River Recharge with Ground Water

Overview

21 February 2019



The search for water

- 2001 Ōtaki River pipeline declined
- 2003 Water Matters Strategy Inc water metering 2008 and Peak demand target 490 l/p/p/d
- 2005 Supplementary groundwater added (hard water)
- Increasing growth pressures and high water use
- 2009 Council committed to well-resourced project to deliver 50-year solution

February 2003: "Water Matters" Sustainable Water Management Strategy adopted

September 2003: Report on Stage 1 investigations for water

January 2004: Report on Stage

2 investigations for water storage

January 2004: Preliminary

geotechnical appraisal of dam

submitted for resource consents

for water takes from Waikanae

Consents granted for water takes

from Walkanae River and Borefield

River and Borefield

December 2004:

storage ponds

September 2003: Drilling of Waikanae Bores commenced

2010 GWRC confirm no ability to assist with additional supply

1991: Water conservation program introduced, including a plan to reduce peak demand to 650 Uperson/day by 2011

1990/1991: Review of future

water supply options for

Paraparaumu/Waikanae

March 1994: Wellington Regional Council report "Hydrology of the Kapiti Coast" April 1995: Report on review of potential dam sites

September 1995: Report on feasibility of Waikanae WTP Dam

March 1996: Report on feasibility of the Otaki Pipeline

August 1996: 10 year consent issued for water take from Waikanae River, with residual river flow requirement of 750 Us effective from January 2003 March 1997: Council approved adoption of the Otaki Pipeline project as the preferred option

September 1997: Report on alternative options. Otaki Pipeline reconfirmed as preferred option

June 1998: Proposal from Montgomery Watson for dam on Kapakapanui Stream

August 1998: Council agreed to review Kapakapanui Dam proposal May 1999: Council agreed to progress to next stage of review for Kapakapanui Dam option

March 2000: Report on feasibility of Kapakapanui Dam option

April 2000: Comparative assessment of Otaki Pipeline and Kapakapanui Dam options. Council agreed to proceed with Otaki Pipeline

November 2000: Report on river recharge options

December 2000: Application for consents for Otaki Pipeline project submitted GWRC on pipeline to Kapiti from Wellington's bulk water system May 2001: Parliamentary

May 2001: Information from

May 2001: Parliamentary
Commissioner for the
Environment report "Whose
Water Is It?"

July 2001: Hearing before commissioners for consents for Otaki Pipeline project

September 2001: Application for consents for Otaki Pipeline project declined. KCDC agreed not to appeal decision. supplementary supply, with dam left as a long-term option

February 2002: Water Working Party set up

August 2002: New compliance date for Waikanae River Consent of early 2006

November 2002: Updated information from GWRC on Wellington Regional Pipeline option July 2006: Council adopted Assessment of Water and Sanitary Services

July 2004: Final Technical Report on Waikanae Borefield September 2005: Commissioning of Waikanae bores and pipeline completed

> October 2005: Property Purchase Sub-Committee decided not to progress with arrangements for purchase of Lower Maungakotukutuku Dam Site

December 2008: Report on water storages supply options study June 2009: 2009/19 LTCCP adopted by KCDC

October 2009: Members of Technical Advisory Group selected

2010

1990 1992 1994 1996 1998 2000 2002 2004 2006 2008

The water supply solution

- 2010 River Recharge with Groundwater confirmed as preferred option
 - Staged flexible programme
 - Iwi Support (Water Working Group)
 - Purchase land for Dam
 - Demand risk still an issue

