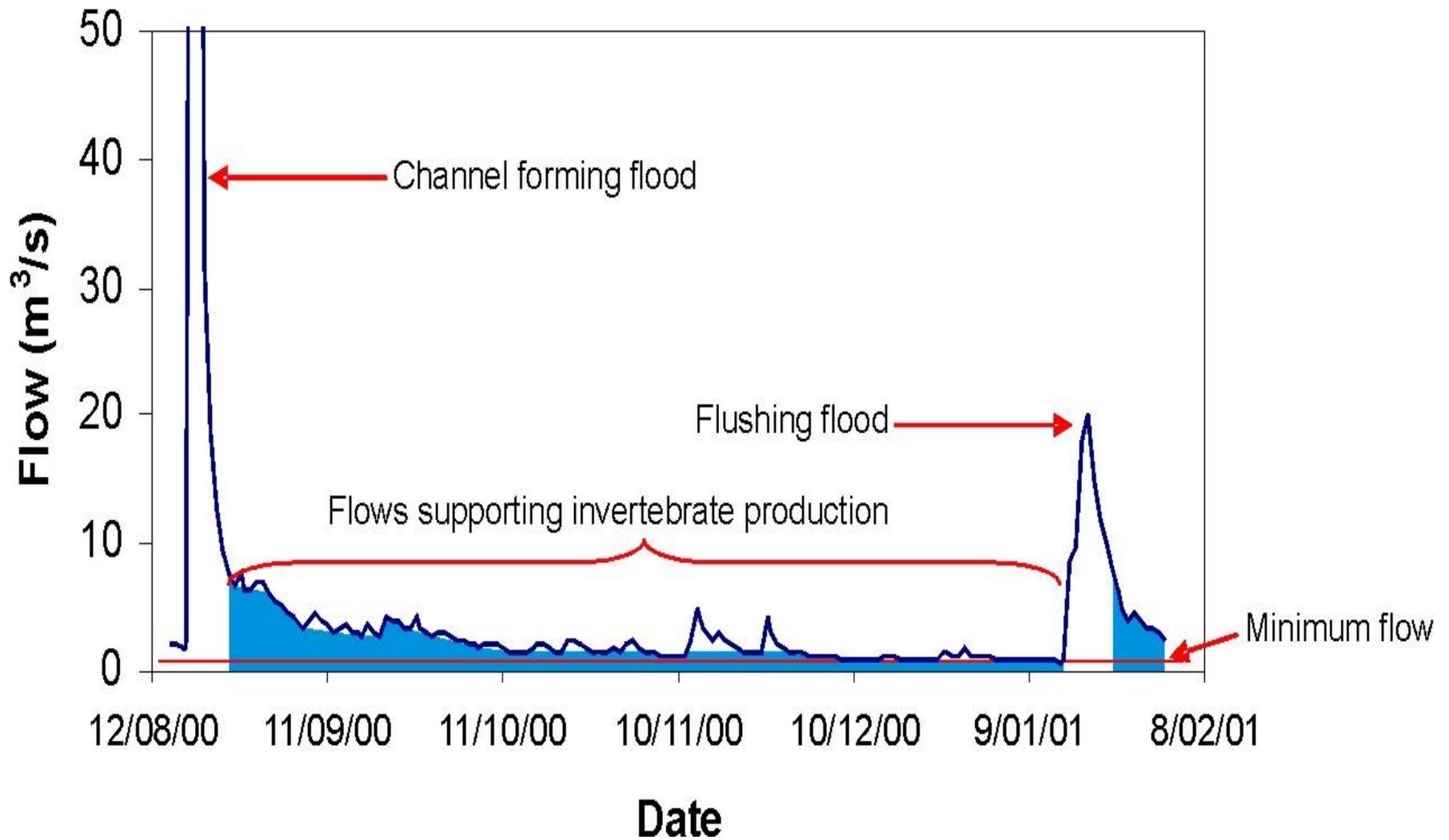


Allocation Workshops

water quantity limits for
managing water takes at
low flows





Model results

Assessment includes:

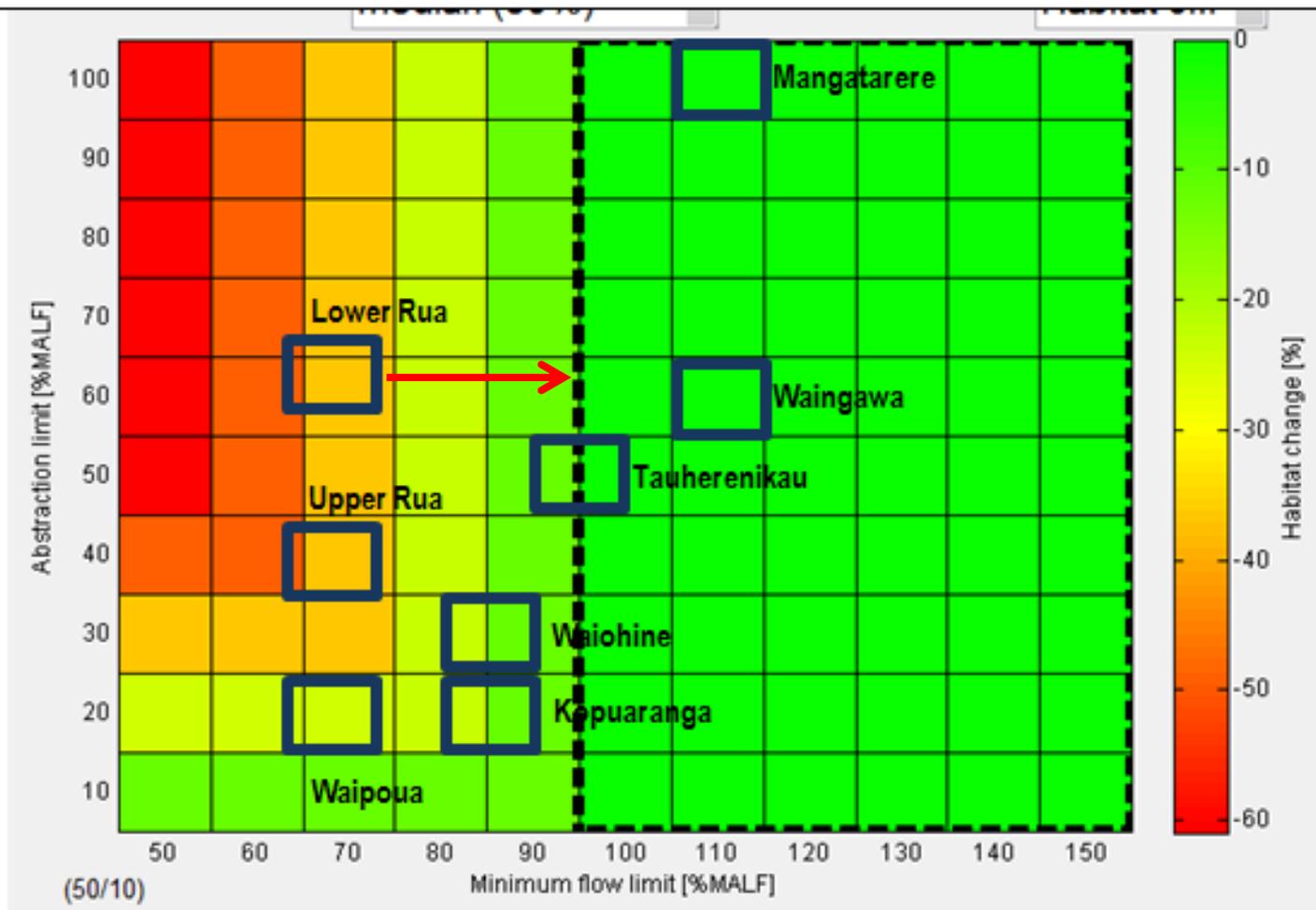
- Ecology - four indicators
 1. Habitat loss/protection
 2. Change in duration of low flows
 3. Change in median flow
 4. Reliability of supply
- Manawhenua values – consequence for reliability

