

**ASSESSMENT OF ENVIRONMENTAL EFFECTS (AEE) FOR
RENEWAL of RESOURCE CONSENTS
Opunake Hydro Electric Power Scheme
Opunake Power Ltd
UNDER SECTION s.88 of the RMA**

1. INTRODUCTION

The purpose of this Assessment of Environmental Effects (“AEE”) is to provide a description of Opunake Power Limited’s hydro generation scheme in the South Taranaki District, of which to analyse their environmental effects in accordance with Section s.88 of the Resource Management Act 1991 (“RMA”). This AEE forms part of and should be read in conjunction with the application of the resource consents.

The Opunake Hydro Electric Power Scheme is one of several small long-established schemes in New Zealand providing power to the National Grid, the scheme was originally operated by Egmont Electricity for many years before being transferred to Powerco Ltd in 1996, then to Taranaki Generation Ltd (Trust Power) in April 1999. In July 1999 the scheme was transferred to New Zealand Energy Ltd. In 2009 the scheme ownership was transferred to Opunake Hydro Ltd, then to the current operator Opunake Power Ltd in 2016.

The operation of the scheme is regulated by eight resource consents issued under the provisions of the Resource Management Act 1991. These relate to various water diversions, water take, and discharge and land occupation related activities.

Opunake Power Ltd is required to renew seven of the eight consents. This AEE document supports the applications for the renewal of these consents.

No new works are being proposed. The effects of the activity will remain the same or similar as they are currently.

There are no significant changes proposed to the operation of the hydroelectric scheme. No new equipment is proposed in the near future, and it is expected that the scheme will continue largely in its current form.

2. THE OPUNAKE POWER STATION – A BRIEF HISTORY

Opunake Hydro is a 400kVA (320kW) hydro station located at Opunake Beach in Taranaki. The scheme has been in its present location since 1922. Included below, by way of background, is a brief history of the scheme:

- In 1899 the Town Board held discussions with engineers regarding the potential for an electricity supply for Opunake.
- In 1903 a consulting engineer made a further report on the possibilities of the Waiaua scheme.
- In 1904 tenders were received to install an appropriate plant, but the matter was postponed until the issue of electricity supply was again raised in 1907.

- A decade later (c. 1917) consulting engineers drew up a scheme for the Town Board, and a loan of £7,000 was raised and building started.
- It was then decided that a larger area than just Opunake could be supplied with electricity, and the Power Board was formed in 1921. This time a loan of £70,000 was raised by a poll of ratepayers of the Power Board area, which went from the Oeo Road in the south to the Mototi Stream in the north.
- In December 1923 the area from the Mototi Stream to Puniho Road was added to the district and a loan of £22,000 was raised to cover it, and the scheme has been operating ever since. In 1995 Egmont Electricity upgraded the scheme and replaced the old system with new penstocks, a new generator and electrical equipment
- Powerco took over Egmont Electricity and due to regulatory changes Powerco had to divest its interest in Power Generation Assets; it sold the Opunake Hydro Station to Trust Power.
- It subsequently sold to NZE a Nelson Based entity, NZE (David Inch) completely upgraded the control system, both intake and generation control.
- The station was sold to Opunake Hydro Ltd in 2009, Simon Young; OHHL was subsequently taken over by Tag Oil and other subsidiaries.
- In 2016 the Hydro Scheme was sold to Opunake Power Ltd the current owner.

3. LOCATION AND CONNECTION TO THE NATIONAL GRID

Opunake Hydro Limited generates electricity and sells it to an electricity retailer that on sells to retail customers in the Taranaki region as well as to the national grid. The location of the existing scheme is due to the presence of a storage facility (Opunake Lake) which means it can generate at peak times of the day. In addition, the present location provides a reasonable head between the generation station and Opunake Beach.

The Opunake hydroelectric power scheme is in south Taranaki, adjacent to the township of Opunake, approximately 50 km south-west of New Plymouth (refer photo 1). The scheme was commissioned in 1922 and provides power to the National Grid at an annual maximum output of 1.75GWh and an average output of, approximately 1.3 GWh. The station was upgraded in 1996 with the installation of a single FLYGT submersible pump "generator". This unit replaced the older turbines, which were in the original power station. The capacity of the scheme remains the same.

Scheme Components and Map



Photo 1 Opunake Power Limited scheme on the Waiaua River

4. HYDRO ELECTRIC SCHEME OPERATION

The scheme involves the diversion via a weir of up to 3900 l/s of water from the Waiaua River to an earth lined canal and then to a storage lake (Lake Opunake). Water passes from Lake Opunake through a penstock to the powerhouse before discharging to the Tasman Sea at Opunake Beach.

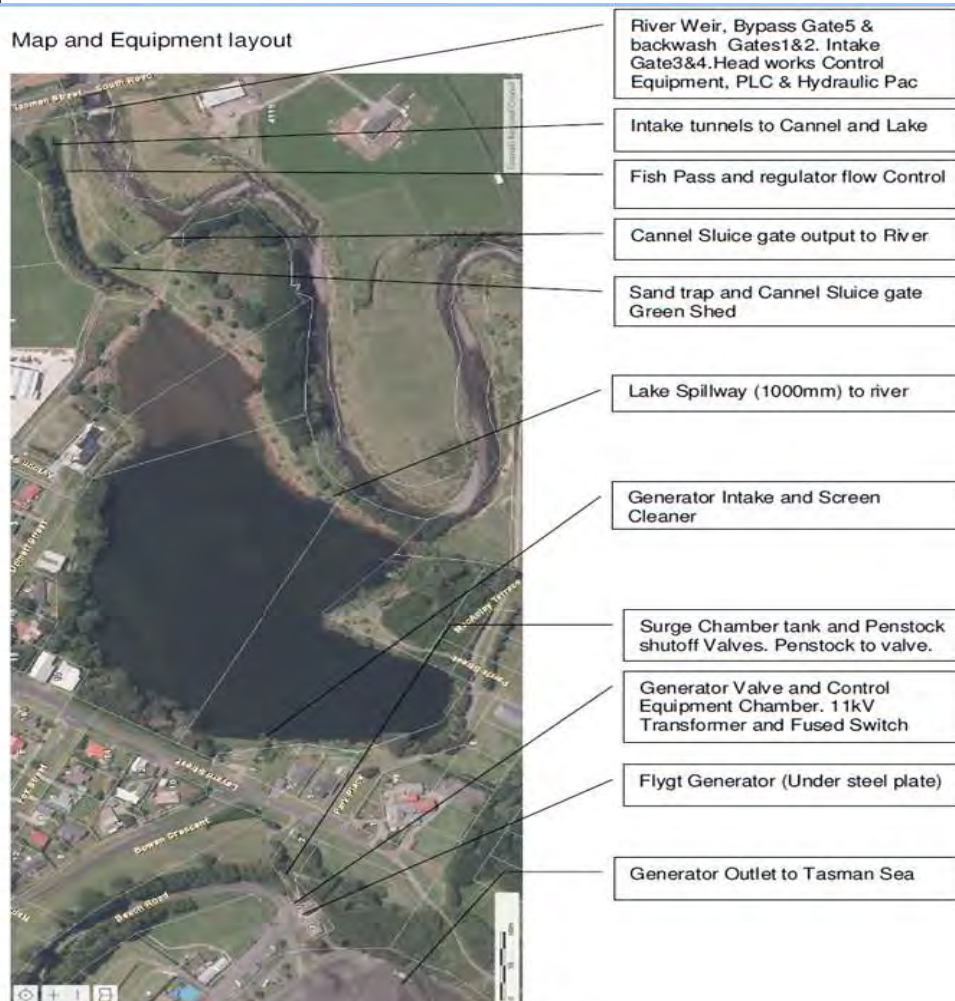
The lake provides intra-day storage under an operating regime of 400mm over the approximately twelve hectares of lake.

The weir is designed to divert most of the flow of the Waiaua River, for 75% of the time and to overtop only at higher flows (35% of the time, noted 2016-2017 records). A residual flow of 180 litres per second is maintained in the river below the weir via a new fish pass constructed in January 1997 and sand trap canal Sluice gate.

The main elements of the scheme are as follows:

- A 4.5-metre-high concrete river diversion weir situated on the Waiaua River below the Waiaua River Bridge. The weir diverts water through two intake gates and along a 30 metre tunnel to a water intake canal;
- A fish pass extending between the water intake canal and the pool below the river diversion weir. The fish pass includes two distinctive channels, a native fish section and fish pass.
- A 200-metre-long water intake canal directing water into Lake Opunake;
- The Lake Opunake storage reservoir.
- An intake structure, tunnel, surge tanks and penstock which directs water from the lake to the powerhouse;
- The powerhouse and generator which is submersed and under a steel plate below ground level and is supplied by water from the penstock via the surge chamber to a control valve.
- A tunnel and tailrace structure that directs water from the powerhouse onto the southeast end of Opunake Beach and into the Tasman Sea.