Staged approach to water supply solution Council is taking a holistic approach to providing a sensible long-term solution to water supply on the Coast. There is not one

simple answer, but a number of interconnected actions that can be staged over time to spread the cost impact on residents. Green Gardener/ Water Waikanae River plumber, Conservation **Eco Design** Recharge incentives Adviser Groundwater from bores Interest free loans up to \$5000 used to trecharge for water saving systems. Pay Wakmae River in times of Three tree Council services principal back via your rates over drought, so only treated helping with small leaks and river water is supplied to water conservation advice-Walkanas, Paraparaumu and Raumati residents, Staged development providing a 50-year solution. Uses existing borefield. Dam Water Council buying land behind Rules Meters the Nikau Valley for a future Development rules require all new dam. Dam cannot be staged, dwellings to have rainwater tanks of estimated to bring so costs are up front at the disersion systems. neak water demand down by 25%-Water Treatment **Plant Upgrade** Pipe ı eak Upgrading of 35 year-old Maintenance Waikanae Water Detection Treatment Plant to Ripe maintenance and replace aged infrastructure Active leak detection upgrade programme and increase capacity to programme using zone to repair and replace meet rising demand. meters and ultrasonic pipe aging inhastructure. monitoring.

River recharge timeline

2010-13 Consenting – Approved Sept 2013

2013-15 Construction – Opened May 2015

2014-17 Baseline monitoring – Top compliance

2015-18 River Recharge used - Two summers

2017 Baseline completion confirmed by GWRC

• 2018 Transition to Ongoing plans



Consenting Investigations

- Extensive investigations to inform and support consenting process
- Demand modelling
- Surface water yield modelling
- Aquifer testing and groundwater modelling
- Aquatic ecology
- Wetland ecology
- Cultural impact assessment







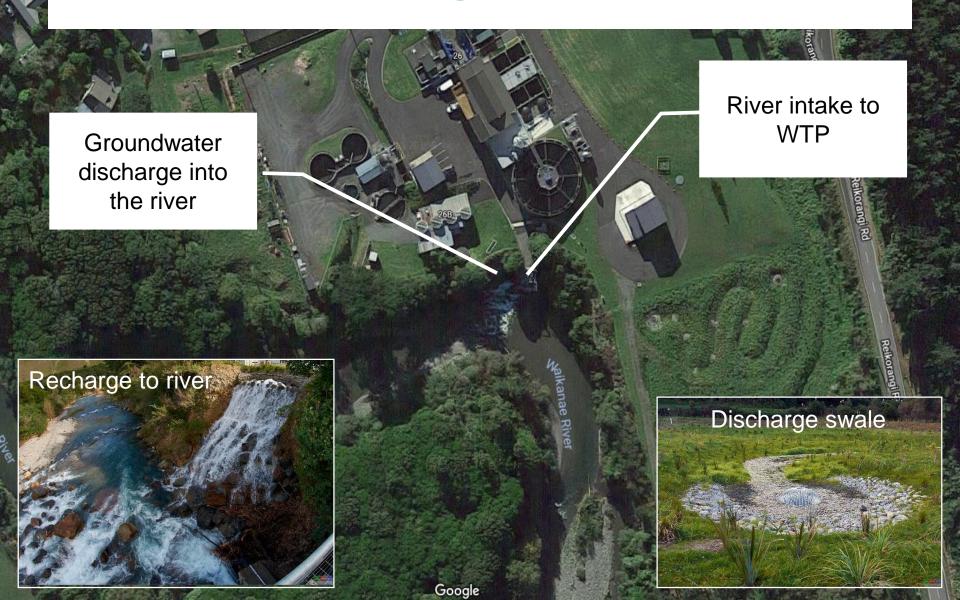


Consent Approval

- November 2012: AEE lodged
 - 23 submissions
- June 2013: Hearing before independent commissioners
- September 2013: 35 year consent granted
 - Innovation
 - Ground water discharge to river so more river water could go to supply
 - No NZ precedent
 - Extensive monitoring regime
 - 3 year baseline monitoring
 - Adaptive Management
 - 20% restriction on river recharge during baseline
- 78 pages of conditions
- 139 individual consent conditions

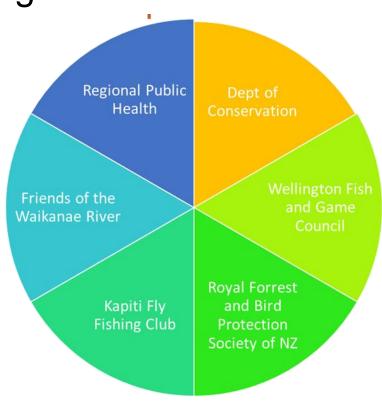


River recharge in operation



Baseline monitoring

- 3 Years of baseline monitoring of
 - Waikanae River
 - 7 Small Coastal Streams
 - 13 Wetlands
 - 32 Borefield sites
- Adaptive management
 - Annual review process
 - Iwi & Regional Council
 - 6 stakeholder groups



Key Stakeholders



136 Automated data parameters

7 Small Coastal Stream site

- Each with in stream DO, Temperature, and water level. Plus piezometer ground water level.
- 13 Wetland sites
 - Each with a piezometer ground water level. Some sites have more than one piezometer.

