

Genesis Energy

5 September 2016
Genesis Energy Limited



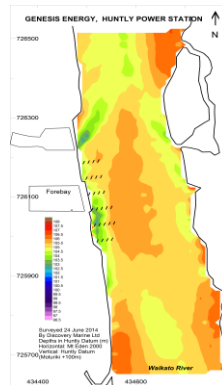
we're in it for you

Introduction

- 1. Genesis Energy's assets include Huntly Power Station ('HPS') located in the lower catchment of the Waikato River and Tongariro Power Station near Lake Taupo (upper catchment).**
- 2. Each have been through robust consenting processes ultimately having consents granted subject to a wide range of restrictions, limits, requirements to avoid, remedy and mitigate effects, and comprehensive monitoring obligations.**
- 3. Consents granted with the support of comprehensive scientific analysis, extensive stakeholder engagement and many years worth of environmental monitoring data.**

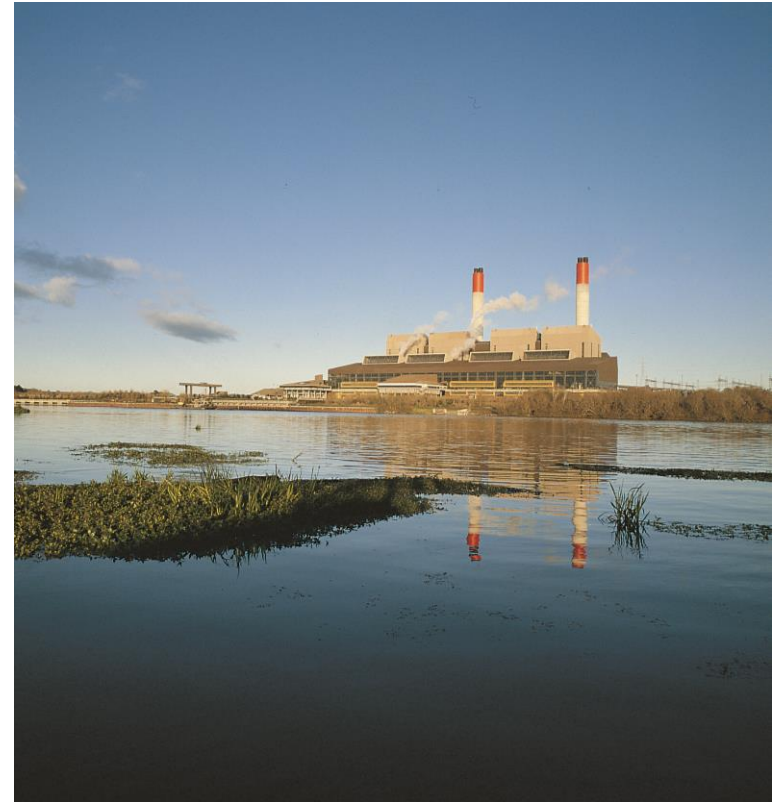
Huntly Power Station

- The HPS is significant for security of supply when weather dependent renewable generation is not available.
- It is located close to major load centres (Auckland and Hamilton).
- The gas-fired plant is run first due its high efficiency, with any additional demand met by the coal/gas-fired units.



HPS Interactions with the River

- Water for cooling and process water.
- Minor water treatment process water discharges are required intermittently (including ammonia and phosphate), and vary depending on operations.
- Water is taken and discharged to the Waikato River in strict adherence with resource consent conditions, supported by robust monitoring and management plans and processes.
- Resource consents expire in 2037 (re-consenting in 2011/2012).
- 8 Operational WRC Resource Consents
- 200+ Resource Consent Conditions
- 11 Management and Monitoring Plans
- Stringent Monitoring and Annual Reporting Requirements