Assumptions

- Amount of habitat available at low flows is an important driver of biological health (and also a good surrogate for other values)
- This modelling assumes that all takes are fully exercised above minimum flow and cease altogether at minimum flow.
 - However, in reality, takes are never simultaneously fully exercised and some takes continue below minimum flows (water race, public supply, and restricted groundwater)

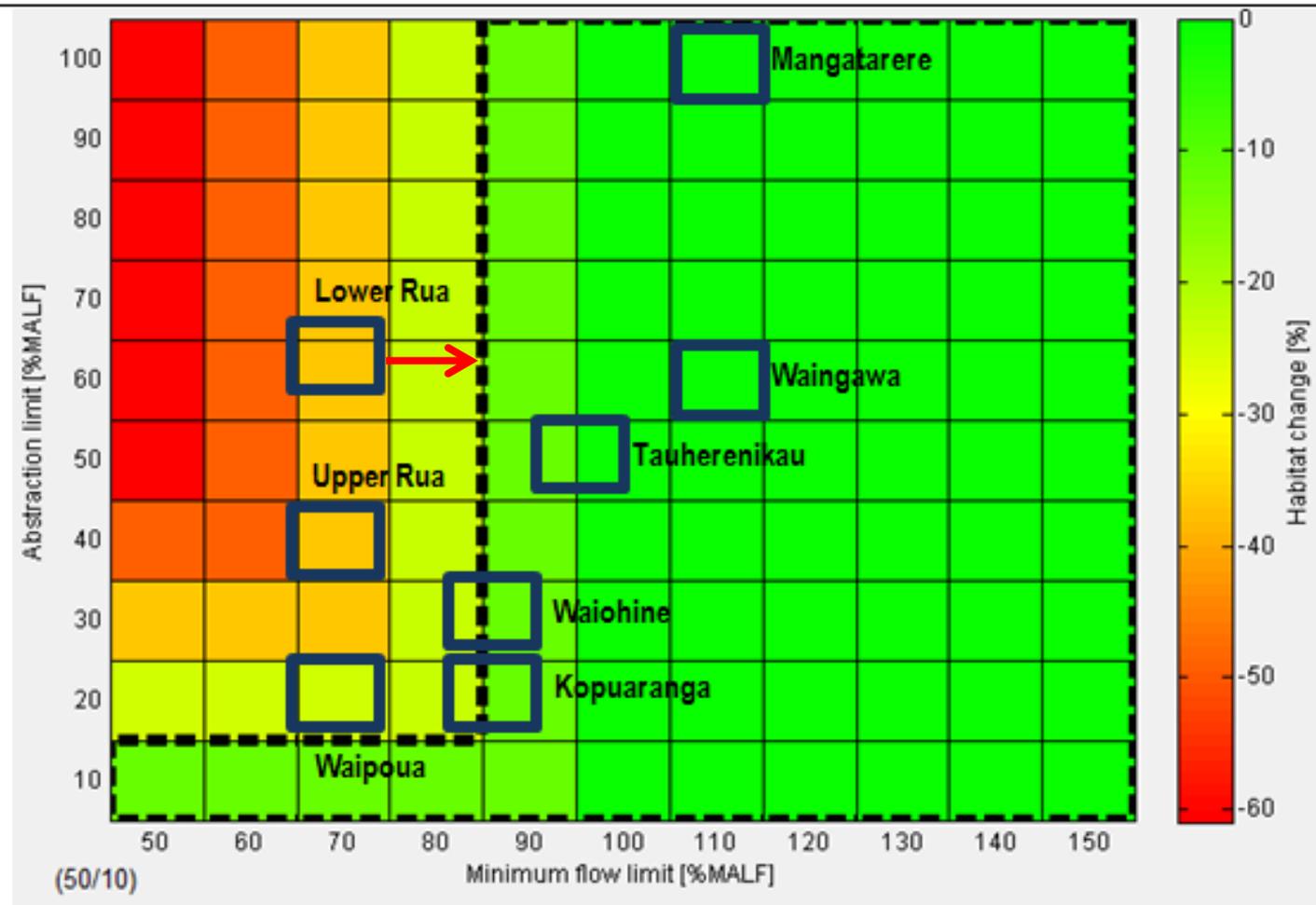
Indicator 1 – Habitat loss

90% habitat, 90% reaches



Indicator 1 – Habitat loss

70% habitat, 90% reaches



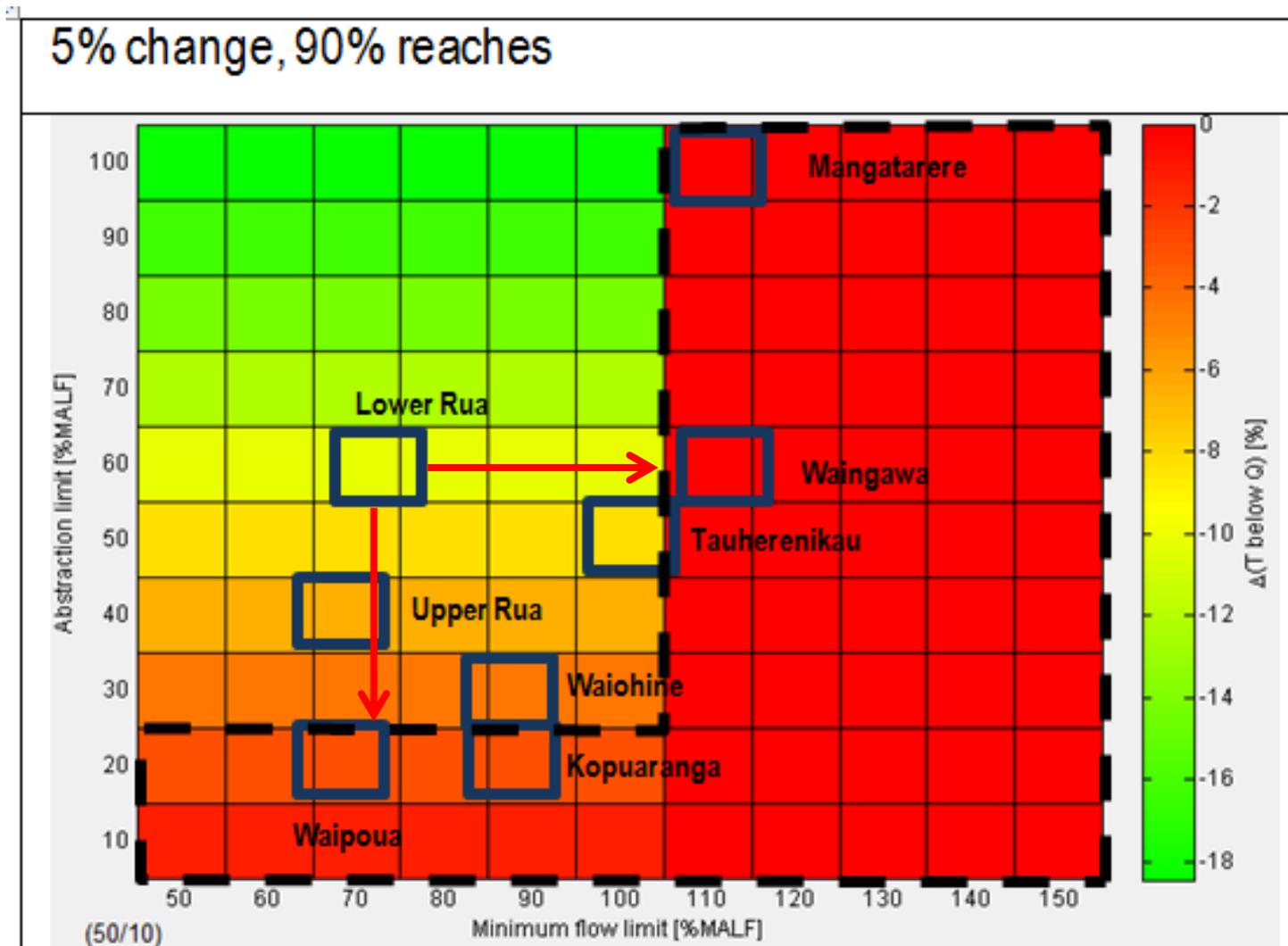
Indicator 2 – Duration of low flows

Key to interpreting results table

Shading	Are minimum flows and allocation limits allowing objective to be met?
	Yes
	Almost