Borefield sites

- 13 Electrical conductivity sensors
- 32 Piezometer ground water level sensors across deep and shallow aquifer

River and WTP sites

- Water level in river
- 2 Raingauges
- 8 Production bores data collection including instantaneous pump rates and daily abstraction rates
- 3 flow meters through the WTP



1400+ Manual data parameters

- 320 Production Bore Water quality sample parameters (monthly)
- 520 Wetland condition monitoring parameters across 13 sites, plus aerial photos + photo points
- 180 at 5 River Condition monitoring parameters across 5 locations (every 2 weeks or more in summer)
- 378 Small Coastal Stream parameters across 7 sites (monthly)
- 6 parameters across 2 River flow gauging sites
- 7 Small Stream Fish Surveys
- 5 Waikanae River Fish Surveys
- 2 Upstream Tributary Fish Surveys
- Additional Borefield water depth and EC measurements as needed.
- Additional monitoring as and when needed should trigger levels activate.



Waikanae River

- Water level in river.
- Two Rain gauges.
- Intake and discharge data.
- Blended bore water sampling..
- Manual river monitoring.
 - 9 water chemistry parameters
 - Water temperature
 - Periphyton (algae)
 - macroinvertebrates
- Waikanae River Fish Surveys four times a year.
- Two Manual River flow gauging sites
- Two Upstream Tributary Fish Surveys.

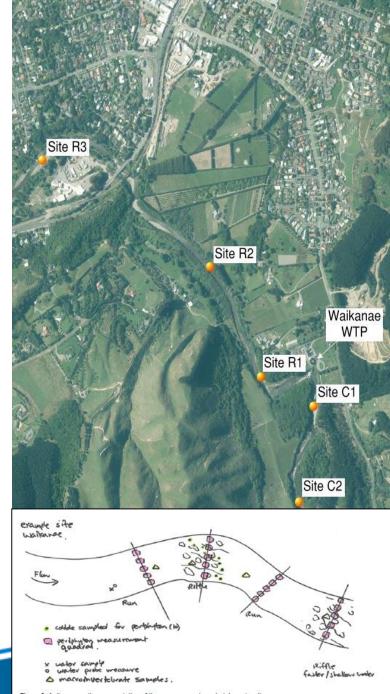


Figure 2. A diagrammatic representation of the measurements undertaken at a site.

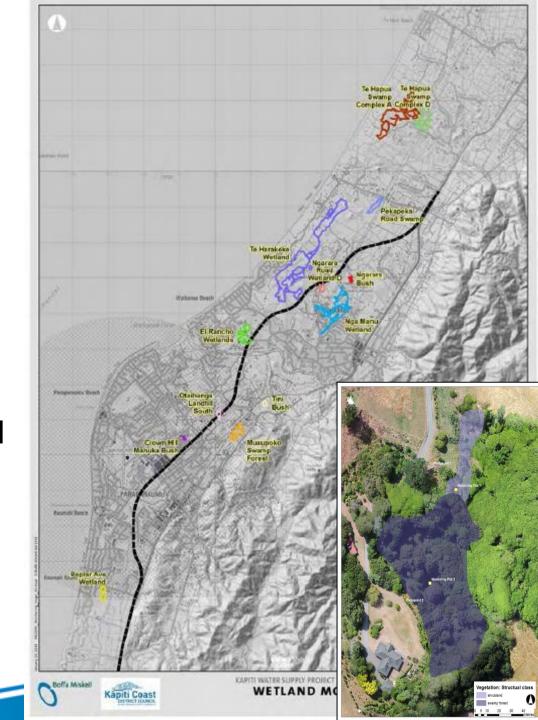
Small Coastal Streams

- 7 SCS Baseline Sites
- In stream DO
- Temperature
- Water level.
- GW Piezometer level
- Manual data monthly (summer)
- Fish surveys
- Bug surveys
- Cross Sections