Photo 2 – Equipment locations



5. SITE AND AREA DESCRIPTION

The site of the hydro scheme is described as follows:

OPUNAKE POWER LIMITED – PROPERTY INTERESTS

EASEMENTS

Index	Instrument	Grantee	Easement Area	Easement Purpose	Title	Address	Landowner
A	EI 7849828.5	Opunake Power Limited	Section 49 Town of Opunake	Right (in gross) to convey and drain water and incidental rights	TN109/194 Section 49 Town of Opunake Suburban	Layard Street/Park Place, Opunake	South Taranaki District Council
			Section 1 Block XIV		TNH1/791 Section 1 BIK XVI Town of Opunake	Layard Street, Opunake	South Taranaki District Council
B	EI 7849828.6	Opunake Power Limited	C on DP 397226	Right (in gross) to convey and drain water and incidental rights	387664 Lot 5 DP 397226	Aytoun Street, Opunake	South Taranaki District Council
			B on DP 397226		387665 Lot 6 DP 197226	Aytoun Street/SH 45, Opunake	South Taranaki District Council
C	EI 6832150.3	Opunake Power Limited	B on DP 356062	Right (in gross) to drain water	228715 Lot 1 DP 356062	3 Beach Road, Opunake	Paul Douglas Ekdahl, Patricia Jean Ekdahl and RMY Trustees (2011) Limited
			A on DP 356062		228717 Lot 3 DP 356082	2 Beach Road, Opunake	Euan Richard Krogh, Janelle Leigh Krogh and Glenn Michael Sharratt
D	EI 7849828.9	Opunake Power Limited	A on DP 397226	Right (in gross) to convey and drain water and incidental rights	387662 Lot 3 DP 397226	Aytoun Street, Opunake	Heather Doreen Sharpe

LEASE

Index	Instrument	Lessee	Lease Area	Title	Address	Landowner
E	Lease (under S83 Land Act 1948) dated 28 May 1961 (embodied in Historical TN255/54) Variation of Lease 448955.1	Opunake Power Limited	Section 48 Opunake Suburban and Sub 2 Section 47 Opunake Suburban	TN255/54	Layard Street, Opunake	Crown (administered by DOC)





6. RESOURCE CONSENTS

The following resource consents permit the operation of the scheme:

- A water permit to divert the Waiaua River (at a maximum rate of 3,900 l/s) into a storage lake for hydroelectric power generation.
- A water permit to take water from the Opunake Lake beside the Waiaua River for hydroelectric power generation.
- A discharge permit to discharge sand and water from the intake canal into the Waiaua River.
- A coastal permit to erect, place and maintain an outlet structure from the Opunake hydroelectric power station within the coastal marine area.
- A discharge permit to discharge up to 3,900 l/s of water from hydroelectric power generation into the Tasman Sea.
- Land use consent to dam the Waiaua River in association with the Power Scheme.
- A land use Consent to disturb the bed of the Waiaua River by removing Sediment build-up upstream of the Weir.
- a land use consent to disturb the bed of Lake Opunake by removing reeds and flax from the edge of the lake

The land occupied by the scheme was designated for the purposes of hydroelectric power generation and denoted D107 in the proposed South Taranaki District Plan.

Below are details of the resource consents from the Taranaki Regional Council held to operate and maintain the Opunake Power Hydro Electric Scheme

Consent No Expiry Date	Location	Activity authorised
1795-4 1 st June 2018	South Road, (State Highway 45), Opunake	To take water from the Waiaua River in association with the Opunake hydro electric power scheme.
1796-3 1 st June 2018	Lake Opunake, Layard Street, Opunake	To take and use water from Lake Opunake for hydroelectric power generation in association with the Opunake hydroelectric power scheme
1797-3 1 st June 2018	Lake Opunake, Layard St, Opunake	To discharge sand and silt deposits from a diversion canal sand trap via a spillway to the Waiaua River in association with the Opunake hydroelectric power scheme
4658-2 1 st June 2024	Lake Opunake, Layard St, Opunake	To disturb the bed of Lake Opunake in the Waiaua catchment by removing reeds and flaxes from the edge of the lake.
4563-2 1 st June 2018	Opunake Beach, Beach Road, Opunake	To erect, place and maintain an outfall structure in the coastal marine area on the Opunake Beach foreshore in association with the Opunake hydroelectric power scheme
4744-2 1 st June 2018	Beach Road, Opunake	To discharge water from hydroelectric power generation through two marine outfall pipes into the Tasman Sea
5692-1 1 st June 2018	South Road [State Highway 45], Opunake	To disturb the bed of the Waiaua River by removing sediment build-up upstream of a weir for the purpose of maintaining the Opunake hydroelectric scheme intake
5581-1 1 st June 2018	South Road [State Highway 45], Opunake	To dam the Waiaua River in association with the Opunake hydroelectric power scheme

Opunake Power Limited holds water permit 1795-4 to cover the taking of water from the Waiaua River in association with the Opunake hydroelectric power scheme. This permit was issued by the Taranaki Regional Council on 21 March 2001 under Section 87(d) of the Resource Management Act, with an expiry date of 31 December 2003. This short time frame was to allow monitoring to be undertaken of the effects of the scheme, about the appropriateness of the residual flow. An application to renew this consent was received by the Council on 25 September 2003, and was put on hold under Section 92 of the Resource Management Act, to allow the Company to apply to change the consent conditions in related consent **1796**. This consent was granted on 13 October 2006, to expire on 1 June 2018.

Special condition 1 of the expired consent defines the maximum rate of abstraction (3900 l/s).

Special condition 2 requires the consent holder to exercise the consent generally in accordance with the application, and special conditions 3 and 4 requires the consent holder to maintain fish passage and a residual flow of 80 l/s in the Waiaua River downstream of the fish pass and 180 l/s downstream of the canal sluice gate.

Special condition 5 is a provision to review the appropriateness of a gradual increase in residual flow, and special condition 6 requires notification prior to the consent being exercised.

Special condition 7 defines when the sluice gate/by wash can be closed, and special condition 8 defines data that must be collected and forwarded to the Council. Special condition 9 requires the consent holder to review the operational procedure and special condition 10 requires the consent holder and Council to meet with interested submitters to the consent once per year to discuss matters relating to this consent.

Special condition 11 relates to expiry of the consent should it not be exercised, and the last condition was a review provision.

Opunake Power Limited holds water permit 1796-3 to take and use water from Lake Opunake for hydroelectric power generation. This permit was issued by the Taranaki Regional Council on 21 March 2001 under Section 87(d) of the Resource Management Act. It is due to expire on 1 June 2018. An application to change the conditions of this consent was received by the Council on 6 May 2005 and subsequently put on hold under Section 92 of the Resource Management Act to allow details of consultation and some operating requirements to be defined. This varied consent was granted in the 2005-2006 monitoring year.

New Special condition 1 requires the consent holder to maintain water levels in the lake between a specified limit and that approval must be gained prior to lowering it further. Special condition 2 requires there to be a constant flow through the fish pass.

Special conditions 3 and 4 require the consent holder to maintain a record of water levels within the lake at a minimum of 15-minute intervals and to install a staff gauge at Lake Opunake. The last condition is a review provision.

Opunake Power also holds Water Discharge Consents.

Section 15(1)(a) of the Resource Management Act stipulates that no person may discharge any contaminant into water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or by national regulations.

Opunake Power holds water discharge permit 1797-3 to cover the discharge of sand and silt deposits from a diversion canal sand trap via a spillway to the Waiau River. This permit was issued by the Taranaki Regional Council on 21 March 2001 under Section 87(e) of the Resource Management Act. It is due to expire on 1 June 2018.

Special condition 1 states that the consent holder shall supply a sediment management protocol within three months of the granting of the consent.

Special condition 2 states that the consent holder must maintain a record of any sand trap discharges for supply to the Council.

Special condition 3 requires the consent holder to adopt the best practicable option. And the last two conditions are review provisions.

Opunake Power holds coastal discharge permit 4744-2 to cover the discharge of up to 3900 l/s of water from hydroelectric power generation through two marine outfall pipes into the Tasman Sea. This permit was issued by the Taranaki Regional Council on 15th November 2012 under Section 48(e) of the Resource Management Act. It is due to expire on 1 June 2018.

There are 3 special conditions which require that the maximum discharge of 3900l/s and the discharge of contaminated water shall not occur and warning signs must be erected.

Opunake Power also holds Land Use Consents.

Section 13(2) (b) of the Resource Management Act stipulates that no person may disturb, remove, damage, or destroy any plant or part of any plant or the habitats of such plants or of animals in, on, or under the bed of any lake or river in a manner that contravenes a rule in a regional plan or a proposed regional plan unless the activity is allowed for by a resource consent or by Section 20 of the Act.

Opunake Power holds land use consent 4658-2 to cover the disturbance of the bed of Lake Opunake in the Waiau catchment by removing reeds and flaxes from the edge of the lake.

