Scenario assessment of fresh water ecological attributes in Te Awarua-o-Porirua Whaitua

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Three ecological attributes…

- Periphyton – the algae/slime attached to surfaces; some is essential as food source for invertebrates – but too much is bad.
- Macroinvertebrate Community Index (MCI) – high score means diverse & clean; low score means degraded.
- Fish – diverse & abundant indicates good ecosystem health.

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Method:

- A little different to water quality attributes.
- Consider several aspects of scenarios that affect ecology…
  - Flows (minimums and allocations)
  - Nutrients & sediment
  - Toxicants (copper, zinc, ammonia, nitrate)
  - In-stream habitat (bed, banks, channel form)
  - Riparian habitat (vegetation, shade)
  - Free passage (in the case of fish)

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Results: Periphyton

				What is the current state?		What could the scenarios give us?		
Drains to	**WMU group**	**WMU name**	**Assessment locality** [1]	**From monitoring data**	**From CMP assessment**	**BAU**	**Improved**	**Water sensitive**
Open coast	Coastal catchments	Pukerua	Hongoeka as proxy					
		Hongoeka to Pukerua	Hongoeka		A	A	A	A
		Whitireia	Mouth					
Taupo	Taupo Stream and Swamp	Taupo Stream	Mouth		C	C	B	B
			Wetland					
Pauatahanui inlet	Pauatahanui steep rural streams	Horokiri and Motukaraka	Battle Hill					
			Near Pauatahanui Golf Club	C	C	C	B	B
		Kakaho Stream	Mouth					
		Judgeford Stream	Bottom of sub-catchment					
		Upper Duck Creek	Bottom of sub-catchment					
	Pauatahanui rural streams	Pauatahanui Stream	Middle reaches	C	C	C	B	B
		Ration Creek	Mouth					
	Pauatahanui urban streams	Lower Duck Creek	Mouth		C	C	C	C
		Pauatahanui fringe streams	Titahi Bay as proxy					
Onepoto inlet	Onepoto steep rural streams	Rangituhi Stream	Bottom of sub-catchment					
		Takapu Stream	Bottom of sub-catchment		C	C	B	B
		Upper Kenepuru	Bottom of sub-catchment					
	Onepoto rural streams	Belmont Stream	Lincolnshire Farms					
		Stebbings Stream	Bottom of sub-catchment		C	C	B	B
	Onepoto small urban streams	Hukarito Stream	Mouth					
		Mahinawa Stream	Mouth		A	A	A	A
		Onepoto Fringe	Elsdon					
		Titahi	Titahi Bay					
	Kenepuru Stream	Kenepuru	Mouth		C	C	C	C
	Porirua Stream	Porirua	Grenada North industrial					
			Mitchell Stream					
			Willowbank					
			Kenepuru Drive	B	B	B	B↑	B↑

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Key messages: Periphyton

- Typically in band C in most of Whaitua
- Improve through stream shading & reduction of sediment and nutrients, by…
  - Riparian planting
  - Stabilise grazed land (retirement/space planting)
- More difficult to achieve in lower reaches due to wider channels difficult to shade

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Results: Macroinvertebrates

				What is the current state?		What could the scenarios give us?		
Drains to	**WMU group**	**WMU name**	**Assessment locality [1]**	**From monitoring data**	**From CMP assessment**	**BAU**	**Improved**	**Water sensitive**
Open coast	Coastal catchments	Pukerua	Hongoeka as proxy					
		Hongoeka to Pukerua	Hongoeka		C	C	C ↑	C ↑
		Whitireia	Mouth					
Taupo	Taupo Stream and Swamp	Taupo Stream	Mouth		C	C	B	B
			Wetland					
Pauatahanui inlet	Pauatahanui steep rural streams	Horokiri and Motukaraka	Battle Hill					
			Near Pauatahanui Golf Club	B	C	B	B	B
		Kakaho Stream	Mouth					
		Judgeford Stream	Bottom of sub-catchment					
		Upper Duck Creek	Bottom of sub-catchment					
	Pauatahanui rural streams	Pauatahanui Stream	Middle reaches	C/B	C	C	B	B
		Ration Creek	Mouth					
	Pauatahanui urban streams	Lower Duck Creek	Mouth		C	C	C↑	B
		Pauatahanui fringe streams	Titahi Bay as proxy					
Onepoto inlet	Onepoto steep rural streams	Rangituhi Stream	Bottom of sub-catchment					
		Takapu Stream	Bottom of sub-catchment		C	C	B	B
		Upper Kenepuru	Bottom of sub-catchment					
	Onepoto rural streams	Belmont Stream	Lincolnshire Farms					
		Stebbings Stream	Bottom of sub-catchment		C	C	B	B
	Onepoto small urban streams	Hukarito Stream	Mouth					
		Mahinawa Stream	Mouth		B/A	B/A	B/A	B/A
		Onepoto Fringe	Elsdon					
		Titahi	Titahi Bay					
	Kenepuru Stream	Kenepuru	Mouth		C	C	C ↑	C ↑↑
	Porirua Stream	Porirua	Grenada North industrial					
			Mitchell Stream					
			Willowbank					
			Kenepuru Drive	C	C	C	C ↑	C ↑