Wetlands

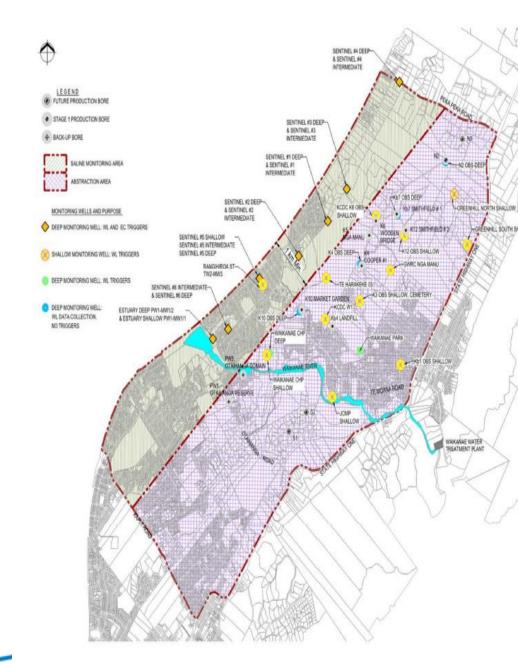
- 13 Wetland Baseline Sites
- Ground water level.
 - Automated piezometer
 - Some sites had up to 3 piezos
- Annual manual wetland condition monitoring
- Aerial photos
- Photo points



Borefield

32 Borefield Sites

- Ground water level.
 - Automated piezometer
 - Deep and shallow aquifer.
- 13 Electrical conductivity sensors.
 - Additional Borefield water depth and EC measurements as needed.
 - Manual Borefield water depth and EC measurements for calibration.
 - Additional monitoring as and when needed should trigger levels activate.
- 8 Production bores
 - pump rates
 - daily abstraction rates.
 - Monthly Bore Water quality samples

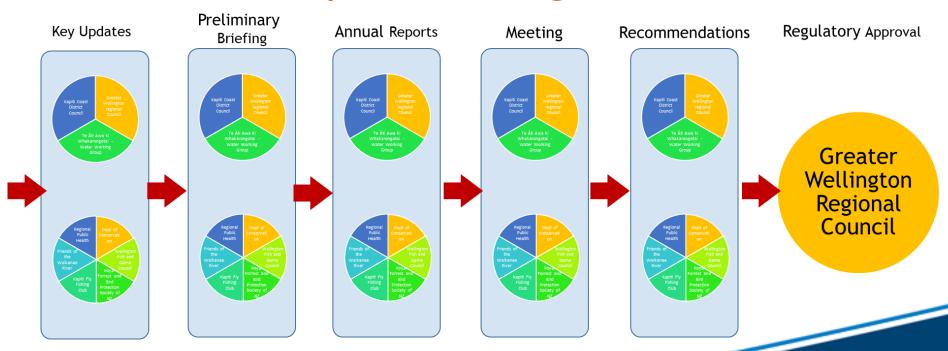


Borefield water level



Adaptive Management

Annual Adaptive Management Process





Completion of 3 year of BLM

- Annual adaptive management stakeholder participation and support
- 4 Star green rating
 - Every year of baseline monitoring
 - Top GWRC compliance ratings
- 30+ compliance reports submitted to GWRC
- Nov 2017 GWRC confirmed
 - Completion of baseline monitoring requirements
 - Removal of the 20% restriction on river recharge.



Key Outcomes

- Provides 50 year supply solution
- 35 year resource consent
- Can be staged as demand increases
- Highest GWRC consent compliance rating
- Enhanced understanding of Waikanae River, wetlands, small coastal streams and borefield
- Maintains minimum flows in the Waikanae River
- Significant Iwi and stakeholder engagement
- Successful adaptive management
- Sustainable use of exiting resources

