



Healthy Rivers
PLAN FOR CHANGE

Wai Ora
HE RAUTAKI WHAKAPAIPAI



RAUKAWA CHARITABLE TRUST
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TŪWHARETOA
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Predicted implications of the proposed HRWO policy mix



Overview

- Waikato Regional Plan Change No. 1—Waikato and Waipa River Catchments (Proposed)
- 10% step towards Scenario 1 targets
- Economic and water-quality implications
- HRWO economic model
 - Assumptions
 - Output
- Lack of information about proposed actions
- Evaluation of a bottom-up approach

Mitigation assumptions (Section 3)

- 75th percentile policy: diverse elements
- Stream fencing
- Effluent management
- Prioritisation strategy
- Farm environment plans:
 - Phosphorus application
 - Edge-of-field strategies
 - Nitrogen loss from sectors
- Soil-conservation plans

Land use assumptions (Section 3.4)

- Land use fixed, except iwi land
- Iwi land: CNI and MMO
- Development activity
 - LUC 1-4: forest to dairy
 - LUC 5-7: forest to drystock
 - LUC 8: stays in forest
- Development scenarios
 - Low: 2,167 CNI and 900 MMO
 - Medium: 4,333 CNI and 1,800 MMO
 - High: 6,500 CNI and 2,700 MMO

Impacts on catchment income

Variable	Units	Current	WRPC1 (none)	WRPC1 (low)	WRPC1 (med.)	WRPC1 (high)
<i>Sector profit</i>						
Dairy	\$m	617	604	610	618	626
Drystock	\$m	210	196	203	205	207
Horticulture	\$m	28	16	16	16	16
Forest	\$m	59	59	58	57	55
<i>Costs</i>						
Transition	\$m	0	0	9	18	27
Stream fencing	\$m	0	3	3	3	3
Effluent update	\$m	0	3	3	3	3
Erosion control	\$m	0	11	11	11	11
Edge-of-field	\$m	0	8	8	8	8
<i>Total</i>	\$m	915	850	853	853	852
<i>Loss in profit</i>	\$m	-	65	62	62	63

Impacts on Scenario 1 limits

Attribute	S1, current	S1, policy mix	S1, policy mix + low	S1, policy mix + med.	S1, policy mix + high	Total sites
Median chlorophyll-a	3	5	5	5	5	9
Max. chlorophyll-a	4	7	7	7	7	9
Total Nitrogen	1	1	1	1	1	9
Total Phosphorus	2	2	2	2	2	9
Median nitrate	46	50	50	50	50	61
95th percentile nitrate	38	44	44	44	44	61
Median <i>E. coli</i>	57	59	59	59	59	61
95th percentile <i>E. coli</i>	12	20	20	20	20	61
Clarity	3	39	38	38	38	58

Size of gap between current and S1

	No iwi land development			High iwi land development		
Attribute	Median	Min.	Max.	Median	Min.	Max.
Median chlorophyll-a	119	38	>1,000	94	37	>1,000
Maximum chlorophyll-a	110	75	>1,000	37	72	>1,000
Total Nitrogen	31	-35	45	23	-60	41
Total Phosphorus	45	26	>1,000	28	-25	>1,000
Median nitrate	33	-29	381	32	-30	381
95th percentile nitrate	42	-140	>1,000	42	-150	>1,000
Median <i>E. coli</i>	38	0	656	38	0	667
95th percentile <i>E. coli</i>	49	6	930	49	6	881
Clarity	127	21	>1,000	127	21	>1000

Extent and location of breaches

Attribute	Site	WRPC1 breach (no int.)	WRPC1 breach (full int.)
Total Nitrogen	Waikato River at Ohakuri	-35%	-60%
	Waikato River at Waipapa	-4%	-11%
	Waikato River at Whakamaru	-16%	-28%
Total Phosphorus	Waikato River at Ohaaki	-	-25%
Median nitrate	Waipapa	-29%	-30%
95 th percentile nitrate	Waipapa	-140%	-150%
95 th percentile <i>E. coli</i>	Mangatawhiri	6%	6%

TN concentrations in main stem of upper Waikato River

	Cur	Cur+LTC	S1	10% step	PM	PM+low	PM+med	PM+high
Ohaaki	0.138	0.147	0.16	0.140	0.139	0.141	0.145	0.144
Ohakuri	0.215	0.281	0.16	0.210	0.234	0.241	0.245	0.248
Whakamaru	0.271	0.354	0.16	0.260	0.288	0.294	0.298	0.302
Waipapa	0.336	0.422	0.16	0.318	0.342	0.347	0.351	0.355
Narrows	0.41	0.501	0.35	0.404	0.388	0.390	0.393	0.396

TP concentration at Waikato River at Ohaaki

	Cur	S1	10% step	PM	PM+low	PM+med	PM+high
Ohaaki	0.011	0.01	0.0109	0.0105	0.0106	0.0111	0.0113

95th percentile *E. coli* breach

- Mangatawhiri (EW-0459-006)
- Tranche 3 site
- 90% of land consists of forest and low-intensity land use
- Link between *E. coli* and pathogens (?)

	Concentration per 100 ml
Current level	5,615
Scenario 1 level	540
Goal at 10%	5,108
Policy mix (25% FEP)	5,300
Policy mix (50% FEP)	5,217
Policy mix (100% FEP)	5,043

Conclusions

- Policy will impact economic outcomes
- Costs vary across sectors
- Policy will substantially improve water quality
- 1% of targets not achieved: N, *E. coli*, (P)
- Impacts of groundwater lags
- Impacts of development
- Water quality will worsen before it improves, at some sites