This permit was issued by the Taranaki Regional Council on 27 October 1994 under Section 87(e) of the Resource Management Act, and was renewed in 2006, expiring on 1 June 2024

Special conditions 1 and 2 require the consent holder to adopt the best practical option to prevent or minimise adverse effects, and to undertake the exercise of the consent generally in accordance with the application. Special conditions 3 and 4 require the consent holder to notify the Taranaki Regional Council at least seven days before commencing work and that the works shall only be undertaken during the period 1 May to 31 October, while special conditions 5 and 6 require that the consent holder minimise the discharge or placement of silt and/or organics and/or debris into the lake, and that the consent holder collect and remove all plant trimmings and other floatable material. Special condition 7 requires that where removed material is placed on or near the banks of the lake, the consent holder ensures that decaying vegetation does not fall or leach into the lake. The last two special conditions specify a lapse date, should this consent not be exercised within five years of it being granted, and provide for a review, if required.

Opunake Power holds land use consent 5581-1 to cover the damming of the Waiaua River in association with the Opunake hydroelectric power scheme. This permit was issued by the Taranaki Regional Council on 21 March 2001 under Section 87(e) of the Resource Management Act. It is due to expire on 1 June 2018.

There are 10 special conditions associated with this consent.

Special condition 2 states that it is the responsibility of the consent holder to maintain and operate a safe dam and the Taranaki Regional Council accepts no responsibility in this regard.

Special condition 3 requires that the consent holder shall maintain a fish pass that allows the passage of native fish, juvenile trout and adult trout. The special conditions also cover issues regarding maintenance work, notification of works, and that should the structure no longer be required then it is to be removed and the area re-instated.

Opunake Power holds land use consent 5692-1 to cover the disturbance of the bed of the Waiaua River by removing sediment build-up upstream of a weir for maintaining the Opunake hydroelectric power scheme. This permit was issued by the Taranaki Regional Council on 21 March 2001 under Section 87(e) of the Resource Management Act. It is due to expire on 1 June 2018.

There are 9 special conditions associated with this consent. They relate to times the sediment removal should be performed, the recording and notifying of any works, and the minimising of adverse environmental effects.

Opunake Power also complies with a Coastal Permit.

Section 12(1)(b) of the Resource Management Act stipulates that in the coastal marine area, no person may erect, reconstruct, place, alter, extend, remove, or demolish any structure or any part of a structure that is fixed in, on, under, or over any foreshore or seabed unless expressly allowed by a rule in a regional coastal plan, proposed regional coastal plan or a resource consent.

Opunake Power holds coastal permit 4563-2 to cover the erection, placement, and maintenance of an outfall structure in the coastal marine area on the Opunake Beach foreshore. This permit was issued by the Taranaki Regional Council on 21 March 2001 under Section 87(e) of the Resource Management Act. It is due to expire on 1 June 2018.

There are 7 special conditions associated with the new consent and they generally relate to requirements when undertaking maintenance works.

7. TARANAKI REGIONAL PLAN POLICY STATEMENTS

The Regional Policy Statement provides an overview of the resource management issues of the Taranaki region and the policies and methods that will be adopted to address those issues. The following provisions of the Regional Policy Statement for Taranaki are relevant to the Opunake Hydro electricity generation scheme.

14.1 “Sustainably managing energy”

Comment:

The document states, as background to the issue of sustainably managing energy, that “...energy enables people to provide for their well-being, health and safety, and is a key factor in the regional (and national) economy.” It also states that “As New Zealand’s energy consumption increases, the country faces specific challenges in relation to securing reliable and affordable energy supplies.”

The existing hydroelectric scheme at Opunake provides a local, reliable and renewable energy resource for the Taranaki region. Furthermore, we consider the scheme meets the objectives set out in section 14, as shown below, because it promotes the use and development of a **renewable energy resource at a local scale** and in a manner, that seeks to avoid and/or mitigate any adverse effects on the environment. In addition, it also seeks the continued use of an existing scheme, which is an efficient use of the region’s resources and which promotes renewable energy.

ENE OBJECTIVE 1

To promote the exploration, development, production, transmission and distribution of energy to meet the energy supply needs of the region and New Zealand in a manner that avoids, remedies or mitigates adverse effects on the environment.

ENE OBJECTIVE 2

To promote the use and development of renewable sources of energy in a manner that avoids, remedies or mitigates adverse effects on the environment.

ENE OBJECTIVE 3

To increase efficiency in the exploration, development use, production, transmission and distribution of energy.

Promotion of renewable energy

ENE POLICY 3

The use and development of renewable energy resources will be promoted whilst avoiding, remedying or mitigating adverse effects on the environment as far as practicable.

15.2 “Providing for regionally significant infrastructure”

Comment:

The hydroelectric scheme at Opunake and associated lake is a regional asset which has been part of the community for nearly 95 years. The continued operation provides for its continued safe and efficient operation, while also ensuring any adverse environmental effects are avoided or mitigated. The continued operation also provides some protection from the adverse effects of subdivision, use and development on the continued effective operation of the scheme.

INF OBJECTIVE 1

To provide for the continued safe and efficient operation of the region’s network utilities and other infrastructure of regional significance (including where this is of national importance), while avoiding, remedying or mitigating adverse effects

INF POLICY 1

Provision will be made for the efficient and effective establishment, operation, maintenance and upgrading of network utilities and other physical infrastructure of regional significance (including where this is of national importance) and provision for any adverse effects of their establishment to be avoided, remedied or mitigated as far as is practicable.

INF POLICY 2

The adverse effects of subdivision, use and development on the safety, efficiency, operation, maintenance and upgrading of the region’s network utilities and on other physical infrastructure of regional significance (including where this is of national importance) will be avoided or mitigated.

Explanation/Principal reasons

The objective, policies and methods of implementation establish a policy framework for providing for regionally significant infrastructure and network utilities. These network utilities and infrastructure are important for the economic and social wellbeing of people and communities in Taranaki and for their health and safety and play a vital role in the operation of daily life. During emergency situations, some are of national as well as regional importance. Provision for the safe, reliable and efficient functioning of such facilities and infrastructure and their maintenance and upgrading is provided for in this document in recognition of the importance of such physical resources. This Regional Policy Statement also recognises that it is not always practical or reasonable for network utilities or infrastructure to co-exist with other major utilities and those operational constraints may also exist and these must be recognised and provided for.

8. SOUTH TARANAKI DISTRICT PLAN

Zoning

The subject property is located within the Rural Zone and as such is required to comply with the performance standards listed in section 3.02 of the Operative South Taranaki District Plan.

We have reviewed all the performance standards for the Rural Zone and consider that most are not applicable to a hydro scheme. However, the following are relevant – please see comments below.

Standard	Comment	Activity Status
3.02.2 General Environmental Standards		
1. All activities and land use shall be undertaken in a manner ensuring no Offensive or objectionable nuisance effects on adjacent properties.	The existing hydroelectric scheme seeks to be a good neighbor and is operated in such a way as to ensure that no offensive or objectionable nuisance effects are experienced on adjacent properties.	Permitted Activities All Activities
3. All sites are to be kept free of litter, refuse or dangerous matter always.	The operators of the existing hydro scheme seek to keep the site free of litter, refuse or dangerous matter always.	Permitted Activities All Activities

Compliance with Permitted Activity Standards

5.2.1 Section 14: Utilities and Services

Activity	Zone	Comment	Activity Status
Electricity generation	Rural	The existing hydroelectric scheme meets the following performance standards for the rural zone: 3.02.1.8 (except as provided for in 14.02.4) 3.02.2.2, 3.02.2.3, 3.02.2.4 3.02.3.2, 3.02.3.3, 10.02.1	Permitted

5.2.2 Section 10: Noise

Opunake Power Limited, the owner/operator of the existing hydroelectric scheme, has a duty to avoid unreasonable noise. The following aspects of the scheme generate noise:

- The generator which is located underground at Opunake Beach
- The sirens which are located at the headwork's and tailrace and which sound when certain activities are undertaken.

The noise effects associated with these aspects of the operation are mitigated by:

- The generator: The Powerhouse was relocated by Powerco in 1995 from existing above ground building to below ground, thus reducing noise considerably.
- The sirens: The sirens are intended to signal to people that an action possibly affecting their safety is about to occur e.g. making beach users aware that the scheme is starting to generate and water comes out of the tailrace.