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Key messages: MCI (macroinvertebrates)

- Typically in band C in most of Whaitua
- Improve through stream shading & reduction of sediment and nutrients, by…
  - Riparian planting
  - Stabilise grazed land (retirement/space planting)
- Reduced toxicants (copper, zinc, nitrate, ammonia)
- Reduced stormwater runoff (frequent flows)
- Reduced wastewater overflow (organic pollution)

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Results: Fish

				What is the current state?		What could the scenarios give us?		
Drains to	**WMU group**	**WMU name**	**Assessment locality** [1]	**From monitoring data**	**From CMP assessment**	**BAU**	**Improved**	**Water sensitive**
Open coast	Coastal catchments	Pukerua	Hongoeka as proxy					
		Hongoeka to Pukerua	Hongoeka		C	C	C	C
		Whitireia	Mouth					
Taupo	Taupo Stream and Swamp	Taupo Stream	Mouth		C	C	B	B
			Wetland					
Pauatahanui inlet	Pauatahanui steep rural streams	Horokiri and Motukaraka	Battle Hill					
			Near Pauatahanui Golf Club		B/A	B/A	A	A
		Kakaho Stream	Mouth					
		Judgeford Stream	Bottom of sub-catchment					
		Upper Duck Creek	Bottom of sub-catchment					
	Pauatahanui rural streams	Pauatahanui Stream	Middle reaches		B	B	A	A
		Ration Creek	Mouth					
	Pauatahanui urban streams	Lower Duck Creek	Mouth		B	B	B	A
		Pauatahanui fringe streams	Titahi Bay as proxy					
Onepoto inlet	Onepoto steep rural streams	Rangituhi Stream	Bottom of sub-catchment					
		Takapu Stream	Bottom of sub-catchment		C?	C?	B	B
		Upper Kenepuru	Bottom of sub-catchment					
	Onepoto rural streams	Belmont Stream	Lincolnshire Farms					
		Stebbings Stream	Bottom of sub-catchment		B	B	A	A
	Onepoto small urban streams	Hukarito Stream	Mouth					
		Mahinawa Stream	Mouth		C	C	C	C
		Onepoto Fringe	Elsdon					
		Titahi	Titahi Bay					
	Kenepuru Stream	Kenepuru	Mouth		B	C/B	C/B	C/B
	Porirua Stream	Porirua	Grenada North industrial					
			Mitchell Stream					
			Willowbank					
			Kenepuru Drive		C/B	C/B	B	B

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Key messages: Fish

- Typically in band C or B most of Whaitua
- Good species diversity but populations likely under stress – multiple stressors
- Improve by all the same things as for periphyton and MCI, plus…
  - Improve physical habitat in straightened, concrete, channelled or piped reaches.
  - Restore obstructions to fish passage
  - Protect & restore spawning habitat (eg inanga)

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Reminder: How can you use this?

- Explore effort to reach different objectives
- Look for the big patterns
- Results graded (A-D) and arrows indicate changes within a band
- Draw on your own and others' knowledge

Group exercise shortly to explore objectives – but first…

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One example in detail…

- Look at your sheet for "*Kenepuru in mid-lower reaches*"
- What is possible and how? – for…
  - Periphyton…
  - Macroinvertebrates (MCI)…
  - Fish…

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Now into group work…

- Each group works 3 more catchments…

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