River Recharge with Groundwater - Adaptive Management in Practice

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RRwGW – Adaptive Management in Practice

Background

September 2013: 35 year consent granted (78 pages of conditions)

Innovation

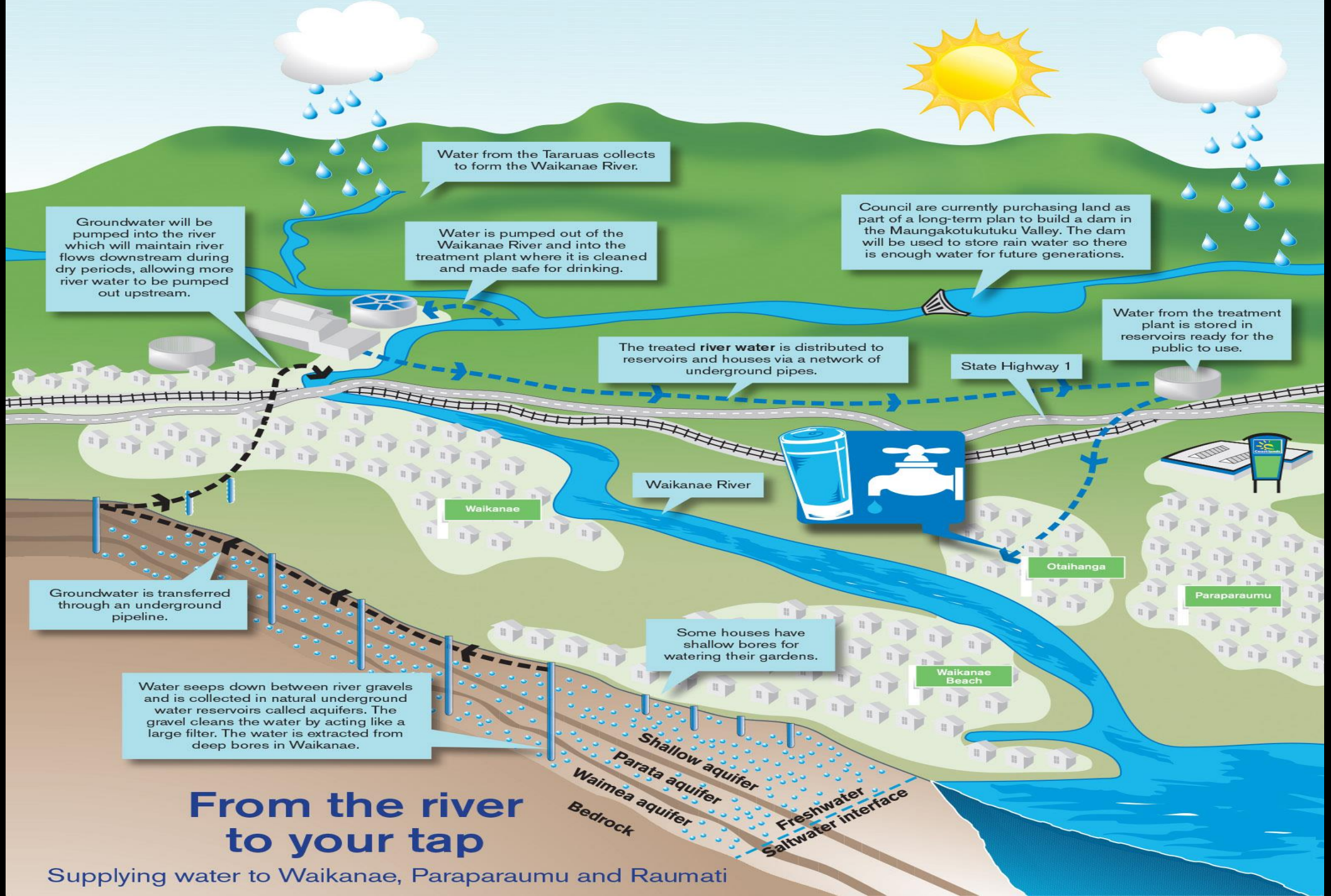
- Ground water discharge to river so more river water for supply.
- No NZ precedent.
- Tests and trails conducted during consenting.

Monitoring

- Conservative three year baseline monitoring.
- Extensive monitoring regime.