	No

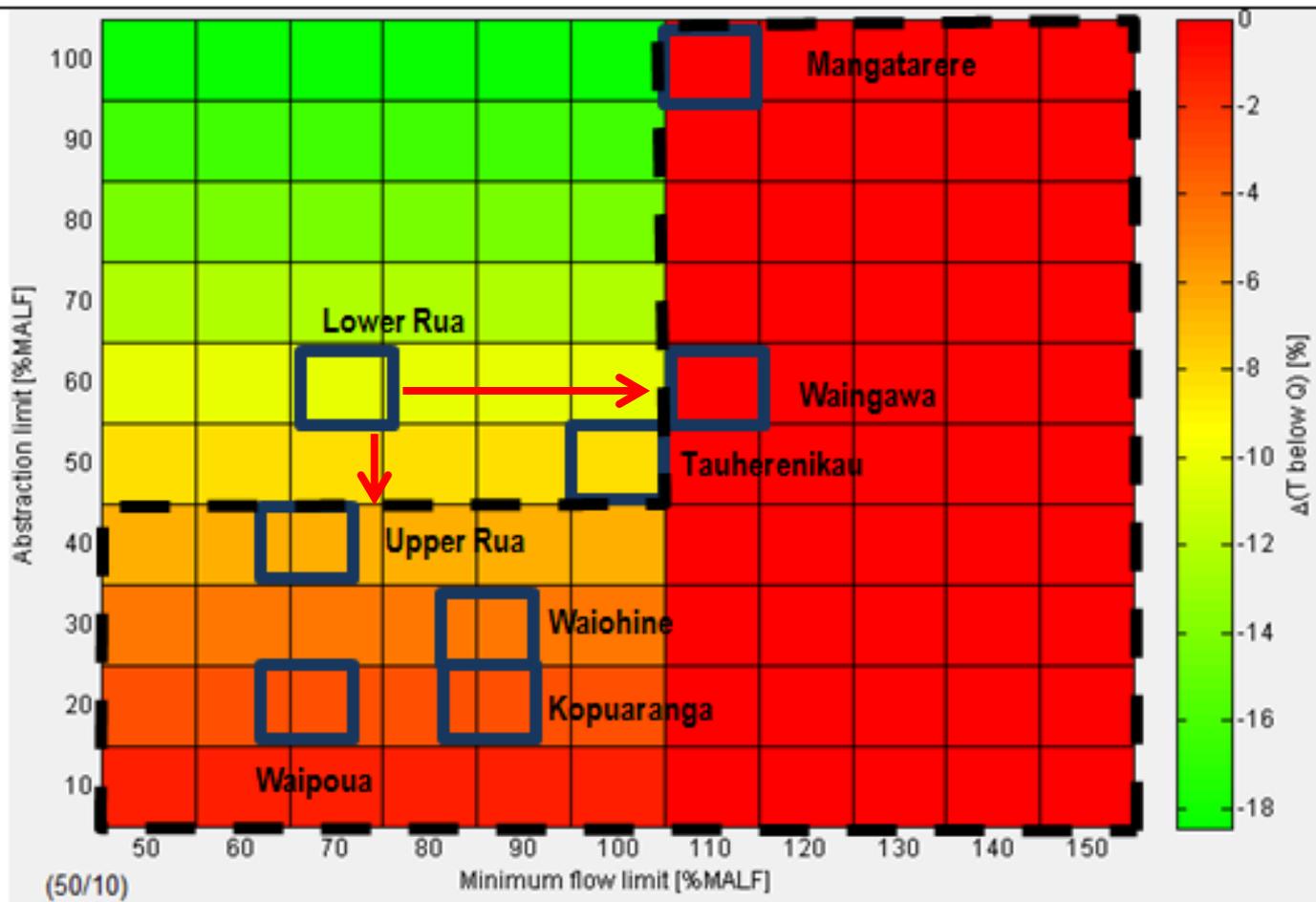
	'Good'		'Probably OK'	
	No more than 5% increase in duration of time under MALF in...		No more than 10% increase in duration of time under MALF in...	
	Most reaches	At least half reaches	Most reaches	At least half reaches
Kopuaranga				
Waipoua				
Waingawa				
Upper Ruamāhanga				
Mangatarere				
Waiohine				
Tauherenikau				
Lower Ruamāhanga				

