

Key to colour rankings used in zone summaries:

Significance of Ecological Values	
<i>Narrative</i>	
Significant	<i>These classes are as assessed by Dr. Roger Young (Freshwater Ecologist, Cawthron - Coastal and Freshwater Group Manager)</i>
High	
Mod-High	
Moderate	
Mod-Low	
Low	

Risk to Aquatic Habitat		
<i>Possible Bands</i>	<i>Narrative</i>	<i>% Habitat retention</i>
A	Low	>=90%
B	Low-Mod	80% to 89%
B	Moderate	70% to 79%
C	Mod-High	60% to 69%
D	High	<60%

Allocation	
<i>% of demand type allowed for</i>	
100%	
1 to 99%	
0%	

Security of Supply	
<i>Possible Bands</i>	<i>% of time flows above cease take triggers</i>
A	>98%
B	94 to 98%
C	90 to 93%
D	<90%

Te Waikoropupu Springs (TWS)

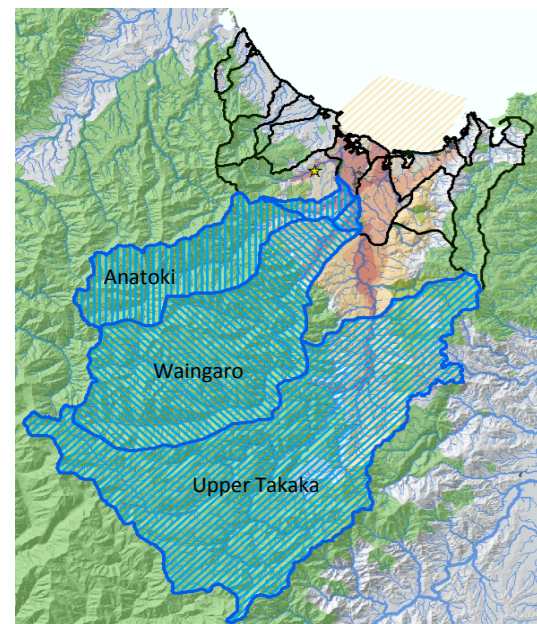
Water Allocation			
Zone Regimes / Area	Proposed Allocation (l/s)	Assumed % contribution to TWS	Allocation (l/s) affecting TWS flows
Upper Takaka Surface Regime (70%:20%)	476	100%	476
Waingaro Regime (80%:20%)	550	8%	44
Anatoki Regime (90%:10%)	171	0%	0
Unconfined AMA remainder (existing takes)	142	100%	142
Middle Takaka	47.93		
Upper Takaka Tributaries	94.07		
Confined AMA (existing takes)	6.7	100%	6.7
TOTAL Allocation in AMA Recharge			668.7

Additional Waiting List and Future Use	Waiting List	Future Use
Middle Takaka	105.3	58.3
Upper Takaka Tributaries	0	0
Confined AMA	0	0
TOTALS	105.3	58.3

Flow Statistics and Default Allocations				
Statistic	Methodology	% of 5yrLF	l/s	Location
7 day MALF	correlated		7661	GW6013
1 in 5 Year Low Flow (7 day)	correlated		6806	GW6013
1 in 10 Year Low Flow (7 day)	correlated		6515	GW6013
Allocation default Lower Limit (AL)	10% of 5yr Low Flow	10%	681	GW6013
Allocation default Upper Limit (AL)	33% of 5yr Low Flow	33%	2246	GW6013

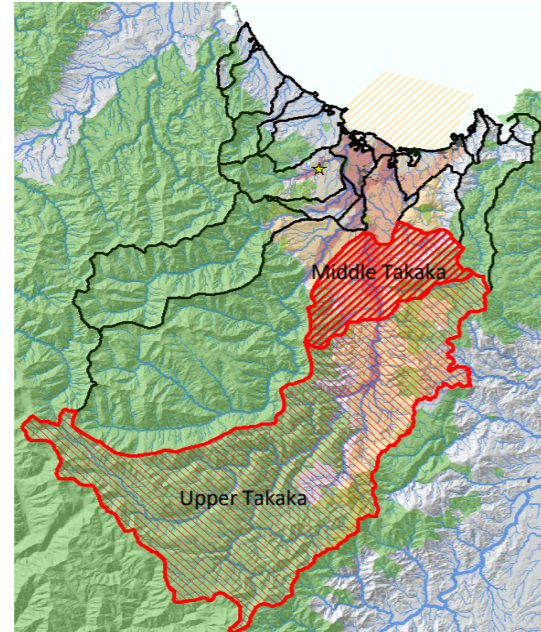
Significance of Ecological Values [#]		Mod-High

as assessed by Dr. Roger Young (Freshwater Ecologist, Cawthron - Coastal and Freshwater Group Manager)