Adaptive Management

- On-going compliance review .
- Adaption of monitoring and operation.


Water from the Tararuas collects to form the Waikanae River.
Groundwater will be pumped into the river which will maintain river flows downstream during dry periods, allowing more river water to be pumped out upstream.
Water is pumped out of the Waikanae River and into the treatment plant where it is cleaned and made safe for drinking.
Council are currently purchasing land as part of a long-term plan to build a dam in the Maungakotukutuku Valley. The dam will be used to store rain water so there is enough water for future generations.
Water from the treatment plant is stored in reservoirs ready for the public to use.
The treated river water is distributed to reservoirs and houses via a network of underground pipes.
State Highway 1
Waikanae River
Waikanae
Otaihanga
Paraparaumu
Waikanae Beach
Groundwater is transferred through an underground pipeline.
Some houses have shallow bores for watering their gardens.
Water seeps down between river gravels and is collected in natural underground water reservoirs called aquifers. The gravel cleans the water by acting like a large filter. The water is extracted from deep bores in Waikanae.
Shallow aquifer
Parata aquifer
Waimea aquifer
Bedrock
Freshwater
Saltwater interface
From the river to your tap
Supplying water to Waikanae, Paraparaumu and Raumati

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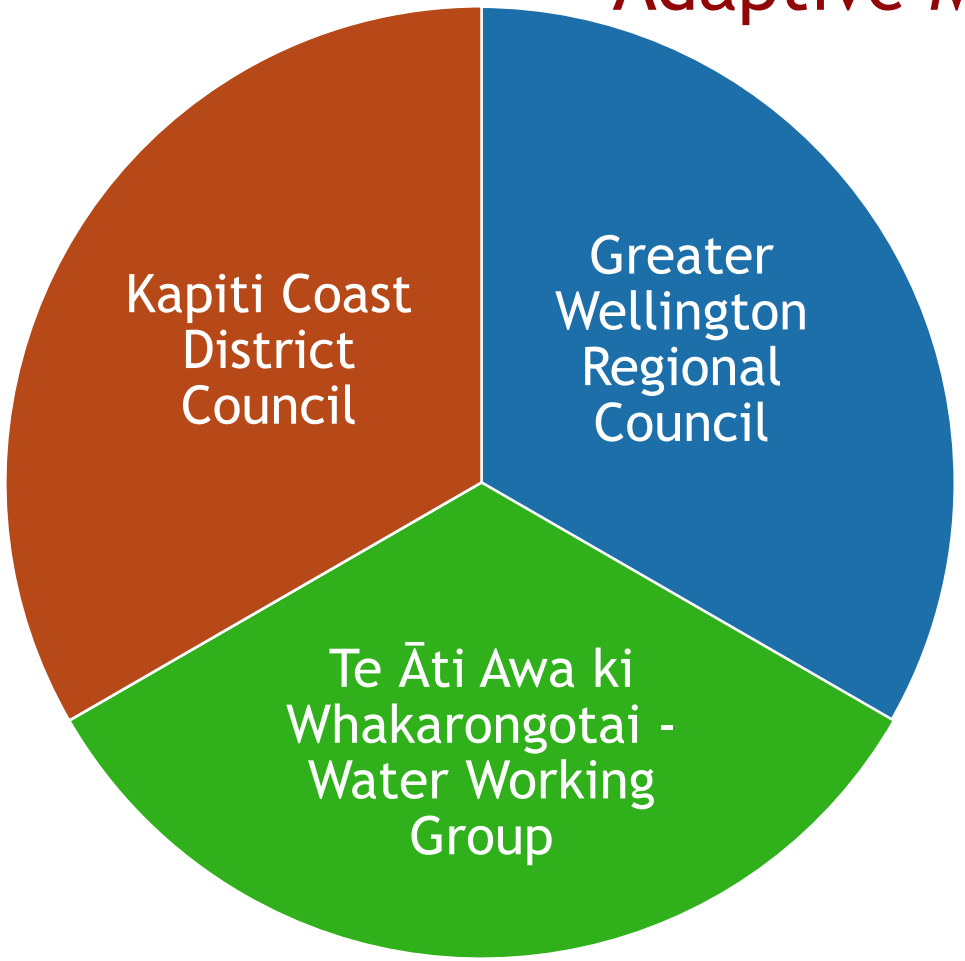
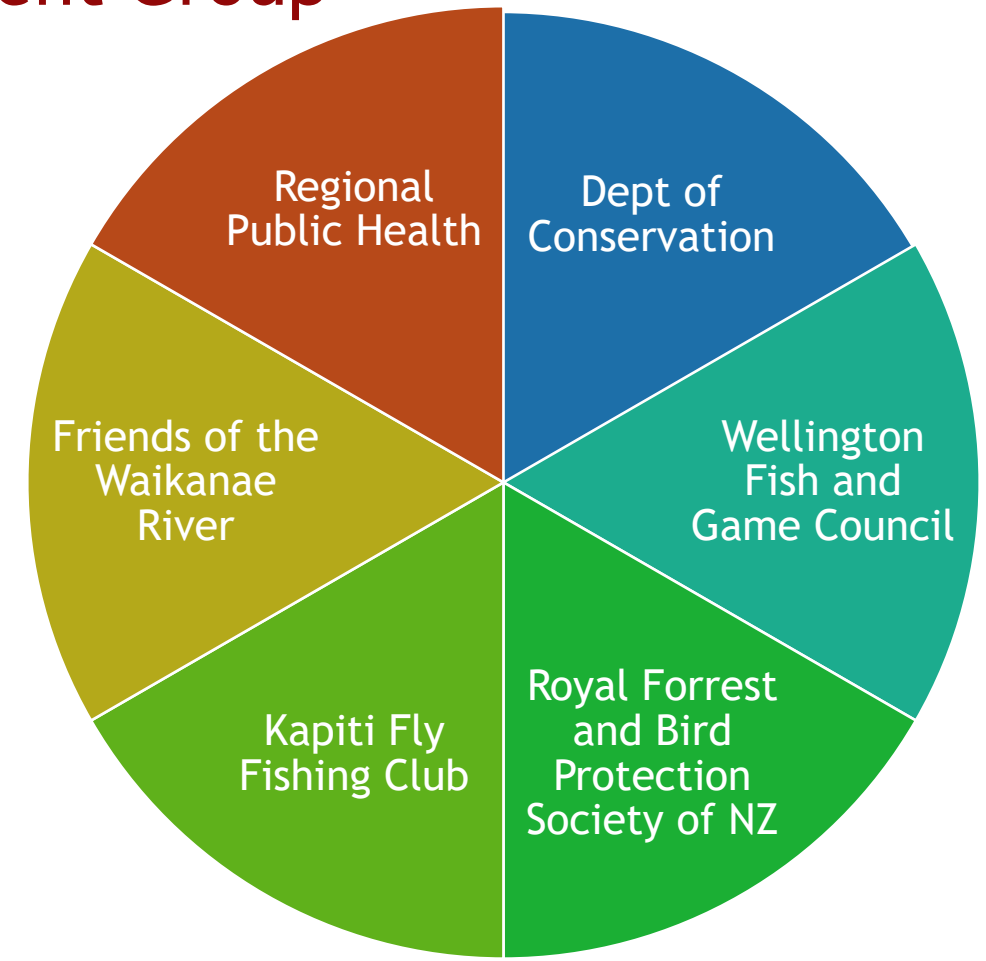
Adaptive Management Group