HPS Monitoring Snapshot

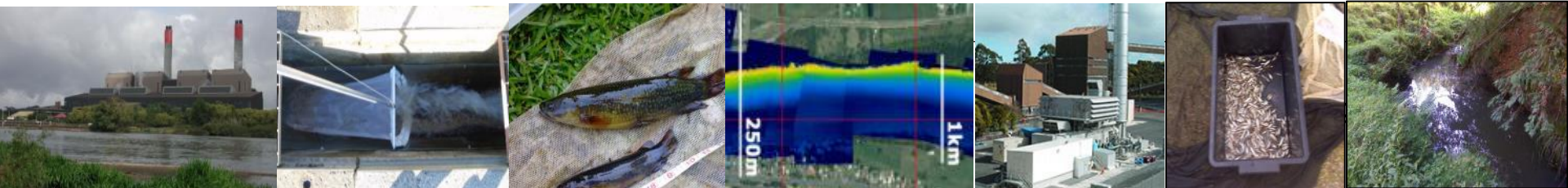
- Continuous temperature monitoring (multiple locations and multiple probes at each location)
- Continuous river flow and level monitoring
- Bathymetry Surveys
- Comprehensive Ecological Monitoring programmes, including for Lake Waahi

- 13,000+ water tests undertaken annually
- Sampling of discharges
- Trend analysis and environmental assessment process water discharges
- Groundwater sampling and testing

- Physical fish protection mechanisms (rotating drum screen, fish return system, log boom, fishway etc.)
- Annual Waikato Catchment Inanga surveys
- Waikato River Fishery Surveys (conducted since 1980s)

- Air emissions monitoring and testing
- Continuous ambient air monitoring (4 locations)
- Vegetation and Lichen Survey

- Thermal Imaging
- River temperature and discharge hydraulic modelling
- Diver inspections for river infrastructure



Examples of Consent Conditions

Best Practicable Option

The Consent Holder shall engage an appropriately qualified and experienced professional to evaluate and report on new developments in technology as applicable to the operations directly associated with the exercise of this consent, with respect to improving the process, and minimising environmental effects. The reports shall include the following:

- a) comparison of the new developments in technology available compared to that installed at the site.*
- b) Any improvements that could be expected by adopting that technology.*
- c) The feasibility, including financial implications of adopting that technology.*

The Consent Authority may, after allowing 28 days for consultation with the Consent Holder to identify whether the purposes in subclauses a), b) and c) of this condition would be more appropriately addressed through alternative means, serve notice of its intention to review the conditions of this consent as follows:

Within 3 months of receiving the report, in order to require the Consent Holder to adopt the best practicable option to remove or reduce any adverse effect on the environment in accordance with section 128(1)(a)(ii) of the Resource Management Act 1991. In assessing the best practicable option, regard shall be had to the report compiled under condition X (above).

Process Improvements

From 01 January 2013, backwash wastewaters from water treatment plant filters and the Unit 5 cooling tower raw water filters shall be reticulated to the stormwater holding pond for treatment via the flocculation plant prior to discharge to the cooling water outfall

And many more.....

