Project timeline

Previous community engagement

12 July MRG

8 Aug MRG

End Aug – NIWA models completed

10 Sept - MRG

23-28 Sept – Values for outcomes consultation

15 Oct - MRG

End Oct – Preliminary science & economic evaluations

Oct/Nov – develop freshwater objectives, describe attribute states, set limits

19 Nov – MRG – Manuherekia Choices

Feb 2020 – Consultation on scenarios

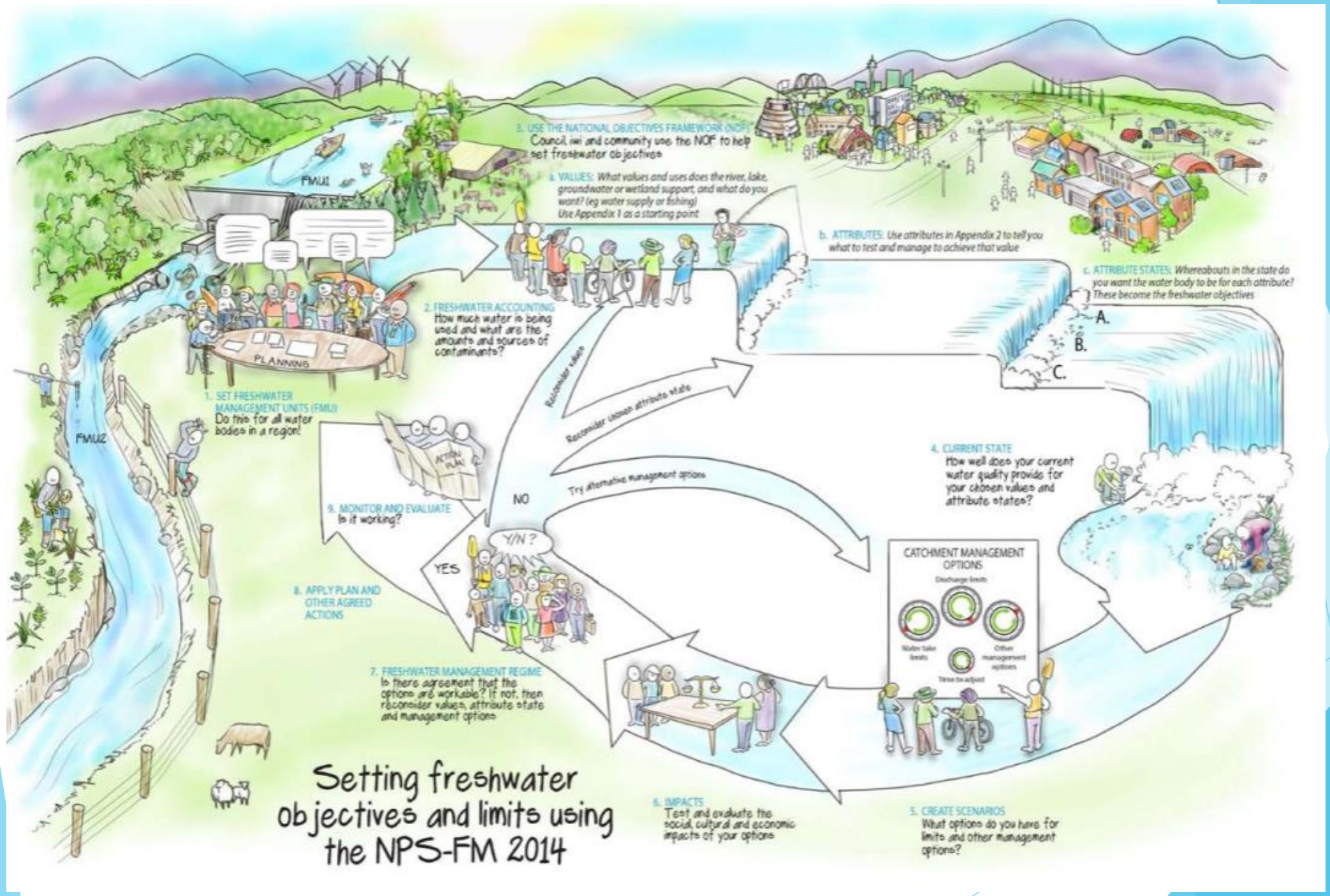
March-Jun Plan drafting

August 2020 - Plan notification

Manuherekia

State of the Environment

TAG research process


FMU1
PLANNING
1. SET FRESHWATER MANAGEMENT UNITS (FMU)
Do this for all water bodies in a region!
FMU2
2. FRESHWATER ACCOUNTING
How much water is being used and what are the amounts and sources of contaminants?
3. USE THE NATIONAL OBJECTIVES FRAMEWORK (NOF)
Council, iwi and community use the NOF to help set freshwater objectives
a. VALUES: What values and uses does the river, lake, groundwater or wetland support, and what do you want? (eg water supply or fishing)
Use Appendix 1 as a starting point
b. ATTRIBUTES: Use attributes in Appendix 2 to tell you what to test and manage to achieve that value
c. ATTRIBUTE STATES: Whereabouts in the state do you want the water body to be for each attribute? These become the freshwater objectives
A.
B.
C.
Reconsider values
Reconsider chosen attribute state
Try alternative management options
4. CURRENT STATE
How well does your current water quality provide for your chosen values and attribute states?
5. CREATE SCENARIOS
What options do you have for limits and other management options?
CATCHMENT MANAGEMENT OPTIONS
Discharge limits
Water take limits
Other management options
Time to adjust
6. IMPACTS
Test and evaluate the social, cultural and economic impacts of your options
7. FRESHWATER MANAGEMENT REGIME
Is there agreement that the options are workable? If not, then reconsider values, attribute state and management options
NO
Y/N ?
YES
8. APPLY PLAN AND OTHER AGREED ACTIONS
9. MONITOR AND EVALUATE
Is it working?
ACTION PLAN
Setting freshwater objectives and limits using the NPS-FM 2014