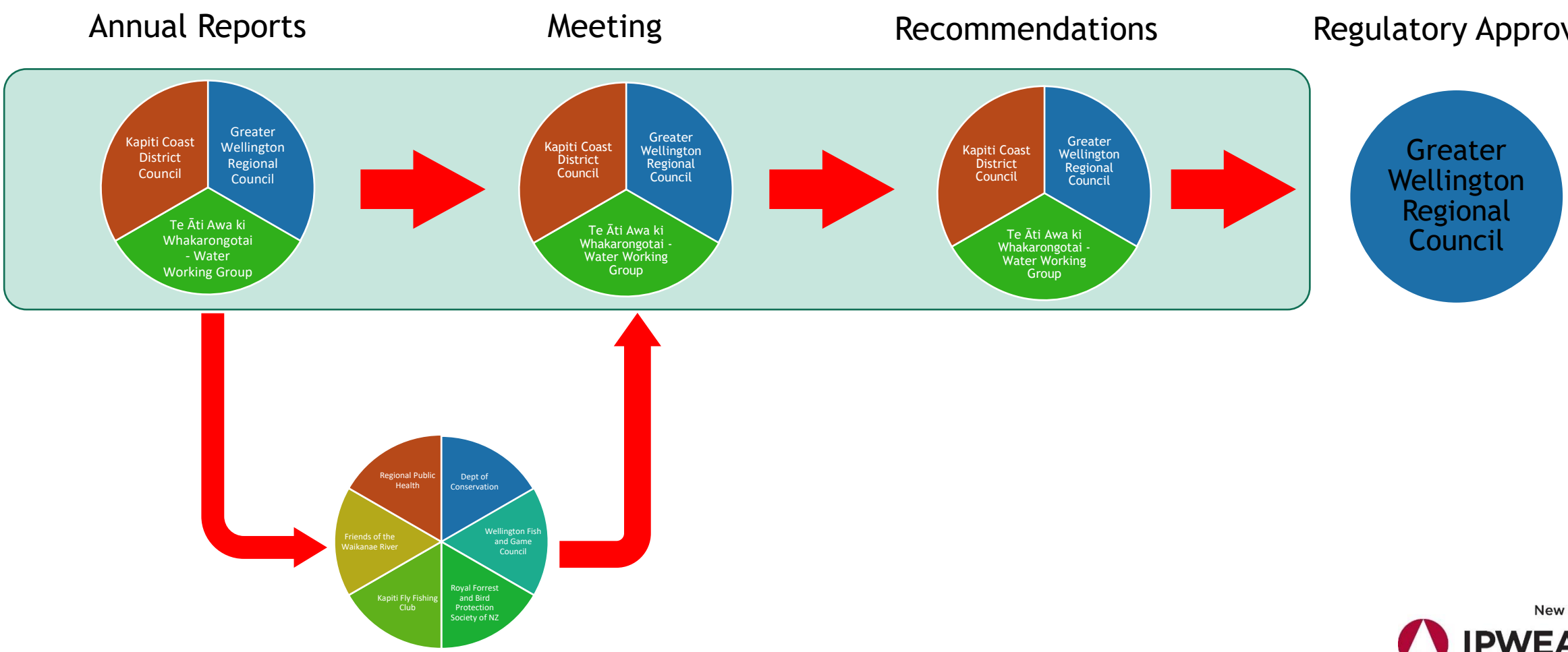


Members

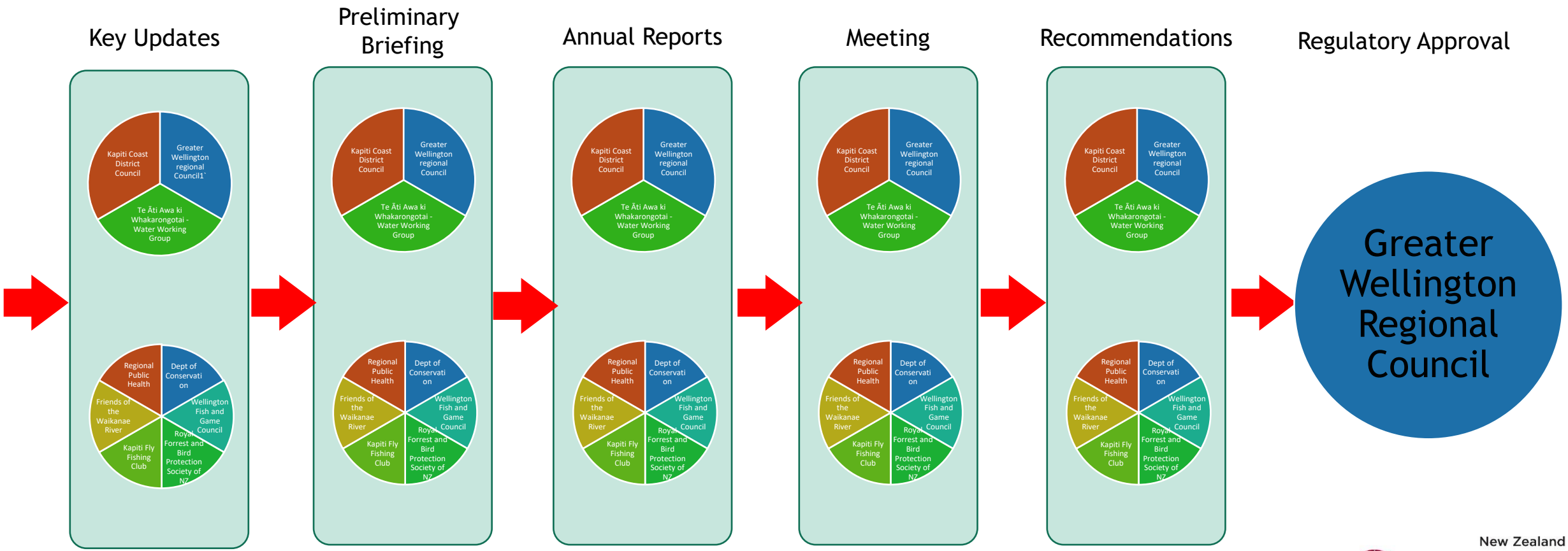


Key Stakeholders

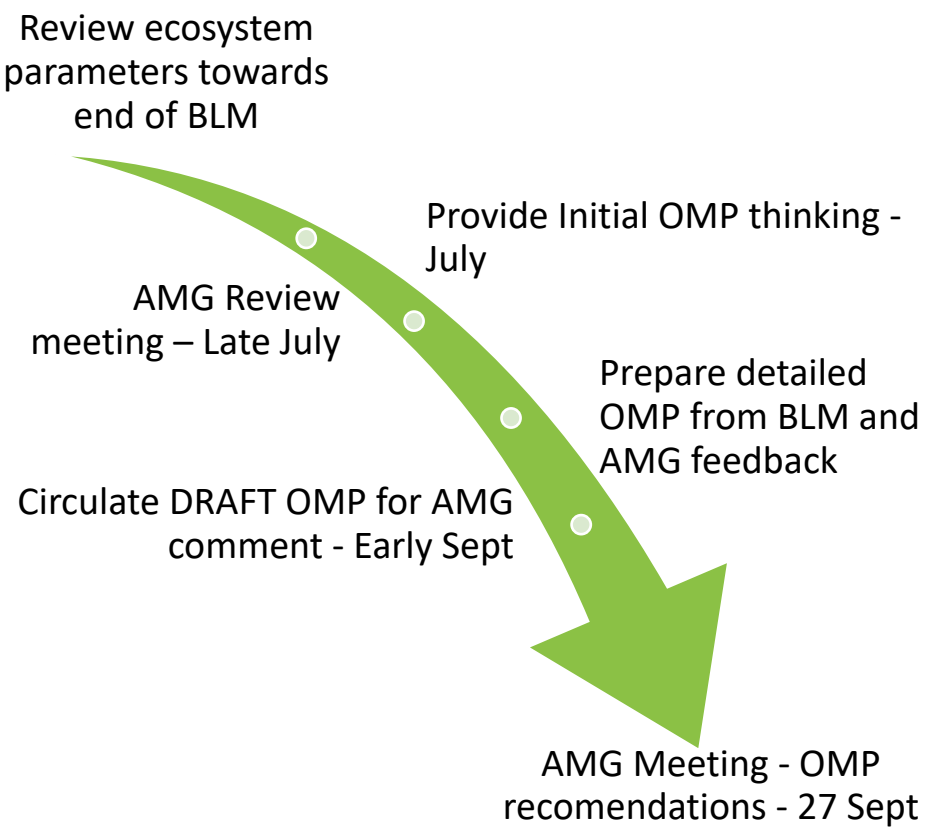
Formal Adaptive Management Process