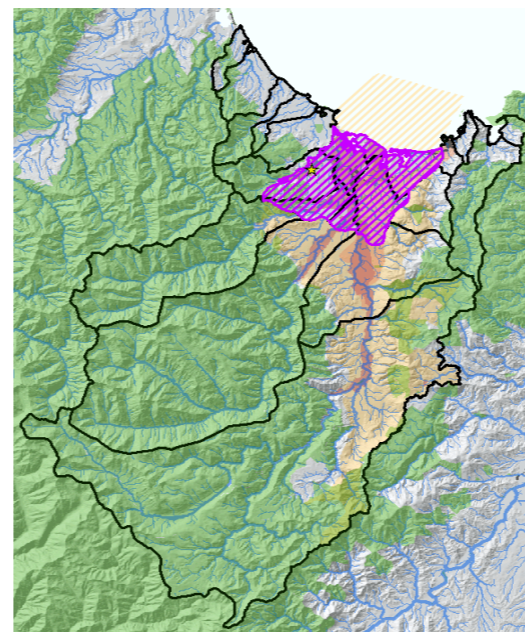
Waingaro, Anatoki and Upper Takaka River Regimes

For Upper Takaka this includes only those takes that affect river flows (As per FLAG agreed regimes)



Unconfined AMA Remainder

Includes:
All Middle Takaka Zone takes
Tributary takes in the Upper Takaka Zone that do not affect Takaka River low flows.



Confined AMA

Includes all takes from the confined Arthur Marble Aquifer

For takes in these zones Rationing and Cease Takes triggered by respective zone regimes

For takes in this zone Rationing and Cease Takes triggered by TWS Regime

For takes in this zone Rationing and Cease Takes triggered by TWS Regime

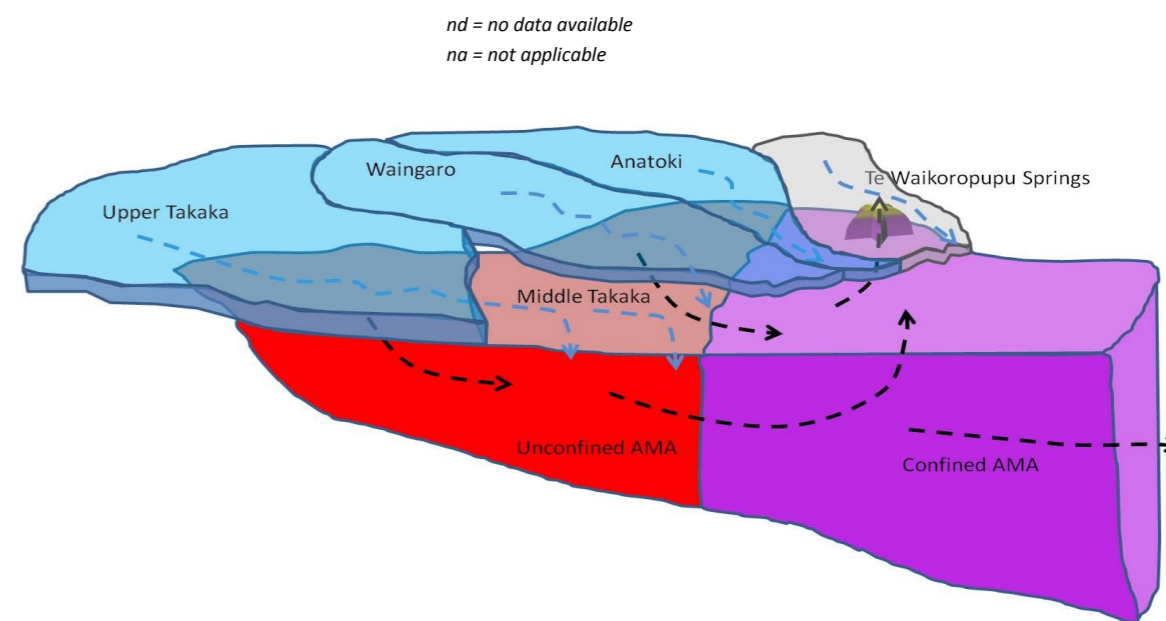
*NOTE: It is recommended that any further takes from the waiting list or future use be limited to the confined or unconfined AMA.