Consistency with the Relevant Objectives and Policies – Operative South Taranaki District Plan

Comment

The existing hydroelectric scheme has been part of the Opunake Township’s infrastructure since 1922 and throughout this time it appears that land use (such as subdivision for residential use) adjacent to the designated land has taken place without any detrimental effects. The scheme owners consider that some subdivision will not adversely affect the scheme and we have identified these areas on the attached aerial photograph included below:



Site	Name	Address	Postal Address*
1	James Scott	7 Farnham St	Opunake, 6515
2	Yule Company	6 Farnham St	6 Farnham St, 6515
3	Farmroads Co	2 Farnham St	
4	Opunake Community Ltd	2 Farnham St	
5	Kulua & Cherrill (Boggy)	6 Farnham St	
6	Shaw & Connor Ltd (Pines)	8 Farnham St	
7	Opunake Power Ltd	Layard St	13 Verona Place
8	Verona Court	8 Layard St	
9	Manu Spring Ltd	15 Layard St	111 Freeman St, 6516
10	Opunake Players Incorporated	17 Layard St	
11	Andrew & Beth Wilson	17 Layard St	6 Grey St, 419
12	Christine Scadding	3 Layard St	
13	Rita & Leslene Langan	3 Layard St	
14	Opunake District Pastoral House	1 Layard St	
15	Orphan & Heather Payne	8 Park Place	
16	Orphan & Heather Payne	8 Park Place	
17	Helen Connolly	PO Box 92, Opunake, 6561	
18	Heather Shorro	3 Farnham St	
19	Rosemary & Nigel Robinson	4119 Old Rd	C- Elite Farm Stations Limited, Opunake, 6515
20	Wood & Nigel Peoples	1 Park Place	
	Dubautou Trustees Limited	South Rd	C- Dubautou Partners, C/- OR, Queens, 143, Dubautou Road, RD, 51 Opunake, 6502

Objective 6

Maintain and develop an efficient, effective and sustainable infrastructure that meets the needs of the District’s community.

Objective 6.1

Avoid, remedy or mitigate any adverse impact of infrastructure facilities and services on the District’s residents and on the environment around their homes, farms and business activities by equitably balancing environmental requirements and individual rights with community needs.

Policies

6(e) to maximise the efficiency and effectiveness of existing infrastructure services and facilities.

6 (f) to provide for the establishment, maintenance and enhancement of utility networks for all utilities required in the District within a framework which avoids, remedies or mitigates the adverse effects of those services.

Explanation of the Policies

The district relies on the use of roads, communications and services to maintain people’s health and well-being and general safety. These services need to be provided with provision for their maintenance, upgrading and development. They have the potential to impact on the environment, particularly the visual amenity of areas, and should be required to meet environmental standards.

Comment

The existing hydroelectric scheme provides the community with an efficient, effective and sustainable piece of infrastructure. The zoning allows for the continued use of the land for the generation of electricity, which is a more sustainable use of resources when compared with the effects of building an entirely new scheme at another location. The visual impact of the hydroelectric scheme is negligible given it has been part of the environment for nearly 95 years.

9. OPUNAKE POWER LTD – PERFORMANCE

- OPL purchased the scheme in mid-2016;
- The scheme had extensive upgrades in 1995 which focused on the upgrade of the Generator and Penstock; NZE completed the extensive upgrades from 2000 to 2005 of the control equipment of both the River intake and generation control equipment.
- OPL have fine-tuned the operation, installed a concrete embankment above the canal sluice gate and adjusted operation of the fish pass. OPL has implemented a fish trap and release program.
- OPL have a “Good level of level of Environmental performance” reports from regular TRC inspections and have tried to maintain river and lake health by being proactive in the operation of the scheme.
- OPL have upgraded the Generator CB, and Communications between Headwork’s and Generator, installed a concrete wall on the canal and rebuilt the canal sluice valve.
- OPL have had some significant issues mainly Power Failures by Powerco, Internet failure by Spark, in both cases causing loss of control of intake gates.

Previously New Zealand Energy achieved the following upgrades:

- Renewed all the Station control equipment and fully automated the station.
- Replaced all the Control gates at the head works.
- Installed automated control equipment at the head works, Installed Sluicing flume at the head works.
- Installed security fencing of the Head works control equipment.
- Installed a new flow regulator at the fish pass.
- Lowered the fish pass culvert and installed new concrete culvert section.
- Installed covering then removed covering form fish pass at request of TRC.
- Installed automation equipment in canal sluice.
- Installed Canal stop gate.
- Replaced lake screen cleaner.
- Installed Head works communications link.

These jobs were significant. They all have some impact on the environmental performance of the scheme.

Furthermore, the RMA also provides for the wellbeing of the Neighbouring communities. Through the efforts and commitment of Opunake Power Ltd, we have ensured that the Power Station has continued to provide the Opunake Community with some of their energy needs; it's numerous recreational activities, its aesthetics, ongoing income for maintenance companies and their general wellbeing.

10 ASSESSMENT OF ENVIRONMENTAL EFFECTS

10.1 Environmental Effects Waiaua River

Opunake Power Limited holds water permit 1795-4 to cover the taking of water from the Waiaua River in association with the Opunake hydroelectric power scheme

And **Opunake Power holds land use consent 5581-1** to cover the damming of the Waiaua River in association with the Opunake hydroelectric power scheme

And **Opunake Power holds water discharge permit 1797-3** to cover the discharge of sand and silt deposits from a diversion canal sand trap via a spillway to the Waiaua River

Fresh Water Plan Policy associated with Damming of the Waiaua River:

Policy 6.1.3 Notwithstanding Policy 6.1.4, when assessing the quantity of water that may be taken, used, dammed or diverted from any surface water body, the Taranaki Regional Council will have particular regard to:

- (a) The natural, ecological and amenity values of the water body;
- (b) the relationship of Tangata Whenua with the water body;
- (c) the importance of the water body to meet existing or reasonably foreseeable needs for community water supplies, agricultural, industrial or other use;
- (d) the effects of water levels and flows on water quality;
- (e) the hydrological characteristics of the catchment including flow variability, flow recession characteristics and the relationship to groundwater recharge; Taking, use, damming and diversion of surface water 49
- (f) the significance of flows and groundwater recharge for the maintenance or enhancement of downstream flows;
- (g) the extent to which the adverse effects of the taking, use, damming or diversion of water can be avoided, remedied or mitigated.

POL 6.1.4 Subject to Policy 6.1.3, when assessing resource consents and imposing conditions for the taking, use, damming or diversion of surface water the Taranaki Regional Council will require quantities, levels and flows of water in rivers and streams (excluding those in Policies 6.1.1 and 6.1.2), that retain at least 2/3 habitat at mean annual low flow. Policy 6.1.4 states that, subject to Policy 6.1.3, the Taranaki Regional Council will require quantities, levels and flows of water in rivers and streams that retain at least 2/3 habitat at mean annual low flow.

This policy excludes those catchments and reaches listed in Policies 6.1.1 and 6.1.2, which have higher standards applied to them. However, the quantity of water that can be taken, used, dammed or diverted will be assessed on a case-by-case basis, based on the criteria contained in Policy 6.1.3.

Together Policies 6.1.3 and 6.1.4 provide a guideline on the amount of water that may be used in a given situation. Policy 6.1.4 applies at the point where the taking, use, damming or diversion occurs. Policy 6.1.4 allows some degree of habitat loss to provide for consumptive water use, while still retaining the life-supporting capacity of the river or stream. **The 2/3 habitat guideline is based on the average between food-producing habitat and habitat requirements for brown trout.** It is generally not possible to consider the effects on the whole ecosystem, the needs of all species and the linkages between species.

The Taranaki Regional Council therefore considers that the provision of a minimum habitat at times of low flow for the needs of brown trout is sufficient to provide for the physical needs of smaller or less prolific fauna including most indigenous fish species and their habitat. **However, for small streams (those with flows of less than 500 l/s) which do not provide habitat for brown trout, the use of the 2/3 habitat model may not be appropriate in all circumstances.**

For these types of streams an assessment of hydrological characteristics and effects on habitat may need to be undertaken. In this way Policy 6.1.4 gives effect to sections 6(c) and 7(h) of the Act. However, notwithstanding Policy 6.1.4, under some circumstances, higher or lower volumes of abstraction may be justified or minimum flows or the restriction or suspension of takes required. Policy 6.1.3 provides guidance on how the amount of water will be set taking into account the range of matters listed in the Policy.

The Opunake Hydro Electric power scheme is situated in the lower reaches of the Waiaua River ring plain catchment close to the coastline and township of Opunake. The land surrounding the lower reaches is surrounded by pastureland and the steep banks on the north side of the river below the diversion weir tend to be covered in scrub and pine trees Riparian vegetation is generally sparse along the river.

The Waiaua River has sand deposition issues that were a result from heavy rain and massive natural erosion event on Mt Taranaki during October 1998. The erosion event diverted slip material from the Oaonui River into the Waiaua River; this bed load of sand continues to flow down the river to this day.