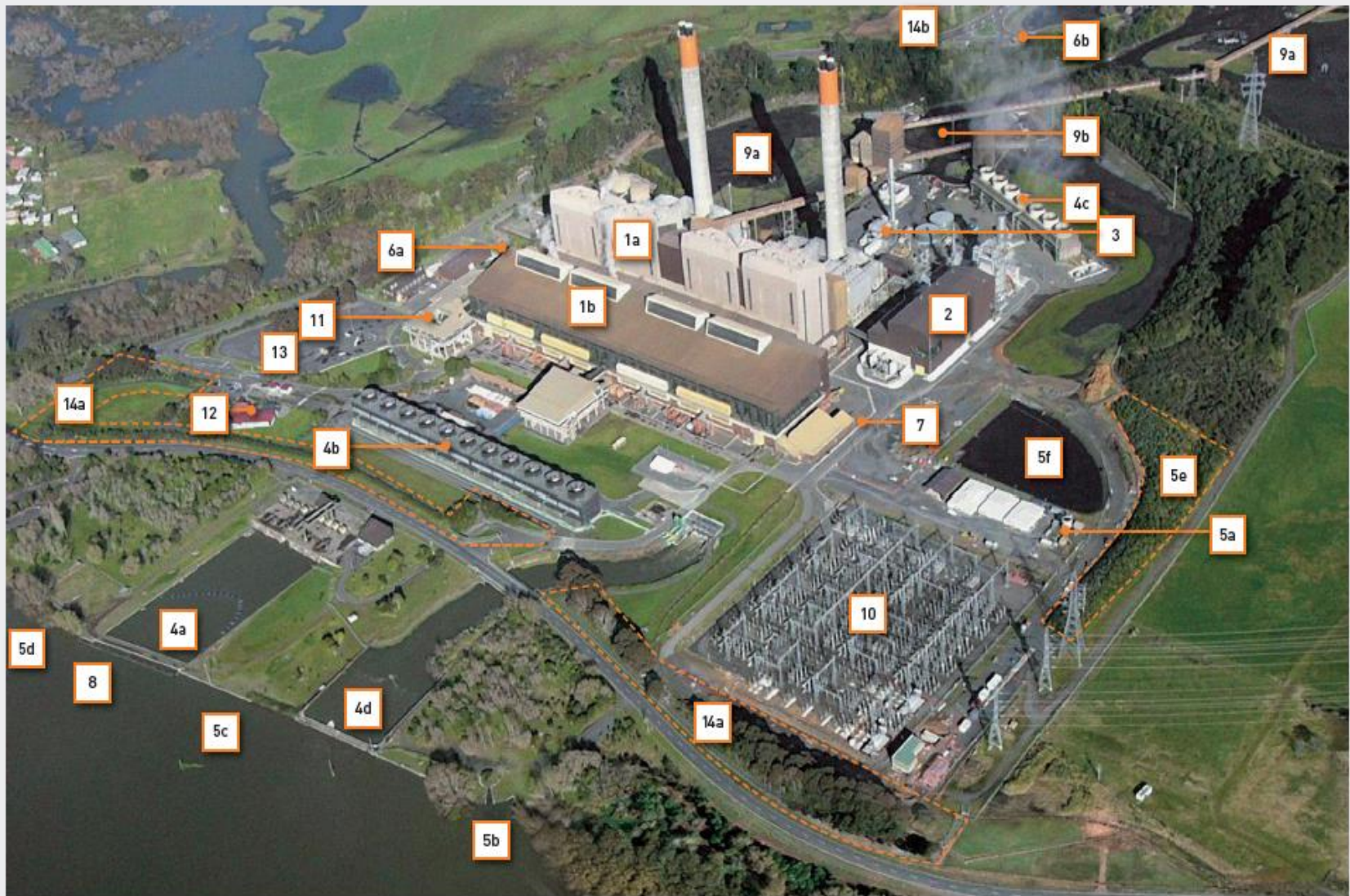


Fig. 02: Key components of the Huntly Power Station

- | | | | | |
|----------------------------|-------------------------------------|------------------------------|------------------------------------|-----------------------------|
| 1a. Units 1-4 Boiler House | 4c. Unit 5 Cooling Tower | 5d. South Stormwater Outfall | 7. Ash Treatment and Disposal Line | 11. Administration Building |
| 1b. Units 1-4 Turbine Hall | 4d. Cooling Water Outfall | 5e. Unit 5 Bund | 8. In-River Iowa Vanes | 12. Seminar Building |
| 2. Unit 5 | 5a. Stormwater Treatment Facilities | 5f. Flocculation Pond | 9a. Coal Stockpiles | 13. Staff Carpark |
| 3. Unit 6 | 5b. North Stormwater Outfall | 6a. Water Treatment Plant | 9b. Coal Handling Area | 14a. Screen Planting |
| 4a. Cooling Water Intake | 5c. Central Stormwater Outfall | 6b. Truck Wash | 10. Transpower Switchyard | 14b. Clean Fill Site |
| 4b. Helper Cooling Tower | | | | |

Enhancement Projects

- Between 1995 and 2014 over 244,500 m² of riparian margins has been enhanced by Genesis Energy through weed control, native planting works and stock exclusion.
- Areas planted include Hakarimata Streams, Whauwhautahi (Port Waikato), Waahi Stream, Marahuru Stream and Taipouri Island.