Indicator 2 – Duration of low flows



Indicator 2 – Duration of low flows

10% change, 90% reaches

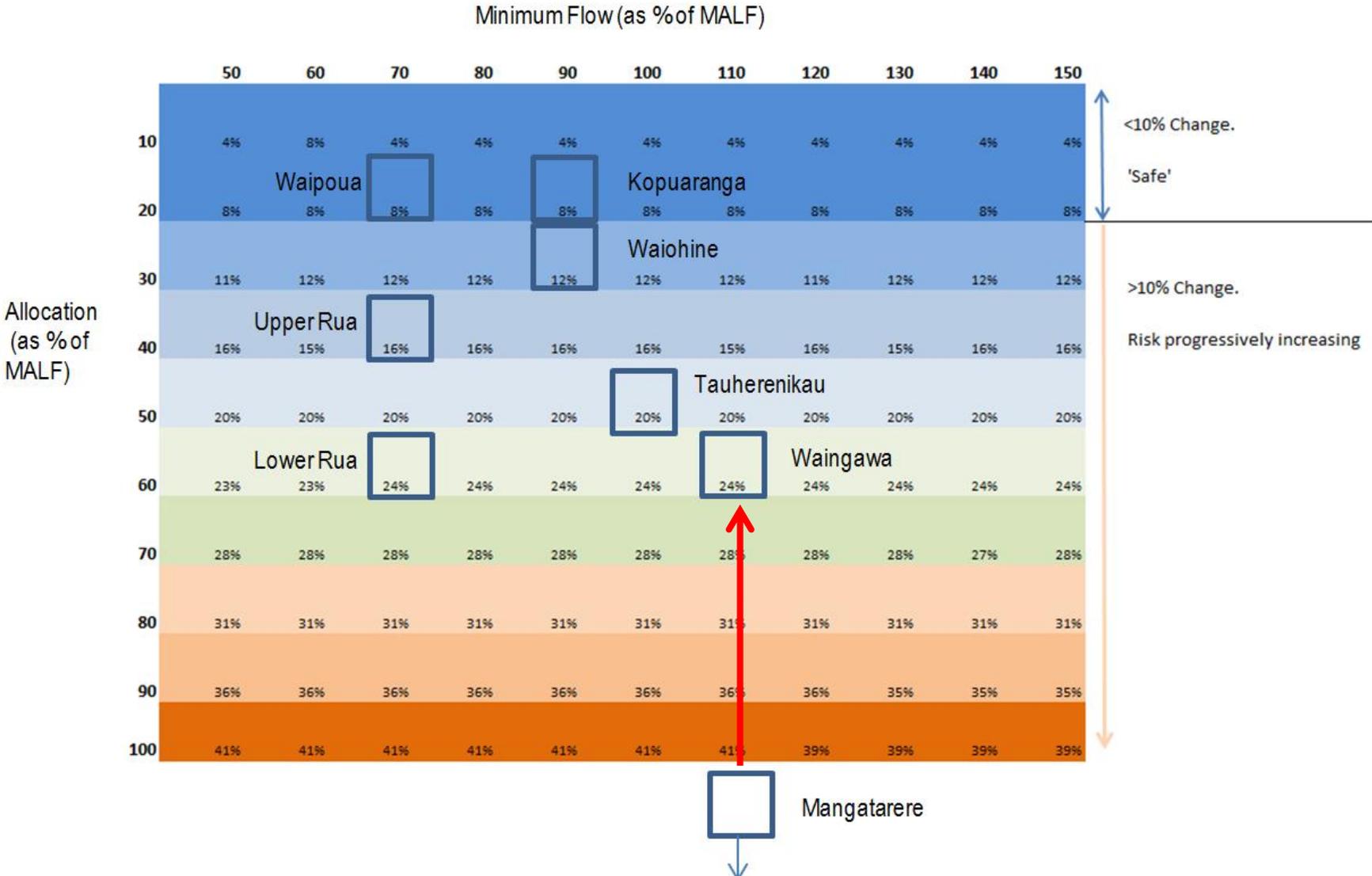


Indicator 3 – Change in median flows

Key to interpreting results table

Shading	Are minimum flows and allocation limits allowing objective to be met?		'Safe'	'Probably OK'	'Potentially noticeable impacts'
	Yes				
	Almost		No more than 10% decrease in summer median flow	No more than 20% decrease in summer median flow	No more than 30% decrease in summer median flow
	No				
		Kopuaranga			
		Waipoua			
		Waingawa			
		Upper Ruamāhanga			
		Mangatarere			
		Waiohine			
		Tauherenikau			
		Lower Ruamāhanga			

Indicator 3 – Change in median flows



Indicator 4 – Reduction in reliability

Minimum Flow	% of Natural MALF	Number of days cease take	Number of consecutive days cease take	Average annual reliability	Average summer reliability
[m3/sec]	[Nat MALF = 12.5m3/s]	[average per year]	[average per year]	[365 days]	[180 days]
Existing (8.5)	68	11	6	97%	94%
Higher 1 (9.4)	75	15	7	96%	92%