The most ~~resent~~recent 2016-2017 TRC annual inspection report is attached as Appendix 1

This is an extract from the 1998-99 TRC monitoring report:

*“The Regional Council was unable to perform hydrological gauging in the river due to unfavorable channel characteristics following the massive sand deposition. The Regional Council initiated continuous temperature monitoring at the appropriate time but temperature loggers were repeatedly lost or buried by sand from the erosion event, so temperature monitoring was abandoned for the 1998-99 monitoring year. The spring macro invertebrate monitoring survey indicated that the macro invertebrate communities in the residual flow section of the Waiaua River were in good condition. **The summer macro invertebrate survey demonstrated that sand from the erosion event had severely impacted the streambed communities”.***

It was also noted by Allen Stancliff of Fish and Game the lower reaches of Waiaua were still being affected by the sand coming down the river – this was reported by Trout fishermen in the summer of 2018, that the lower reaches of the Waiaua River bed below the weir is inundated with sand and is affecting the trout fishing.

It was also noted that due to extreme prolonged summer temperatures the rise in water temperatures has affected most of the rivers and streams in Taranaki.

Near the scheme, the river features a sequence of riffles, runs and pools flowing across boulder, stony substrates. The river downstream of the diversion weir is quite entrenched with a wide flood channel containing residual flows

Mean minimum monthly flows for the period 1970 to 1995 vary from 205 l/s in February to 702 l/s in June while the mean monthly flows vary from 1338 l/s in January to 3559 l/s in October. The MALF is estimated to be 1117 l/s, these readings are derived from flow data from the Punehu Stream, the nearest similar catchment to Waiaua River. Water temperatures in Waiaua River near the scheme vary from a mean range of 13 to 15° c in spring to 24 to 25° C in summer.

Previous bio-monitoring surveys performed by the Taranaki Regional Council indicate that the river supports relatively diverse macro invertebrate fauna and micro flora both upstream and downstream of the diversion weir. Common inhabitants include oligochaete worms, net-building caddis flies, midges, stoneflies, elmids beetles and crane flies while the freshwater shrimp was a common component of the fauna near the river mouth. Filamentous algae cover was extensive across the riverbed near the diversion weir especially during the low flow summer period. Dominant types include the *genuses Cladophora, Oscillatoria and Lyngbya*.

Fish surveys conducted by the Taranaki Regional Council have recorded long and short finned eel, and adult red finned bully above the diversion weir and common smelt, inanga, juvenile red finned bullies and torrent fish downstream of the weir. Other fish likely to be inhabit the lower reaches of the Waiaua River; based on the predictive model of riverine fish communities in Taranaki (Joy & Death, 1999) would also include brown trout and Koaro.

Potential contaminant sources that could influence water quality include agricultural runoff from surrounding land and periodic inflows of silt and debris during large flood events.

Effects on the Aquatic Environment

At the time of commissioning of the scheme in 1922, the river diversion would have brought about an immediate and dramatic change in the in-stream conditions in the 2 km stretch of river downstream the diversion weir. Reduced stream flows in the affected reach would have led to exposure of large areas of the river bed and consequent confinement of in-stream habitats.

Physio-chemical and biological monitoring of the Waiaua River conducted by the Taranaki Region, Council in the spring and summer over previous years provides comprehensive information on the effects of the diversion weir on in-stream conditions.

Key findings arising from the annual monitoring programmes are as follows:

A fish survey was conducted on 26 February 2014 to determine if the fish pass around the Waiaua weir was effective in allowing the migration of fish up the river, and to assess the community living within the residual flow reach. This survey also included a comparative survey of the Mangahume Stream, to provide some perspective to the result.

On 26 February 2014, three sites were surveyed for freshwater fish. Two sites were in the Waiaua River, upstream and downstream of the Opunake Hydro intake weir, while a third was in the Mangahume Stream, at a similar altitude and distance inland as the Waiaua River sites. The survey methods employed included electric fishing and seine netting, with the latter method being particularly effective for pelagic species such as common smelt and inanga, which are less frequently recorded by electric fishing.

The Mangahume Stream recorded a relatively low species richness and fish abundance for a site so close to coast and at a low altitude. This may reflect the amount of habitat available, as this is a smaller stream, which at times can experience sand inundation.

However, it is also likely to reflect the area surveyed, which was relatively small. The two Waiaua River sites were clearly different to each other, with six migrant species recorded downstream (including one migrant invertebrate), and only two recorded upstream. Red fin bully, which was recorded at both sites, was much more abundant downstream (0.23 fish/m²) than upstream (0.03 fish/m²). Although this species can climb over the weir, it is apparent that the weir is still a significant barrier to this species.

The seine netting had similar results, with this method recording 72 common smelt downstream of the weir, at a density of 0.8 fish/m², but recording no fish upstream, despite the area surveyed upstream being approximately 150% of that surveyed downstream.

These results support the conclusions made previously, that the weir and intake tunnels constitute a significant barrier to the passage of some native fish, including common smelt, and inanga. It is apparent that passage into the canal is adequate; however, the intake tunnels present quite an impediment, most likely due to flow velocities. The maximum water velocity in which inanga will swim freely is between 0.30 and 0.34 metres per second (Department of Conservation, 1999). Water velocities suitable for smelt are similar. These velocities have been assessed twice prior to the current monitoring period, with velocities ranging from 1.1 to 2.0 metres per second.

They were reassessed on 11 January 2011, and found to range from 0.5 to 1.3 m/sec. Therefore, it is concluded that water velocities in the tunnels are frequently (if not always) too high for inanga and smelt to move through. Individuals of other fish species such as torrent fish may also be restricted in their ability to move through the tunnels, although previous surveys confirm that some torrent fish have successfully migrated upstream.

During the 2004-2005 monitoring period, the Company retrofitted one of the intake tunnels with a fish ladder which was hoped to provide rest areas and create a slower flowing boundary layer on the inside edge of the culvert which may improve the passage of fish through this area. Unfortunately, it appears that this fish ladder has done little to improve the passage of native fish.

The results of this survey support the conclusion that the weir and intake tunnels constitute a barrier to fish passage, and as such, Opunake Power Limited are noncompliant with resource consents 1795-4 and 5581-1. The consent holder will need to investigate options for remediating fish passage at this location, and it is recommended their investigations include consultation with the Department of Conservation and Fish and Game NZ.

These investigations should as a minimum, consider the following:

- Trap and transfer at the head of the fish pass, possibly in conjunction with a local school(s)
- Installation of an additional fish pass that bypasses the intake tunnels
- Installation of a new fish pass, at the weir, bypassing the canal entirely

A significant factor in all **resentrecent** monitoring is the over-riding effects arising from silt and sand debris deposition in the affected reaches from the Oaonui and Waiauua convergence in their headwaters, even some 18years later the sand inundation is significant but can be mitigated by minimising the sand entering the canal system.

A copy of the complete 2014 fish survey report is included in appendix 2.

Summary and conclusions

On 26 February 2014, three sites were surveyed for freshwater fish. Two sites were located in the Waiauua River, upstream and downstream of the Opunake Hydro intake weir, while a third was located in the Mangahume Stream, at a similar altitude and distance inland as the Waiauua River sites. The survey methods employed included electric fishing and seine netting, with the latter method being particularly effective for pelagic species such as common smelt and inanga, species less frequently recorded by electric fishing.

The Mangahume Stream recorded a relatively low species richness and fish abundance for a site so close to coast and at a low altitude. This may reflect the amount of habitat available, as this is a smaller stream, that at times can experience sand inundation. However, it is also likely to be a reflection of the area surveyed, which was relatively small.

The two Waiauua River sites were clearly different to each other, with six migrant species recorded downstream (including one migrant invertebrate), and only two recorded upstream. Redfin bully, which was recorded at both sites, was much more abundant downstream (0.23 fish/m²) than upstream (0.03 fish/m²). Although this species is capable of climbing over the weir, it is apparent that the weir is still a formidable barrier to this species.

The seine netting had similar results, with this method recording 72 common smelt downstream of the weir, at a density of 0.8 fish/m², but recording no fish upstream, despite the area surveyed upstream being approximately 150% of that surveyed downstream.

These results support the conclusions made previously, that the weir and intake tunnels constitute a significant barrier to the passage of some native fish, including common smelt, and inanga. It is apparent that passage into the canal is adequate, however, the intake tunnels present quite an impediment, most likely due to flow velocities. The maximum water velocity in which inanga will swim freely is between 0.30 and 0.34 metres per second (Department of Conservation, 1999). Water velocities suitable for smelt are similar. These velocities have been assessed twice prior to the current monitoring period, with velocities ranging from 1.1 to 2.0 meters per second. They were reassessed on 11 January 2011, and found to range from 0.5 to 1.3 m/sec. Therefore it is concluded that water velocities in the tunnels are frequently (if not always) too high for inanga and smelt to move through. Individuals of other fish species such as torrentfish may also be restricted in their ability to move through the tunnels, although previous surveys confirm that some torrentfish have successfully migrated upstream.

During the 2004-2005 monitoring period, the Company retrofitted one of the intake tunnels with a fish ladder which was hoped to provide rest areas and create a slower flowing boundary layer on the inside edge of the culvert which may improve the passage of fish through this area. Unfortunately it appears that this fish ladder has done little to improve the passage of native fish.