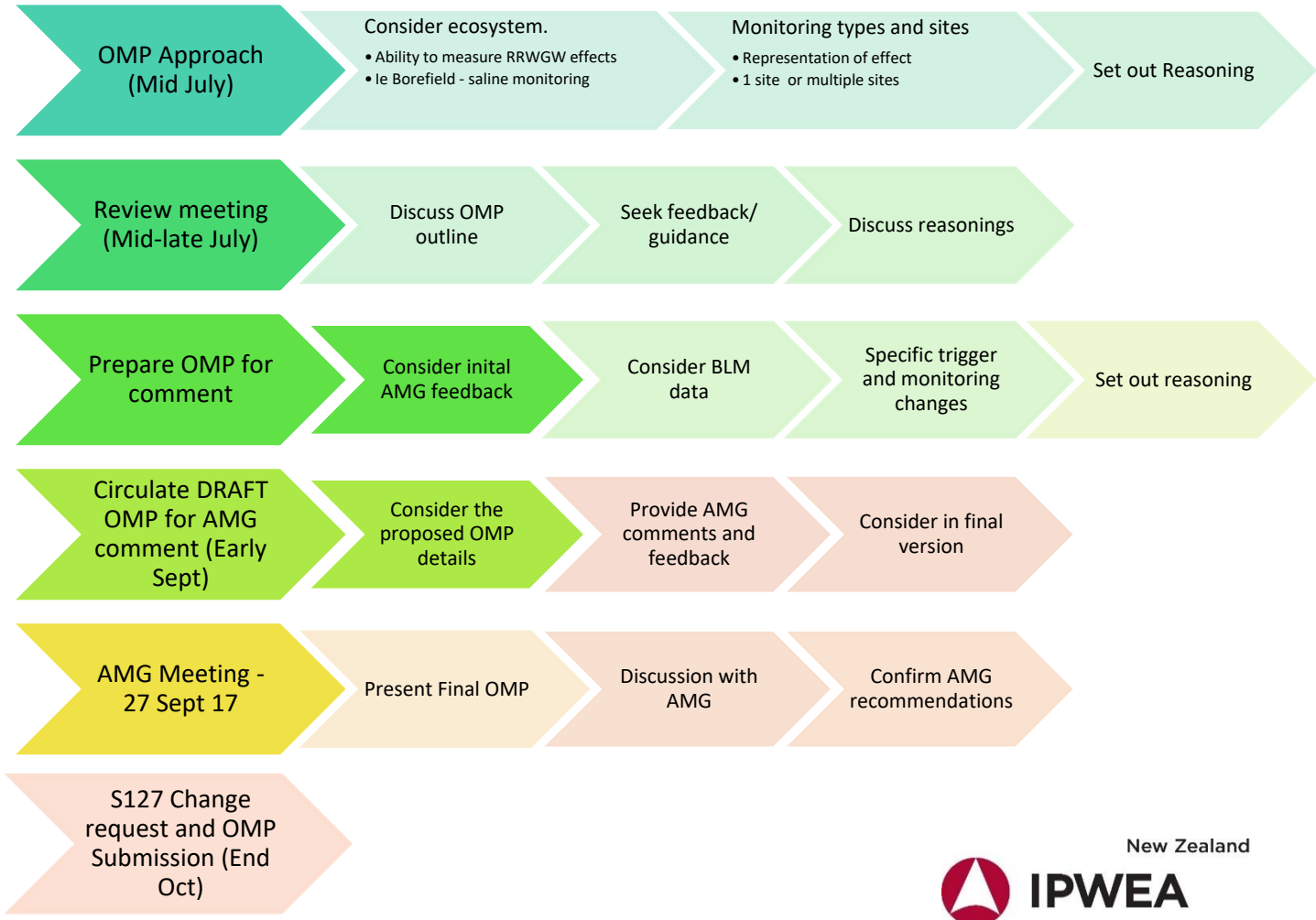


Adaptive Management Application



From Baseline Monitoring to Ongoing Mitigation





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