Higher 2 (10.0)	80	17	8	95%	90%
Higher 3 (10.6)	85	21	10	94%	89%
Higher 4 (11.25)	90	24	10	93%	87%
Higher 5 (12.5)	150	62	19	83%	65%
Higher 6 (25)	200	90	24	75%	50%
Higher 7 (50)	400	188	37	49%	5%

Flows for cultural values

River/Stream	Existing Minimum Flow (m ³ /sec)	Recommended Minimum Flow for cultural values* (m ³ /sec)	% Increase in Minimum Flow
Waingawa	1.7	2.5	47%
<u>Waiohine</u>	3.05	3.75	23%
<u>Waipoua</u>	0.25	0.5	100%
Upper <u>Ruamahanga</u>	2.4	10	320%
<u>Tauherenikau</u>	1.3	1.35	4%
<u>Parkvale</u>	0.1	0.15	50%
<u>Kopuaranga</u>	0.27	0.5	85%

Flows for cultural values

River/Stream	Existing Summer Reliability (Oct-Apr)	Reduction in reliability	Days of cease-take in 2013 Existing Min Flow [New Min Flow]
Waingawa	87%	-17%	64 [94]
<u>Waiohine</u>	98%	-5%	22 [34]
<u>Waipoua</u>	91%	-16%	47 [93]
<u>Upper Ruamahanga</u>	96%	-56%	38 [148]
<u>Tauherenikau</u>	94%	-1%	28 [32]
<u>Parkvale</u>	81%	-9%	94 [121]
<u>Kopuaranga</u>	95%	-30%	34 [130]

Economic impact of reduction in reliability