Available Water		
Regime Option (MF%-AL%)	90%-10%	status quo
Minimum Flow Percentage of MALF	90%	none
Minimum Flow l/s (MF)	6895	none
Allocation Percentage of MALF	10%	7%
Total allocation l/s (AL)	766	500
Allocation Limit Remaining (less existing and proposed takes)*	97	-169
% of demand met by allocation limit		
% of Existing/Proposed Regime met	100.0%	74.8%
% of Waiting List met	92.5%	0.0%
% of Future Use met	0.0%	0.0%

Low Flow Management		
Regime option	90%-10%	status quo
Risk to instream values (Roger Young's advice)	Low	na
Rationing Trigger 50% cut (MF + AL)	7661	none
Cease Take Trigger l/s (MF + 50%AL)	7278	none
Average days below Minimum Flow per yr	4 days	na

Security of Supply (based on data from 1999-2015 - Nov-April inclusive)		
Regime option	90%-10%	status quo
% of time flows are above cease trigger	98.0%	na
% of time flows are above rationing trigger	96.3%	na

Comparison to last 16 years data (from 1999/2000 to 2014/2015)		
Regime option	90%-10%	status quo
Average days of cease take per year	7 days	na
Number of years (and no. of events) with cease takes > 3 days	4yrs (6)	na
Number of years (and no. of events) with cease takes > 5 days	3yrs (5)	na



nd = no data available
na = not applicable

Upper Takaka Zone

Water Demand					
Existing Takes		Waiting List		Future Irrigation	
Surface	240	Surface	120		
Ground	0	Ground	0		
Total	240	Total	120	Total	65

(There is a further 105 l/s on the waiting list in the Middle Takaka zone)

Existing & Waiting 360

Max Demand 425

Flow Statistics and Default Allocations

Statistic	Methodology	% of 5yrLF	l/s	Location
7 day Malf			2380	Harwoods
1 day Malf			1669	Harwoods
1 in 5 Year Low Flow (7 day)			1646	Harwoods
1 in 10 Year Low Flow (7 day)			1397	Harwoods
Allocation default Lower Limit (AL)	10% of 5yr Low Flow	10%	165	Harwoods
Allocation default Upper Limit (AL)	33% of 5yr Low Flow	33%	543	Harwoods

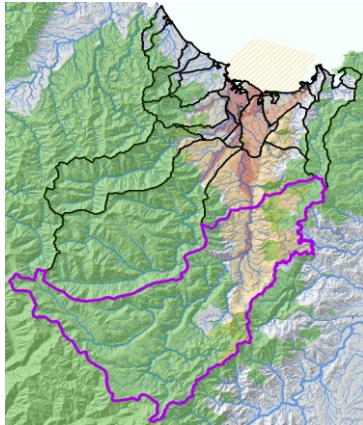
Opportunity for C type takes to storage (over last hydrological year)

Median flow (l/s)		10100
% of time flow above median flow		52%
Volume of water above median flow for year (million m3)		298

Significance of Ecological Values[#]

Moderate

[#] as assessed by Dr. Roger Young (Freshwater Ecologist, Cawthron - Coastal and Freshwater Group Manager)



Available Water

Regime Option (MF%-AL%)	80%-30%	70%-20%	70%-15%	70%-10%	status quo
Minimum Flow Percentage of Malf	80%	70%	70%	70%	none (cease take ~ 70%)
Minimum Flow l/s (MF)	1904	1666	1666	1666	1657*
Allocation Percentage of Malf	30%	20%	15%	10%	14%
Total allocation l/s (AL)	714	476	357	238	333
% of demand met by allocation limit					
% of Existing met	100.0%	100.0%	100.0%	99.2%	100.0%
% of Waiting List met	100.0%	100.0%	97.5%	0.0%	77.5%
% of Future Irrigation met	100.0%	100.0%	0.0%	0.0%	0.0%

