recorder	95	
Tauherenikau River upstream of Lake Wairarapa	Gorge recorder	1,100	
Lower Ruamāhanga River between the boundary with the coastal marine area and the Waiohine River confluence	Waihenga recorder	8,500	

Table 7.2: Minimum lake levels and minimum water levels for Lake Wairarapa

Time period	Minimum lake levels at Burlings recorder	Minimum water levels
1 December to 29 February	10.15m	For the purpose of allocating water, minimum water levels in Lake Wairarapa shall be determined by: (i) minimum lake levels, and (ii) the minimum flow for the Tauherenikau River in Table 7.1, and (iii) no net decline in lake level over the preceding five days.
1 March to 31 May	10.00m	
1 June to 30 September	9.95m	
1 October to 30 November	10.00m	

Attachment 2 – ‘Default’ allocation amounts from Tables 7.3-7.5 of the Proposed Natural Resources Plan for the Wellington Region 2015 (PNRP)

Table 7.3: Surface water allocation amounts for rivers and groundwater directly connected to surface water in the Ruamāhanga River catchment above the Lake Wairarapa outflow

Catchment management unit²	Allocation amount³ (L/s)
Ruamāhanga River and tributaries, upstream of (but not including) the confluence with the Lake Wairarapa outflow, and all category A groundwater and category B groundwater (directly connected) identified in the catchment management sub-units below in Table 7.3	7,535
Catchment management sub-units in the upper Ruamāhanga catchment¹	Allocation amount² (L/s)
Kopuaranga River and tributaries, category A groundwater and category B groundwater (directly connected)	180
Waipoua River and tributaries, category A groundwater and category B groundwater (directly connected)	145
Waingawa River and tributaries, category A groundwater and category B groundwater (directly connected)	920
Ruamāhanga River and tributaries upstream of the confluence with the Waingawa River, category A groundwater and category B groundwater (directly connected), excluding all the above catchment management sub-units in the Ruamāhanga catchment (above this row in Table 7.3)	1,200
Catchment management sub-units in the middle Ruamāhanga catchment¹	Allocation amount² (L/s)
Parkvale Stream and tributaries and category B groundwater (directly connected)	40
Booths Creek and tributaries and category B groundwater (directly connected)	25
Mangatarere Stream and tributaries, category A groundwater and category B groundwater (directly connected)	110
Waiohine River and tributaries (excluding Mangatarere Stream and tributaries) and category A groundwater	1,590
Papawai Stream and tributaries and category A groundwater	65
Ruamāhanga River and tributaries upstream of the confluence with the Papawai Stream, excluding all the above catchment management sub-units in the Ruamāhanga catchment (above this row in Table 7.3)	1,240

² When assessing surface water allocation, both the relevant catchment management unit and catchment management sub-unit must be considered

³ This allocation amount has been derived as a default based upon one of two rules; for rivers with a mean flow of greater than 5,000 litres/sec, the allocation limit is equal to 50% of the natural seven-day mean annual low flow (7d MALF) and for rivers with a mean flow of less than 5,000 litres/sec, the allocation limit is equal to 30% of the 7d MALF.

Catchment management sub-units in the lower Ruamāhanga catchment¹	Allocation amount² (L/s)
Huangarua River and tributaries and category A groundwater	110
Lower Ruamāhanga River and tributaries upstream of (but not including) the confluence with the Lake Wairarapa outflow; and excluding all the above catchment management sub-units in the Ruamāhanga catchment (above this row in Table 7.3)	1,475

Table 7.4: Surface water allocation amounts for rivers, Lake Wairarapa and groundwater directly connected to surface water in the Lake Wairarapa catchment

Catchment management unit⁴	Allocation amount⁵ (L/s)
Lake Wairarapa and tributaries above the confluence of the Lake Wairarapa outflow with the Ruamāhanga River, category A groundwater and category B groundwater (directly connected)	1,800
Catchment management sub-units³	Allocation amount⁴ (L/s)
Otukura Stream and tributaries above (but not including) the confluence with Dock/Stonestead Creek and category B groundwater (directly connected)	30
Tauherenikau River and tributaries, category A groundwater and category B groundwater (directly connected)	410

⁴ When assessing surface water allocation, both the relevant catchment management–unit and catchment management sub-unit must be considered

⁵ This allocation amount has been derived as a default based upon one of two rules; for rivers with a mean flow of greater than 5,000 litres/sec, the allocation limit is equal to 50% of the natural 7d MALF and for rivers with a mean flow of less than 5,000 litres/sec, the allocation limit is equal to 30% of the 7d MALF.

Table 7.5: Groundwater allocation amounts for groundwater not directly connected to surface water in the Ruamāhanga River catchment

Upper Ruamāhanga catchment management sub-units³	Allocation amount (m³/year)
Te Ore Ore category B groundwater (not directly connected)	480,000
Waingawa category B groundwater (not directly connected) and Waingawa category C groundwater	1,900,000
Ruamāhanga category B groundwater (not directly connected) and Ruamāhanga category C groundwater	3,550,000
Middle Ruamāhanga catchment management sub-units³	Allocation amount (m³/year)
Fernhill-Tiffen category C groundwater (not directly connected)	1,200,000
Taratahi category B groundwater (not directly connected) and Taratahi category C groundwater	1,400,000
Parkvale category B groundwater (not directly connected) and Parkvale category C groundwater	350,000 [unconfined] 1,550,000 [confined]
Mangatarere category B groundwater (not directly connected) and Mangatarere category C groundwater	2,300,000
Lower Ruamāhanga catchment management sub-units³	Allocation amount (m³/year)
Tauherenikau category B groundwater (not directly connected)	6,600,000
Lake Category B groundwater (not directly connected) and Lake Category C groundwater	6,750,000
Huangularua Category B groundwater (not directly connected)	650,000
Martinborough Category C groundwater	800,000
Dry River Category B groundwater (not directly connected)	650,000
Onoke Category C groundwater	2,100,000