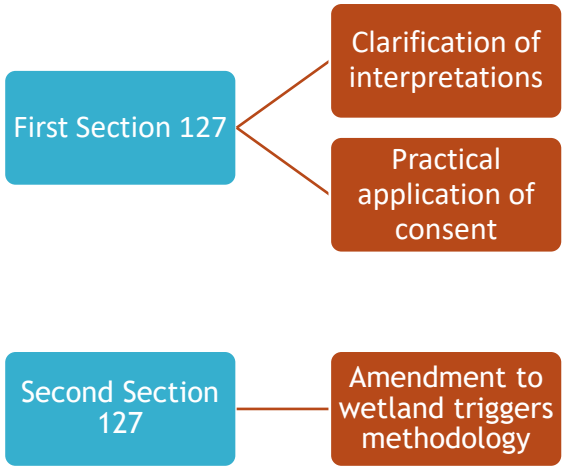
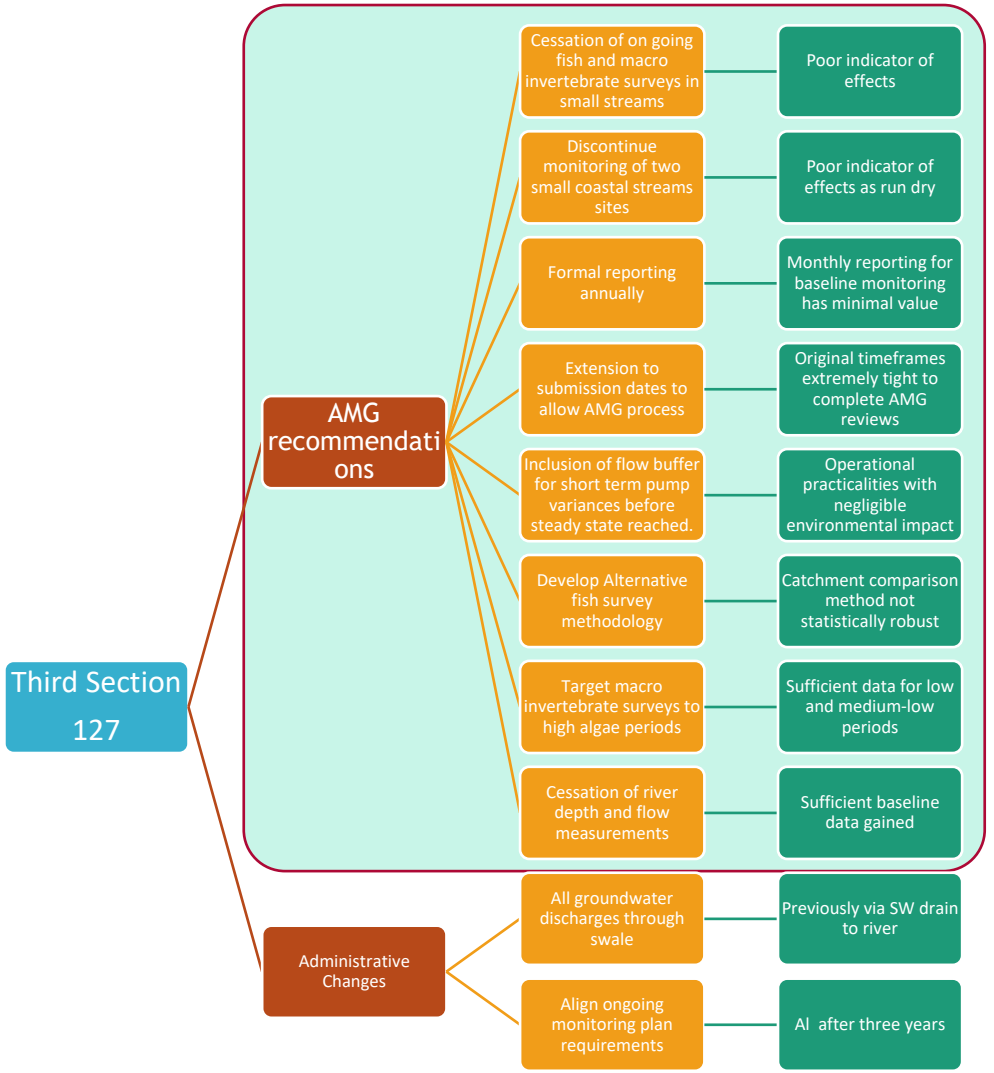
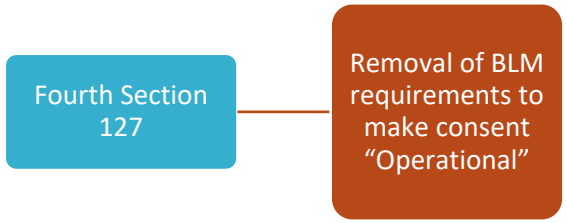
Adaptive management driven consent changes





Changes to Come



BLM to OMP

- Completion of BLM.
- 30 Reports.
- Removal of the 20% restriction on river recharge.
- Reassess triggers, monitoring sites and parameter for ongoing monitoring and mitigation.