Agreed Option Agreed Option

Low Flow Management

Regime option	80%-30%	70%-20%	70%-15%	70%-10%	status quo
Risk to instream values (Roger Young's advice)	low-mod	moderate	moderate	moderate	moderate
Rationing Trigger	none	none	none	none	none
Cease Take Trigger l/s (MF + AL)	2618	2142	2023	1904	1657*
Average days below Minimum Flow per yr	12	8	8	8	7
Change to extent of Drying Zone	←-----extent of drying zone reduces ----- (200-300m variation in drying zone upstream of Craigieburn)				

Security of Supply (based on data from 1975-2015 - Nov-April inclusive)

Regime option	80%-30%	70%-20%	70%-15%	70%-10%	status quo*
% of time flows are above cease trigger	87.6%	91.9%	92.9%	93.9%	96.1%

Comparison to last 16 years data (from 1999/2000 to 2014/2015)

Regime option	80%-30%	70%-20%	70%-15%	70%-10%	status quo*
Average days of cease take per year	25	16	14	12	7
Number of years (and no. of events) with cease takes > 3 days	9yrs (12)	8yrs (10)	5yrs (5)	4yrs (4)	2yrs (2)
Number of years (and no. of events) with cease takes > 5 days	4yrs (4)	1yr (1)	1yr (1)	1yrs (1)	1yrs (1)

nd = no data available

na = not applicable

* information for 3 large consented takes only

Waingaro

Water Demand				
Existing Takes		Waiting List *		Future Irrigation**
Surface	276	Surface	39	
Ground	89	Ground	0	
Total	365	Total	39	Total 48

TOTAL Waingaro Existing & Waiting 404

TOTAL Waingaro Max Demand 452

Flow Statistics and Default Allocations

Statistic	Methodology	% of 5yrLF	l/s	Location
7 day MALF			3585	Hanging Rock
7 day MALF (downstream site)	correlation		2751	U-S confluence
1 in 5 Year Low Flow			3080	Hanging Rock
1 in 5 Year Low Flow	correlation		2155	U-S confluence
Allocation default Lower Limit (AL)	10% of 5yr Low Flow	10%	275	U-S confluence
Allocation default Upper Limit (AL)	33% of 5yr Low Flow	33%	908	U-S confluence

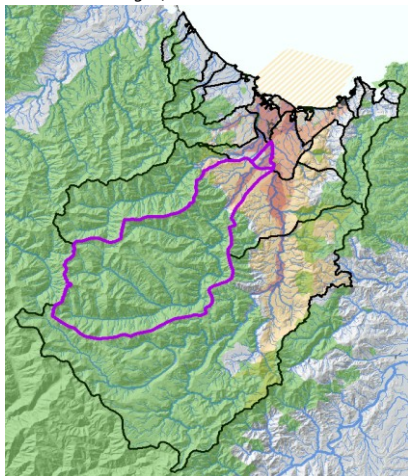
Opportunity for C type takes to storage (over last hydrological year)

Median flow (l/s)	10520
% of time flow above median flow	47%
Volume of water above median flow for year (million m3)	366

Significance of Ecological Values[#]

Mod-High

[#] as assessed by Dr. Roger Young (Freshwater Ecologist, Cawthron - Coastal and Freshwater Group Manager)



TOTAL Waingaro Available Water

Agreed option

Regime Option (MF%-AL%)	80%-20%	80%-15%	70%-15%	status quo
Minimum Flow Percentage of MALF	80%	80%	70%	none
Minimum Flow l/s (MF)	2868	2868	2510	none
Allocation Percentage of downstream MALF	20%	15%	15%	13%
Total allocation l/s (AL)	550	413	413	365
% of demand met by allocation limit				
% of Existing met	100.0%	100.0%	100.0%	100.0%
% of Waiting List met	100.0%	100.0%	100.0%	0.0%
% of Future Irrigation met	100.0%	18.0%	18.0%	0.0%

Low Flow Management

Regime option	80%-20%	80%-15%	70%-15%	status quo
Risk to instream values (Roger Young's advice)	low-mod	low-mod	moderate	na
Rationing Trigger (MF + AL)	3418	3281	2922	none
Cease Take Trigger l/s (MF + 50%AL)	3143	3074	2716	none
Average days below Minimum Flow per yr	4	4	0.4	na

Security of Supply (based on data from 1986-2015 Nov-April inclusive)