The results of this survey support the conclusion that the weir and intake tunnels constitute a barrier to fish passage, and as such, Opunake Hydro Ltd are non-compliant with resource consents 1795-4 and 5581-1. The consent holder will need to investigate options for remediating fish passage at this location, and it is recommended their investigations include consultation with the Department of Conservation and Fish and Game NZ.

Proposed Mitigation Measures

The mitigation measures proposed as part of this application are in line with the recommendations contained in previous Taranaki Regional Council's monitoring reports. Opunake Power Ltd undertake to maintain the fish pass on a regular basis and perform repairs as soon as practicable following floods events that are likely to disable or impair the functioning and maintenance of the fish pass and residual flow requirements.

Opunake Power Ltd have demonstrated this over the last 2 years. Specific measures are Maintenance works shall be undertaken on the fish pass to ensure the structure allows for the migratory passage on native and introduced fish within the Waiaua River.

- These works should include the removal of all extraneous plant material and debris from the pass, the fixing of suitable numbers and sizes of rocks to the native side of the pass; and appropriate alteration to the gate at the head of the pass, these works should be performed to the satisfaction of the TRC.
- Repair of any damage to fibre glass fish pass
- Changing the operation of the fish pass level control to maintain an optimal flow of 80 l/s down the fish pass. (FP level 425mm)
- Maintain a residual flow of at least 180 litres per second in the lower Waiaua River, immediately downstream of the canal sluice gate;
- Maintain water levels in Lake Opunake to appropriate levels that allow the flows in the fish pass to be maintained to the optimum levels always. These levels are set by reference to the staff gauge at the lake outlet. The generator will start generating when the level reaches 850mm on the staff gauge and stop generating when the level reduces about 550mm on the staff gauge. This will create an operating range of 300mm. The generator may start within this range but will not operate below the low level.
- Maintain regular flushing flows down the lower reach of the Waiaua River during high flow periods utilising the full flow of the Waiaua River.
- Implementation of a fish nets for a catch and release scheme

Fish Pass – to upper reaches of the Waiaua River

The clear passage of migrating fish via the intake tunnels to the upper reaches of the Waiaua River

- Previous consent holders have implemented various solutions to assist with the passage of spawning fish.
- These were not limited to – installing Fish Pass Level Control
- Deflecting Barriers (Fish Ladder) in the smaller intake tunnel to reduce the water velocity inside the tunnel.
- Immediate changes the last year 2017 by Opunake Power includes revision of the control settings to keep more constant level in the Fish Pass, and have instigated a Catch and release trapping from the top of the Fish Pass. The critical time to complete this is from August to March as per the table attached below.
- We have tried two fish trap options with varying success, one was in the main fish pass flow – the trap netted several “torrent fish” which were released above the weir. A second net was installed in the exit after the fish pass regulator – this position was affected by vandals and sand.
- Discussions between Bart and I have come up with a new plan to install the net before the fish pass level modulation ladder on the native pass.

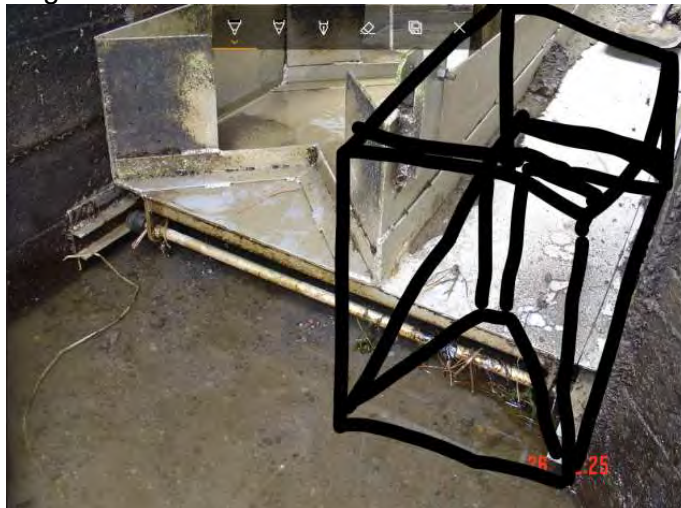
1st Fish trap in main flow



2nd Trial in top of fish passes, Canal side of regulator



Option 3 – Install the trap on the lower side of the Fish Pass Regulator



Migration dates

Key
 Peak Range Instream works restriction for peak sensitivity period of indigenous fish migration under Regional Plan section 4.2.21.
 T = threatened NT = not threatened S = spartfish

Migration – Environment Waikato region

Species	Status	Direction	Life stage	Summer		Autumn			Winter			Spring			Summer
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Lamprey ^{1,2}	T	upstream	adult												
Long and shortfinned eel ^{3,4}	T/NT	to estuary	glass eel												
Long and shortfinned eel ^{3,4}	T/NT	upstream	juvenile												
Common Smelt (sea run) ⁵	NT	upstream	juvenile												
Inanga ^{6,7,8}	NT	upstream	juvenile												
Giant Kokopu ^{9,10,11}	T	upstream	juvenile												
Banded Kokopu ^{9,10}	NT	upstream	juvenile												
Shortjawed Kokopu ⁹	T	upstream	juvenile												
Koaro ¹²	NT	upstream	juvenile												
Torrentfish ¹³	NT	upstream	juvenile												
Redfinned Bully ^{14,15}	NT	upstream	juvenile												
Common Bully ^{14,15}	NT	upstream	juvenile												
Bluegilled Bully ¹	NT	upstream	juvenile												
Giant Bully ¹	NT	upstream	juvenile												
Lake Taupo and tributaries															
Rainbow Trout (North Taupo) ^{16,17}	S	upstream	adult												
Rainbow Trout (South Taupo) ^{18,19,20}	S	upstream	adult												
Brown Trout (Taupo) ¹	S	upstream	adult												
Juvenile Trout (Taupo) ¹	S	down	juvenile												
Koaro (Taupo) ^{21,22}	NT	up/down	adult												
Koaro (Taupo/Rotoaira) ²³	NT	down	larvae												
Koaro (Taupo) ²⁴	NT	upstream	juvenile												

- ¹ McDowall 1995
- ² Jellyman et al 1999
- ³ Standifff et al 1988
- ⁴ McDowall and Kelly 1999
- ⁵ McDowall 1990
- ⁶ Wilding et al 2000 (and references therein).
- ⁷ G. Maden (pers. comm.)
- ⁸ Rowe and Grayneith (MIE) 2002
- ⁹ Dedual and Jowett 1999
- ¹⁰ Rowe et al 2002
- ¹¹ Ward et al 2005 (and references therein)
- ¹² Mitchell and Riddington 1982
- ¹³ Charteris et al 2003
- ¹⁴ Allibone and Coskey 2000
- ¹⁵ Scrimgeour and Eldon 1989
- ¹⁶ Jellyman et al 2000
- ¹⁷ Staples 1975 (peak)
- ¹⁸ McDowall and Eldon 1997 (Captive breeding, range)
- ¹⁹ Barrier and Hicks 1994
- ²⁰ Thompson 1987
- ²¹ Hopkins 1971
- ²² Boubée et al 2000
- ²³ Chris Annandale (pers. comm.)
- ²⁴ Ben Wilson (pers. comm)

Figure 1: Fish migration calendar for the Environment Waikato (EW) region showing the peak and range periods for migration activity, conservation status, migration direction, life stage at time of migration and instream works restriction period relating to indigenous fish habitat waterways under the EW regional plan.

Waiaua River Residual flow

The Waiaua HES does not meet the Fresh Water Plan “Policy 6.1.4 states that, subject to Policy 6.1.3, the Taranaki Regional Council will require quantities, levels and flows of water in rivers and streams that retain at least 2 /3 habitat at mean annual low flow’

The Waiaua River is listed with Lake Opunake as an entity in the Aug15 Regional Fresh Water Plan for Taranaki, and they are listed for their significant as a trout fishery only, and this was not commented on by Fish and Game in their written submission regarding SNA’s. **ResentRecent** comments from Fish and Game are that, Lake Opunake is a more significant trout fishery than the Waiaua River.

The predicted MALF of the Waiaua River is 1117 l/s thus residual flow of 2/3 MALF is 744 l/s, the existing residual flow is 180 l/s.

The residual flow had increased during the previous consent review in 2004 from 100l/s to 180L/s.

Opunake Power Ltd needs to keep the residual flow at the existing consent levels to ensure the financial viability of the HEP scheme.

The residual flow was increased in line with the report “Flow Requirements for Fish Passage and in stream Habitat Downstream of the Waiaua Hydroelectric Power Scheme Weir” by I G Jowett (NIWA) dated 28th March 1995. This report is contained in the appendices of this AEE.

Ian Jowett was requested to comment and update this report but the TRC cited a conflict of interest as Ian is consulting to the TRC on the draft Fresh Water Plan.