Small Coastal Stream

7 Baseline Sites

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

2 Ongoing Sites

- Water level
- GW Piezometer level
- Manual data (triggers only)

Wetlands

13 Baseline Sites

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

1 Triggered Site

- Ground water level.
  - Automated piezometer
- Automated piezometer ground water level at 6 locations.
- Manual wetland condition monitoring if triggered or 3yrly
- Aerial photos 3 yrly

Borefield

32 Baseline 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

Ongoing

30 Sites

- Ground water level.
  - Automated piezometer
  - Deep and shallow aquifer. 12 Electrical conductivity sensors.
- Manual Borefield water depth and EC measurements for calibration.
- Additional monitoring as and when needed should trigger levels activate.
- Eight Production bores data collection including instantaneous pump rates and daily abstraction rates.
- Twice a year Bore Water quality sample parameters

River and WTP Site

Baseline

- Water level in river.
- Two Rain gauges.
- Intake and discharge data collection including instantaneous pump rates and daily rates.
- Blended bore water sampling. After one day and two days and when combination of bores changes.
- Five manual river monitoring locations.
  - River Condition monitoring parameters across 5 locations if triggers hit (was every 2 weeks or more in summer).
- Waikanae River Fish Surveys four times a year.
- Two Manual River flow gauging sites
- Two Upstream Tributary Fish Surveys.

Ongoing

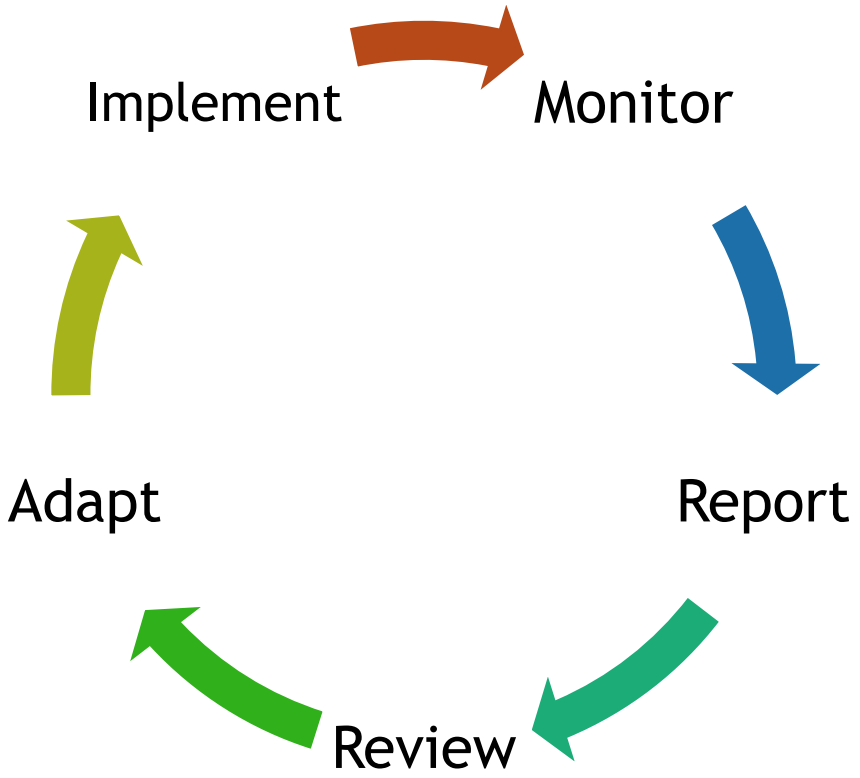
- Water level in river.
- One Rain gauge.
- Eight production bores data collection including instantaneous pump rates and daily abstraction rates.
- River Condition monitoring parameters across five locations (Should discharge exceed 225 l/s over 48hrs).
- Additional monitoring as and when needed should trigger levels activate. Unlikely in next 5-10 years based on current demand .
- River flow gauging at two sites should tiggers be exceeded.
- Further two years of Waikanae River Fish Surveys.

Into The Future

Continue to optimise levels of monitoring to focus on indicators of potential adverse effects

Continuous adaption

Full effects not realised till 50 years out in 50 year drought



Conclusions

A key success of the scheme is a result of the collaboration and practical approach taken by all parties. This will continue to be a key part of the scheme into the future

This approach has resulted in an efficient and effective monitoring regime for ongoing monitoring/mitigation

The completion of baseline monitoring allows Council to monitor locations and parameters that may indicate potential effects going forward with confidence.


Questions