Regime option	80%-20%	80%-15%	70%-15%	status quo
% of time flows are above cease trigger	97.6%	97.9%	99.4%	na
% of time flows are above rationing trigger	95.7%	96.8%	98.7%	na

Comparison to last 16 years data (from 1999/2000 to 2014/2015)

Regime option	80%-20%	80%-15%	70%-15%	status quo
Average days of rationing per year	27	21	8	na
Average days of cease take per year	16	13	4	na
Number of years (and no. of events) with cease takes > 3 days	8yrs (16)	6yrs (12)	2yrs (5)	na
Number of years (and no. of events) with cease takes > 5 days	7yrs (13)	6yrs (11)	2yrs (3)	na

nd = no data available

na = not applicable

* The Waiting List number is only for the upper (AMA) part of the Waingaro catchment and has been calculated from the plausible irrigation map for the upper catchment as there is double counting with the waiting list statistics (ie - if approved, one of the waiting list amounts would result in relinquish of existing take)

** The Future Irrigation number is for the lower part of the Waingaro catchment only

Anatoki Zone

Water Demand					
Existing Takes		Waiting List		Future Irrigation	
Surface	75	Surface	0		
Ground	4	Ground	0		
Total	79	Total	0	Total	68.7

Existing & Waiting 79

Max Demand 147.7

Flow Statistics and Default Allocations

Statistic	Methodology	% of 5yrLF	l/s	Location
7 day MALF			2156	Happy Sams
7 day MALF	<i>correlation</i>		1707	One Spec Rd
1 in 5 Year Low Flow			1784	Happy Sams
1 in 10 Year Low Flow			1658	Happy Sams
Allocation default Lower Limit (AL)	10% of 5yr Low Flow	10%	178	Happy Sams
Allocation default Upper Limit (AL)	33% of 5yr Low Flow	33%	589	Happy Sams

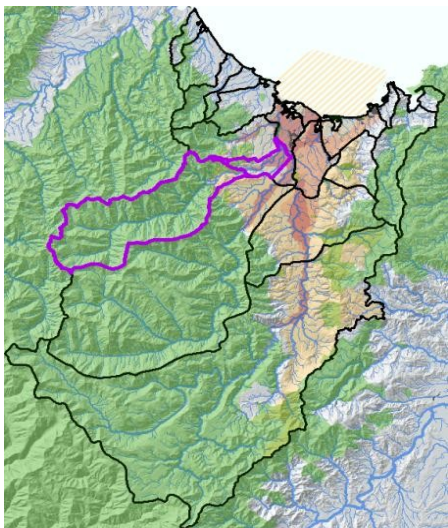
Opportunity for C type takes to storage (over last hydrological year)

Median flow (l/s)	7104
% of time flow above median flow	39%
Volume of water above median flow for year (million m3)	232

Significance of Ecological Values[#]

Mod-High

[#] as assessed by Dr. Roger Young (Freshwater Ecologist, Cawthron - Coastal and Freshwater Group Manager)



Available Water

Regime Option (MF%-AL%)	90%-10%	80%-20%	80%-15%	70%-15%	status quo
Minimum Flow Percentage of MALF	90%	80%	80%	70%	none
Minimum Flow l/s (MF)	1940	1725	1725	1509	none
Allocation Percentage of MALF at One Spec	10%	20%	15%	15%	5%
Total allocation l/s (AL) at One Spec Rd	171	341	256	256	79
% of demand met by allocation limit					
% of Existing met	100.0%	100.0%	100.0%	100.0%	100.0%
% of Waiting List met	na	na	na	na	na
% of Future Irrigation met	100.0%	100.0%	100.0%	100.0%	0.0%

Agreed option

Suggested option

Low Flow Management

Regime option	90%-10%	80%-20%	80%-15%	70%-15%	status quo
Risk to instream values (Roger Young's advice)	low	low-mod	low-mod	moderate	na
Rationing Trigger (50% cut) (MF+AL)	2111	2066	1981	1765	none
Cease Take Trigger l/s (MF + 50%AL)	2026	1896	1853	1637	none
Average days below Minimum Flow per yr	6	3	3	1	na

Security of Supply (based on data from 1987-2015 Nov-April inclusive)