The Report, "Flow Requirements for Fish Passage and in stream Habitat Downstream of the Waiaua HEP Scheme Weir 28th March 1995 I G Jowett" is attached in Appendix 3:

The summary comments in the report were:

"Flow requirements vary depending upon the use that is expected of the river. In the Waiaua River flow requirements varied from 60 to 180 l/s depending upon the use and standards of assessment.

- *Adequate native fish passage and minimum native fish habitat would be provided by a flow of 60 l/s.*
- *Optimum habitat for red finned bullies and common bullies is provided by a flow of 100 l/s.*
- *Adequate passage depth for brown trout is provided by a flow of 120 l/s.*
- *Minimum (15%) food producing habitat is provided by a flow of 180 l/s.*

I would recommend that a minimum flow of 100 l/s would provide for native fish passage and habitat in this section of the river and would probably provide sufficient depth of passage for trout. This recommendation would be consistent with other native fish flow recommendations I have made in the Waipara and Kakanui Rivers, both South Island east coast rivers. The quality of the food producing habitat, although poorer than many Taranaki Rivers, is probably appropriate for a small stream. A lower minimum flow of 60 l/s would provide for minimum native fish requirements and a higher minimum flow of 180 l/s would provide food producing habitat consistent with a 15% minimum guideline."

ResentRecent discussions with Allen Stancliff Fish and Game Senior field officer indicated supporting the status quo with regards to residual flow.

Variation in residual flow:

The residual flow is naturally varied by water over topping the weir – this has occurred approximately 36% of the time from monitoring data obtained 2016-2017.

The residual flow is also varied by the automatic operation of the Weir sluice gate (G5) the gate partially opens every 6hrs when the river level is below the weir and every hour when the level is >100mm overtopping the weir. The opening of G5 has the additional benefit of allowing sand and gravel to continue its natural path down the river instead of entering the lake intake canal.

Additional variation in river flow happens when the canal sluice gate is opened.

The disturbance of the Waiaua River bed

Opunake Power holds land use consent 5692-1 to cover the disturbance of the bed of the Waiaua River by removing sediment build-up upstream of a weir for the purpose of maintaining the Opunake hydroelectric power scheme

POL 6.6.5 The extraction of material (ie sand, gravel and rock) from river beds, will be prohibited, except for: (a) extraction of sand and gravel from the dry areas of river beds to meet reasonable domestic and on-farm needs; (b) the purpose of avoiding, remedying or mitigating the adverse effects of flooding and erosion; (c) as necessary for the placement and maintenance of structures within the bed.
POL 6.6.6 Disturbances to river and lake beds shall be timed, and/or carried out in a manner and location, that will avoid, remedy or mitigate any adverse effects on seasonal fish migration or spawning, including the disturbance of: (a) gravel bedded rivers on the ring plain between May and October; (b) lower river and estuarine areas between March and June. (c) lower river and estuarine areas between mid-August and end-November

This consent is to allow the extraction of sand and stone material above the weir in the Waiaua River to reduce the impact of the moving bed load of material traveling down the river which if not ~~extracted~~extracted could end up in the Lake or continuing out to sea.

Proposed gravel and sand extraction location from the Waiaua River



Background:

- The Waiaua River carries large volumes of river gravels and silt that are progressively and continuously moved down the river during floods and high river flows.
- This has resulted in excessive build up of gravel and sand behind the weir and up to the point above the road bridge. The movement of this sand has an adverse effect on the fishery below the weir.
- Extraction of gravel and sand will help mitigate the effects listed above.

Nature and effects of the Activity

- The activity will remove river bed gravel and sand undertaken using mechanical machinery
- There will be higher levels of noise during the machinery operation
- There will be some discoloration of the river when the machinery is operating in the river flow path.

Mitigation of potential effects

- The machinery will be operated during daylight hours
- The extraction site is located directly below SH45, thus the higher level of noise will mitigate by general traffic noise.
- Diverting the river flows away from the extraction area to alleviate disturbance of the river flow and hence minimise discoloration

- The undertaking of extraction work during medium to low flows will create lesser a problem when undertaking extraction in the river bed. This will always be at a time when there is no overtopping of the weir.
- The sluicing chamber and canal will act as a settling basin for any sedimentation that may occur.
- The effect of this activity will have minimal effect on the landscape, there is currently an existing laydown area utilised for this activity

Monitoring

- The monitoring of this activity will be based on the following
 - State of the river (Flow rate)
 - Quantity of material removed
 - Date and time of extraction
 - Area of extraction
 - Extent of new deposits since extraction

Conclusion

- The potential effects on the environment are generally positive
 - Enhance the habitate of the ecosystems below the weir struction
 - Reduce the excessive buildup of silt and sand within the canal and fishpass
 - Reduce the sand deposits in the lake headwaters.
 - Create a stilling basin above the weir.

10.2 Environmental Effects Lake Opunake

Opunake Power Limited holds water permit 1796-3 to take and use water from Lake Opunake for hydroelectric power generation

POL 5.1.1 When managing the use and development of fresh water and the beds of rivers and lakes, the Taranaki Regional Council will recognise:

(a) the need for all activities to avoid, remedy, or mitigate adverse environmental effects in accordance with the objectives and policies of this Plan;

(b) the positive benefits to people and communities arising from the use or development; (c) existing uses of physical resources including any human-made resources that have a specific-use purpose;

(d) the effects on existing lawfully established activities;

(e) the need to allow existing users to progressively upgrade their environmental performance, where improvements are necessary to meet the provisions of this Plan.

POL 6.1.5 When assessing resource consent applications for the taking, use, damming or diversion of water, the Taranaki Regional Council will consider:

(a) the need to ensure that surface water is available for reasonable domestic needs, stock drinking water requirements, and fire fighting purposes;

(b) where there are competing uses for water, or in catchments identified in Policy 6.1.2, the degree of community or regional benefit from the taking, use, damming or diversion as distinct from private or individual benefit;

(c) the need for the volumes of water sought;

(d) the need to use water efficiently and with a minimum of waste;

(e) what alternative sources of water or water collection or storage methods have been considered?

(f) possible mitigation measures including the maintenance of adequate minimum flows or flow regimes, the reduction or suspension of takes, the location, timing, duration and rate of the abstraction, the maintenance of fish passage, the application of riparian planting, use of gradient control for diversions, or other measures; (

g) the need to install systems to accurately measure the volumes of water abstracted and to reduce or suspend abstractions.

Opunake Lake covers approximately 12 hectares and reaches a maximum depth near the intake structure. The shore line includes several grassed areas maintained by the STDC, a several private residences and several steep scrub covered escarpments. Extensive reed beds dominate the shore line margins on the southern shore of the lake

The key recreational uses of the lake are the walking track circumnavigating the lake, this has been instigated by the Opunake Lions club.

The lake is used for a variety of recreational pursuits such as swimming, kayaking and trout fishing. One boat ramp exists on the lake shore near the intake structure.

The lake supports both Brown and Rainbow trout, some of which are introduced each year for a "Take a Kid Fishing Day". Trout can move between the lake and the Waiaua River and spawning grounds upstream.

The lake has many species of water fowl and wading birds; there are hundreds of birds on the lake at any one time, from Canada Geese to Spoonbill Waders



Photo: Birds May 2018

10.3 Lake Bed Sand Inundation

Sand has built up in the lake bed due to a sand deposition resulting from heavy rain and massive natural erosion event on Mt Taranaki during October 1998, near the head waters of the Waiaua River that diverted slip material from the Oaonui River into the Waiaua River, this bed load of sand continues to flow down the river to this day.

The issue of sand and sedimentation entering the lake has been documented from the time of the scheme inception by newspaper articles dating from 1927.

- The immediate issue has been addressed by changing the operation of the intake gates, closing of the intake gates during high river flow events.
- Whenever possible, the bypass gate is left open to minimize the sand entering the canal, this has had the effect of only having to operate the canal sluice gate to clear the sand trap 3 times in 6 months.
- The historical issue of the existing sediment builds up, appears to be a natural event as the lake has been cleared every 20 odd years.
- Opunake Power Ltd is happy to assist a community lead initiative to clear the lake bed, and continue to operate the scheme in the most efficient manner to minimize sand inundation, attached are the operational guidelines appendix 4.

The following photos show the change in sand near the head waters of the Lake Opunake.

Opunake HEP Scheme AEE



2010 Lake Head



2015 July Lake Head



Photo: October 2014 Lake from Intake



Photo: 2016 June Low level <500mm after canal wall installation



Photo: May 2018 – lake level <500mm and filling

11. TAIL RACE OUTLET ON OPUNAKE BEACH

Opunake Power holds coastal discharge permit 4744-2 to cover the discharge of up to 3900 l/s of water from hydroelectric power generation through two marine outfall pipes into the Tasman Sea.