Current consent condition

The consent holder shall undertake riparian planting works in each consecutive three year period that this consent is operative, commencing from 30 June 2014, such that in each three year period: A total of 3 kilometres of existing river, stream or lake margin is enhanced through planting, fencing to exclude stock if required, and maintenance. Note: Enhancement of river or stream margin is to include both banks. If only one bank is to be enhanced, then the length of margin to be enhanced shall be 6 kilometres.....



Current Projects

Northwest Channel (Taipouri Island)

The project will restore the area from the stop bank into the wet channel by undertaking weed control, and planting of 6,000 new native plants. A seven wire fence has been constructed along the entire one kilometre length of the project

Hopuhopu Enhancement Project – Waikato RiverCare

The Hopuhopu Enhancement Project is to restore a 1 km length of Waikato River bank located on Waikato Tainui land on Old Taupiri Road at Hopuhopu.

The Eel Enhancement Project

This project involved GE, Hukanui aa muri, Waahi Whaanui Trust and Waikato-Tainui. The continuation of this project will see an additional 5,100 native plants put into the area, weed control, a new seven wire fence installed to protect the site



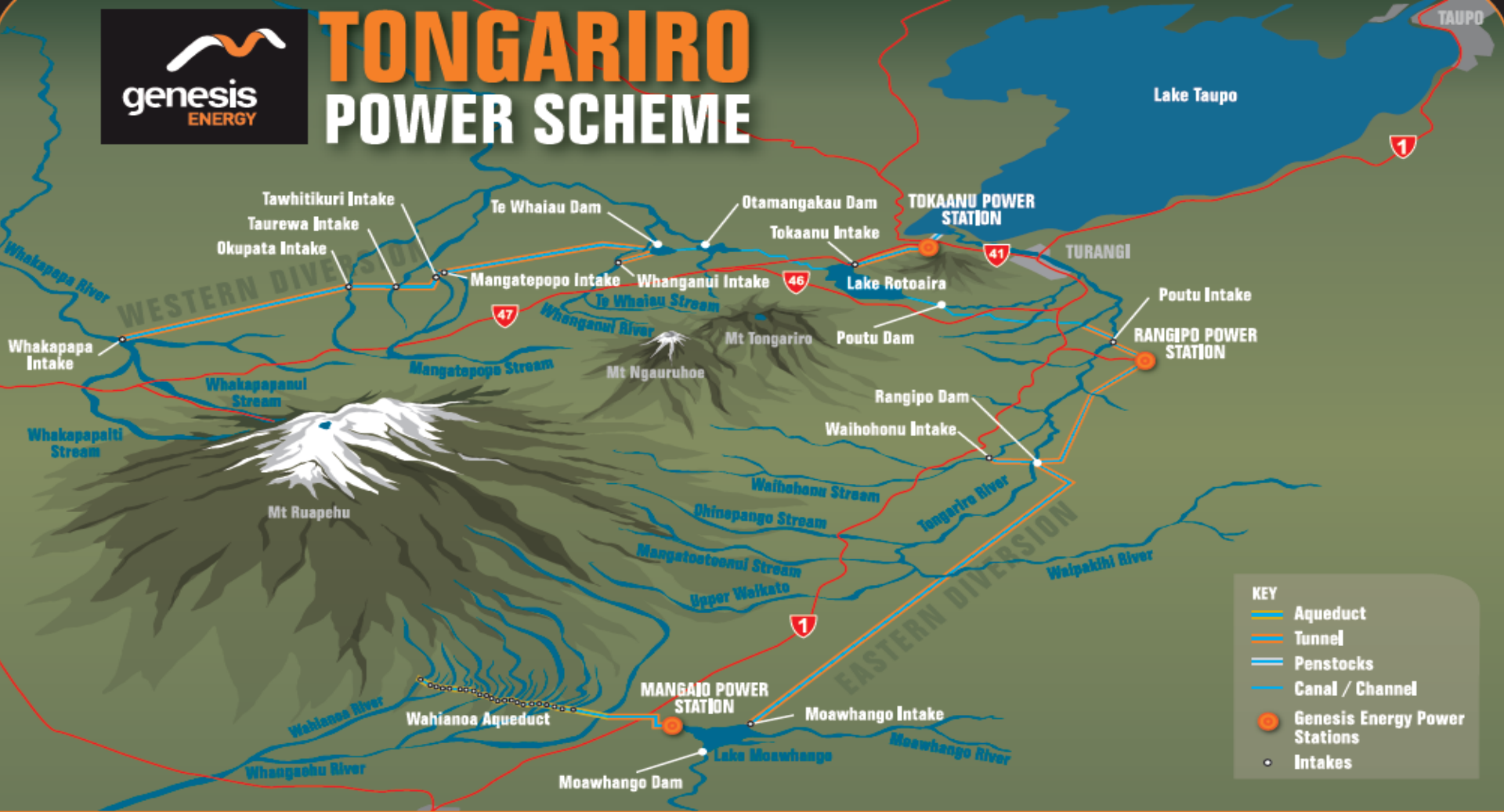
Lake Waahi



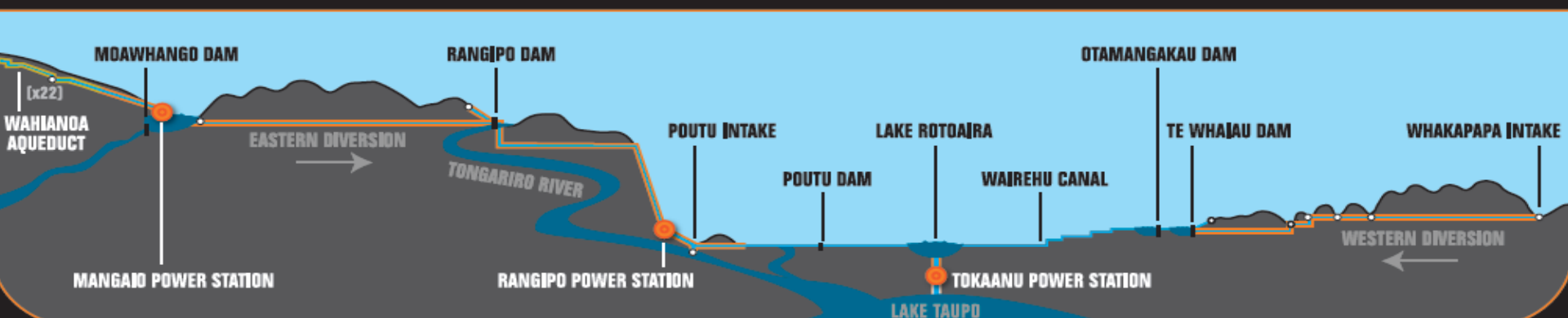
- Collaborative project (GE, Waahi Whaanui Trust & Waikato-Tainui)
- Riparian planting and wetland creation at sites around Lake Waahi
- 103,215 plants planted
- Fishery Monitoring