State of the Environment

- NPS-FM (2017)
  - Ecosystem Health:
    - Nitrate-N
    - Ammoniacal Nitrogen
  - Human health for recreation:
    - E.coli

NPS-FM National Objective Framework: attribute state thresholds

Attribute State	Annual Median	Annual 95th percentile	Colour code
★ A	≤ 1.0	≤ 1.5	
B	> 1.0 and ≤ 2.4	> 1.5 and ≤3.5	
C	> 2.4 and ≤ 6.9	> 3.5 and ≤ 9.8	
D	> 6.9	> 9.8	

Nitrate-N mg/L

Nitrate-N

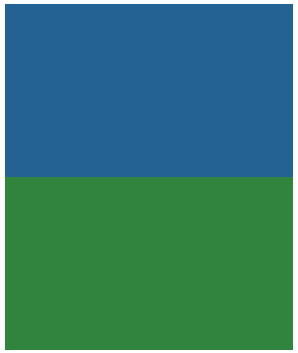
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Dunstan Cr at Beattie Road											
Manuherekia at Blackstone Hill											
Manuherekia at Galloway											
Manuherekia at Ophir											
Thomsons Cr at SH85											
Manuherekia at Larkhill											

NPS-FM National Objective Framework: attribute state thresholds

Attribute State	Annual Median	Annual Maximum	Colour code
A	≤ 0.03	≤ 0.05	
B	> 0.03 and ≤ 0.24	> 0.05 and ≤ 0.40	
C	> 0.24 and ≤ 1.30	> 0.40 and ≤ 2.20	
D	> 1.30	> 2.20	

Ammoniacal-N mg/L, based on pH 8.0 and 20 degrees C

Ammoniacal Nitrogen



Majority of sites classified as NOF band A waters

Thomson’s creek at SH85 classified as NOF B

- Interpret cautiously as many results are below analytical limit of detection.

NPS-FM National Objective Framework: attribute state thresholds

	Exceedances (%)		Concentration (cfu/100ml)			
Attribute State	No samples > 540 cfu/100ml	No samples >260 cfu/100ml	Median	95th Percentile	**Colour code**	**Infection risk (%)**
A	< 5%	<20%	≤ 130	≤ 540		1
B	5-10%	20-30%	≤ 130	≤ 1000		2
C	10-20%	20-34%	≤ 130	≤ 1200		3
D	20-30%	>34%	> 130	> 1200		>3
E	>30%	>50%	> 260	> 1200		>7

***E. coli* concentration, No of samples (cfu/100ml)**

E. coli concentration

	2009/13	2010/14	2011/15	2012/16	2013/17	2014/18	2015/19
Dunstan Cr at Beattie Road							
Manuherekia at Blackstone Hill							
Manuherekia at Galloway							
Manuherekia at Ophir							
Thomsons Cr at SH85							

Summary

- TAG to evaluate the research evidence and endorse:
  - State of the Environment for Manuherekia
  - Research programme for Manuherekia for 2019/2020

Manuherekia TAG – Purpose & functions

- To support the Otago Regional Council with science and technical advice
- To ensure the interpretation of science for policy development is accurate and complete.
- The TAG will:
  - Provide technical advice as required on the Manuherekia NPS FM plan change process to ORC
  - Focus technical expertise on: Freshwater Hydrology and Ecology
  - Assess existing scientific research and whether it is fit for purpose
  - Identify science and research gaps and provide advice on filling the gaps
  - Provide technical advice to the Manuherekia Reference Group (MRG)
  - Operate in partnership with Ngāi Tahu to recognise and respect the principles of the Treaty of Waitangi to develop technical advice using A Ki Uta Ki Tai (mountains to sea) approach to integrated land and water management.

Research programme to be determined by the TAG

- Model (Hydrology): Identify and prioritise additional work needed
- Mainstem: Maintain existing studies as required
- Tributaries: Collect additional water quality and quantity information to address value and objective setting

- MRG to prescribe scenarios for TAG to assess

Why do we need a model?

Given the complexity of the catchment, a model is needed to provide naturalised flows

Why do we need a model?

- We can, and do, measure actual flow (observed) at various points in the catchment
- However, due to water abstraction, these flows are altered from their natural levels
- To assess irrigation availability, a natural flow estimate is needed so the amount of water available can be determined
- The natural flow also provides a stable reference point for comparisons or scenarios

The model selected by TAG will need to:

- Provide natural flow time series and low flow estimates at key points in the catchment
- Provide irrigation reliability estimates to be used in economic analyses
- Run different minimum flow, allocation and potential storage scenarios

Where are we at?

- TAG to deploy investigation into CHES and GOLDSIM
  - CHES and GOLDSIM will be evaluated against a set of prescribed criteria for a water reliability model
- TAG to resolve to identify the most suitable model (CHES or GOLDSIM) to be used to investigate scenarios for the Manuherekia
- ORC to organise a wider stakeholder technical session to discuss model assumptions (for the chosen model) and for Roddy Henderson (CHES) and/or Ian Lloyd (GOLDSIM) to validate the assumptions.

Scenarios: To evaluate the impact of the options, we need:

- A ‘modelled’ view of the naturalised state
- A ‘real world’ view (observed state)
- A clear understanding of shared community values and aspirations
- To evaluate ‘naturalised’ state against a ‘modified’ state (understanding the variation i.e. extremes)
- Run scenarios - testing various flow regimes, including minimum flows and their impact on water allocation, ecosystem and human health.
- Financial impact on farm systems and catchment economics
- High flow, low flow storage