Regime option	90%-10%	80%-20%	80%-15%	70%-15%	status quo
% of time flows are above cease trigger	95.8%	97.3%	97.7%	99.1%	na
% of time flows are above rationing trigger	94.7%	95.3%	96.4%	98.3%	na

Comparison to last 16 years data (from 1999/2000 to 2014/2015)

Regime option	90%-10%	80%-20%	80%-15%	70%-15%	status quo
Average days of rationing days per year	16	14	11	5	na
Average days of cease take per year	12	9	7	3	na
Number of years (and no. of events) with cease takes > 3 days	10yrs (21)	7yrs (12)	7yrs (11)	2yrs (5)	na
Number of years (and no. of events) with cease takes > 5 days	8yrs (14)	6yrs (9)	6yrs (9)	2yrs (5)	na

nd = no data available

na = not applicable

Pariwhakaoho

Water Demand					
Existing Takes		Waiting List		Future Irrigation	
Surface	0	Surface	0		nd
Ground	0	Ground	0		nd
Total	0	Total	0	Total	0

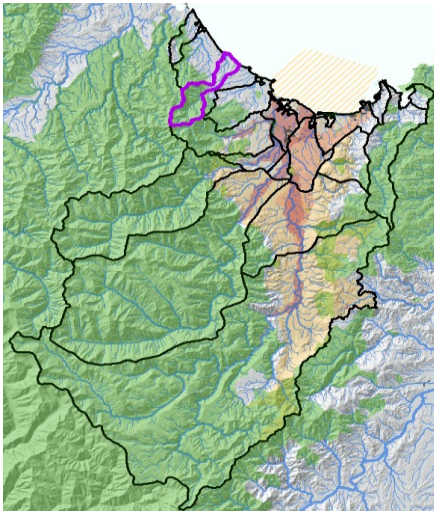
Existing & Waiting 0
Max Demand 0

Flow Statistics and Default Allocations**				
Statistic	Methodology	% of 5yrLF	l/s	Location
7 day MALF	<i>correlated</i>		195	SH60
1 day MALF	<i>correlated</i>		180	SH60
1 in 5 Year Low Flow (7 day)	<i>correlated</i>		166	SH60
1 in 10 Year Low Flow (7 day)	<i>correlated</i>		156	SH60
Allocation default Lower Limit (AL)	10% of 5yr Low Flow	10%	17	SH60
Allocation default Upper Limit (AL)	33% of 5yr Low Flow	33%	55	SH60

Opportunity for C type takes to storage (over last hydrological year)	
Median flow (l/s)	540
% of time flow above median flow	39%
Volume of water above median flow for year (million m3)	nd

Significance of Ecological Values [#]	Significant
	Significant

[#] as assessed by Dr. Roger Young (Freshwater Ecologist, Cawthron - Coastal and Freshwater Group Manager)



Available Water			
Regime Option (MF%-AL%)	100%-10%	90%-10%	status quo
Minimum Flow Percentage of MALF	100%	90%	none
Minimum Flow l/s (MF)	195	176	none
Allocation Percentage of MALF	10%	10%	0%
Total allocation l/s (AL)	20	20	0
% of demand met by allocation limit			
% of Existing met	na	na	na
% of Waiting List met	na	na	na
% of Future Irrigation met	nd	nd	nd

Low Flow Management			
Regime option	100%-10%	90%-10%	status quo
Risk to instream values (Roger Young's advice)	low	low	na
Rationing Trigger	none	none	none
Cease Take Trigger l/s (MF + AL)	215	195	none
Correlated CT Trigger: Anatoki -Happy Sams	2421	2156	na
Average days below Minimum Flow per yr	12	5	na

Security of Supply*			
Regime option	100%-10%	90%-10%	status quo
% of time flows are above cease trigger*	89.0%	94.0%	na

Comparison to last 16 years data (from 1999/2000 to 2014/2015)			
Regime option	100%-10%	90%-10%	status quo
Average days of cease take per year	29	17	na
Number of years (and no. of events) with cease takes > 3 days	15yrs (42)	12yrs (30)	na
Number of years (and no. of events) with cease takes > 5 days	14yrs (28)	10yrs (16)	na

nd = no data available

na = not applicable

* numbers to be used with caution

**Statistics for the Pariwhakaoho zone are based on a correlation with the Anatoki River. As more comparative data is collected during low flow periods these statistics will be updated.

Can we determine plausible irrigation for this catchment?