- Planting now completed and moving into the maintenance phase



TONGARIRO POWER SCHEME



KEY	
	Aqueduct
	Tunnel
	Penstocks
	Canal / Channel
	Genesis Energy Power Stations
	Intakes



Tongariro Power Scheme



- The 361.8 MW TPS comprises three hydro power stations – Rangipo (120 MW, underground), Tokaanu (240 MW) and Mangaio (1.8 MW).
- The scheme gathers water from the headwater streams of the central volcanic plateau.
- The headwaters of the Moawhango, Whangaehu and Whanganui Rivers are diverted north via the Eastern and Western Diversions of the scheme.
- The water passes through a series of pipes, lakes, canals and/or tunnels to the Mangaio, Tokaanu and Rangipo hydro power stations before entering Lake Taupo.
- Resource consents granted for 35 years and expire in 2039.
- **The diversions contribute additional water to Lake Taupo (and therefore the Waikato Catchment), adding on average 20% to Waikato River flows**

- The consents that were granted for the TPS include a complex suite of conditions.
- These include a broad range of minimum / residual / flushing / recreational flows. These specific flows are required to maintain healthy ecosystems downstream of structures, improve sediment flushing and increase recreational opportunities.
- In addition to the resource consent requirements, a wide range of other enhancement and mitigation measures are undertaken, for example the Central North Island Blue Duck Trust (focused on predator control), Whanganui River Enhancement Trust (focused on improving water quality) and trout fishery monitoring and enhancement.