This is covered by the Taranaki Regional Coastal Plan

POL 9.3 Discharges of contaminants or water to water should: (a) be carried out in a way that avoids or mitigates significant adverse effects on marine biological community composition; (b) maintain or enhance, after reasonable mixing, water quality of a standard that allows existing community use of that water for recreation, fishing or kaimoana gathering to continue; (c) avoid, remedy or mitigate significant adverse ecological effects on estuaries or intertidal areas; (d) be of a quality that ensures that the size or location of the zone required for reasonable mixing does not have a significant adverse effect on community use of the coastal marine area or the life-supporting capacity of water and aquatic ecosystems.

And Opunake Power holds coastal permit 4563-2 to cover the erection, placement, and maintenance of an outfall structure in the coastal marine area on the Opunake Beach foreshore

The tail race structure is allowed by the Regional Coastal Plan section C1.1

Policy References Reconstruction, alteration or removal and replacement of an existing structure for maintenance C1.1 • Activity is for the purpose of maintaining the structure in good repair; • Size of the structure will not increase beyond original size; • Sediment disturbance will not decrease the visual clarity of water by more than 50% outside a 50 metre radius zone of mixing; • No contaminant will be released into coastal water; • Activity complies with the general standards in Section 4.4; • At least one working day before the maintenance commences, the Taranaki Regional Council is informed that the maintenance activity is to occur.

Comments: the fixed tail race structure allows the water from the lake to flow via the penstock to the generator out to sea via the tail race pipes.

Since the upgrade of the HEP scheme only one of the two pipes are utilised. The fresh water flows out when the HEP scheme is taking water from Lake Opunake and generating. There is a small amount of water that passes the shut off valve when there is no generation.

The structure was modified during the station upgrade in 1995, but has predominantly been in place since 1923 when the scheme was commissioned.

The only three concerns raised about the water discharge are as follows:

- Notification of water discharge to people in the area
- Change in direction of the tail race towards the surf club.
- Contaminated water

The HEP has installed warning signs approaching and at the discharge pipes, and prior to the discharge a siren is sounded, to ward people of the impending high-water flow out the discharge pipe.

The change in discharge direction towards the north generally occurs if the station is not operated for period and the rock formed tail race is inundated with sand. The power of the ocean currents and discharge water redirect the tail race discharge water back to the desired route.

There should not be any chemically contaminated water discharged to the sea, at times there may be discoloured water due to suspended solids that have entered the lake from the river, this water is being discharged to the sea at the river mouth so as no additional environmental effects.



Photo HEP Outlet – 2017 White baiters

12. CONSULTATION UNDERTAKEN

Previous stakeholder meetings include a meeting in November 2011, the agenda is below:

- Sediment loadings in the Waiaua and the lake
- Returning lake sediment to the river
- Consent 1795-4
 - Fish Passage
 - Residual Flow
 - Monitoring programme
 - Lake weeds

During the 2018 renewal process discussions had taken place with the key stakeholders notably Rex Langton, Heather Sharp, Fish and Game, and Counsellors from the STDC

A stakeholders meeting is programmed for 1st June 2018 with the Taranaki Fish and Game Council and the Department of Conservation and others to canvass key issues of concern.

They are expected to be as follows: (this will be updated once the meetings have been held)

- The impact of bed load movement, debris and silt entering the canal and lake
- Residual flows downstream of the diversion weir;
- The high-water velocities at the top of the fish pass are presently posing a barrier to fish passage;

Further discussions are to be undertaken with the affected parties as listed below

- Taranaki Iwi - Authorised voice is Te Kāhui o Taranaki Trust Leanne Horo
- STDC Brent Manning, Group Manager Engineering Services
- Department of Conservation – Nikki Palmer
- Fish and Game New Zealand – Allen Stancliff
- Lions Club of Opunake.
- Rex Langton
- Gloria Kahupukoro
- Heather Sharpe
- Residents around the lake.

13. EFFECTS ON AMENITY, ECONOMIC AND SOCIAL VALUES

The scheme contributes to the national economy through power generation while Opunake Lake which was created as part of the overall scheme, provides an important recreational resource for the people of Opunake and surrounding areas.

The loss of amenity values due to exposure of the shallow lake margins arising from lake level fluctuations for generation requirements was mitigated by the deepening of the lake in 2002 by the Opunake Lions Club, but in the pursuing years the sand from the slip near the headwaters has inundated the lake with sand. History has indicated that every 25-20 years the lake bed needs clearing.

The operation of the generator and hence the lake level is controlled by the various factors that influence the scheme. These include river inflow levels, time day Electricity usage, and equipment maintenance and plant failure. Generally, the lake is at its highest level during the late afternoon and early evening periods, this is when most activity takes place on and around the lake.

14. EFFECTS ON CULTURAL VALUES

Since the scheme was commissioned in 1922, the reduced flows in the reach downstream of the diversion weir resulted in the loss of the Mauri or life force of the river, and possibly areas favoured for mahinga kai.

Discussions will need to be held with Iwi to understand the effect on cultural values of the Waiaua River with in relation to the HEP Scheme.

Lake Opunake has been part of the Opunake community and since the 1960s has been progressively been a focus of community groups spear headed by the Opunake Lions Club, which has been instrumental in the formation of the walkway, playground and boat ramp.

- The lake has over a 95-year period become inextricably linked to the community
- The lake provides walking paths for the popular walkway and pleasant access to the river and swimming holes.
- The lake provides a safe place to trout fish which is cemented into the community by the "Take a kid fishing day" held most years.
- In the past the lake has been used for water sports such as water skiing and canoeing
- The lake discharge provides fresh water at the beach which has been a regular place to whitebait, which the presence of this history is embedded in the community
- All these things depend on the water take from the Waiaua River; this is via the intake canal which is a very popular swimming spot where children swim with the current down to the sand sluice pool. At the sand sluice pool, they have improvised a diving board from trees on the north side of the pool.

15. PART II RESOURCE MANAGEMENT ACT (1991)

In considering the Notice of Requirement, regard must be had to Part II of the RMA (Purpose and principles). Section 5 (1) establishes that the purpose of the RMA is:

- *to promote the sustainable management of natural and physical resources:*

Section 5 (2) defines 'sustainable management'

(2) in this Act, 'sustainable management' means managing the use, development, and protection of natural and physical resources in a way or at a rate, which enables people and communities to provide for their social, economic and cultural wellbeing and for their health and safety while –

(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonable foreseeable needs of future generations; and

(b) Safeguarding the life-supporting capacity or air, water, soil and ecosystems; and

(c) Avoiding, remedying or mitigating any adverse effects of activities on the environment.

Comment

Section 5 of the Act requires a broad overall judgment on if a proposal promotes the sustainable management of natural and physical resources. That approach allows for a comparison of conflicting considerations, their scale or degree and their relative significance.

Electricity is a physical resource. The ability to have access to a secure and reliable electricity supply is an integral part of the social, economic and cultural wellbeing of communities and is a crucial part of allowing people to provide for their health and safety.

The renewal of resource consents with minimal changes in conditions will allow the existing hydroelectric scheme at Opunake to operate to sustain the ability of the electricity network to meet the electricity needs of both the people of Taranaki and further afield given access to the national grid. The design of the scheme and its ongoing operation will ensure that most of potential adverse effects are avoided or mitigated to no more than minor levels. Confirmation of the rollover of the designation will therefore be entirely consistent with and achieve the purposes of the Act.

Section 7 (RMA)

Particular regard must be had to the matters set out in (a) – (j) of s7 in considering if the proposed designation achieves the purposes of the Act. The matters relevant to the hydroelectric scheme designation are:

(aa) The ethic of stewardship

(b) The efficient use and development of natural and physical resources

(c) The maintenance and enhancement of amenity values

(f) Maintenance and enhancement of the quality of the environment

Comment

In reference to section 7 and (aa) and (b) above, we refer to the National Policy Statement on Renewable Electricity which encourages investment in wind, geothermal, hydro, and tidal power.

The purpose of the NPS is to recognise the importance of renewable energy and to seek to help New Zealand meet its targets of 90% renewable electricity by 2025 and 50% reduction in greenhouse gas emissions by 2050.

The NPS requires local authorities to recognise the importance of new renewable generation for New Zealand in their resource management plans and consent decisions. And while encouraging new renewable generation, local authorities are also required to promote and encourage existing renewable generation in the spirit of stewardship.

In reference to section 7 and (c) and (f) above the scheme provides the community with a lake which is regularly used for water sports and other recreational activities.

16. CONCLUSION

The existing hydroelectric scheme has been in existence for almost 95 years and is a recognised part of the fabric of Opunake.

The existing resource consents need to be renewed with minimal adverse changes to the conditions to allow the viable continuation of the Opunake Hydro Electric Scheme, which will allow scheme to meet or exceed the required environmental performance.

When the Fish Migration issues associated with the intake tunnels are mitigated, the effects on the Waiaua River environment are no more than minor. The Opunake Lake's recreational value can be restored if the bed load of sand is removed, but the compromise is the loss of wading bird's habitat.