

Trustpower Limited
Patea Hydroelectric Power Scheme
Monitoring Programme Report
2011-2014

Technical Report 2014-88

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Executive summary

Trustpower Limited (the Company) operates a hydroelectric power station located on the Patea River on Maben Road, near Hurleyville. Water is impounded behind the 82m high Patea Dam to form Lake Rotorangi. This water is diverted through the 30 MW power station, the largest in Taranaki. This report for the period July 2011–June 2014 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Company's environmental performance during the period under review, and the results and environmental effects of the Company's activities.

The Company holds 10 resource consents, which include a total of 146 conditions setting out the requirements that the Company must satisfy. The Company holds three consents to allow it to dam, take and/or use water, two consents to discharge water into the Patea River, three consents for structures associated with the scheme and two consents to discharge emissions into the air at this site.

During the monitoring period, Trustpower Limited demonstrated an overall level of environmental performance that required improvement.

The Council's monitoring programme for the period under review included seven inspections and two hydrological gaugings. In addition, analysis of generation data, lake level data, Patea River flow and groundwater abstraction data, provided by the Company, was conducted. The Council also reviewed numerous reports submitted in accordance with consent conditions.

The monitoring showed that overall the scheme was operated well, and within resource consent requirements. The Company coordinated a significant number of investigations and reports during the reporting period. However, in one aspect, being the provision and monitoring of flow in the lower Patea River, the Company demonstrated poor performance. It should be noted that this poor performance related to insufficient supervision of a contractor and over reliance on automated alarms, and this was not considered to be deliberate offending. This is the first monitoring report to discuss compliance with the new consents, which commenced in 2010. There were two Unauthorised Incidents recording non-compliance in respect of this scheme during the period under review, one which was attributed to teething issues associated with the new regime, the other which resulted in the issuance of three infringement notices and an abatement notice.

During the year, the Company demonstrated an 'improvement required' level of environmental and administrative performance with the resource consents, principally due to the issues with the flow in the Lower Patea River. All other aspects of the scheme were operated with a high level of environmental and administrative performance.

For reference, in the 2012-2013 year, 35% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 59% demonstrated a good level of environmental performance and compliance with their consents. In the 2013-2014 year, 60% of consent holders achieved a high level of environmental performance and compliance with their consents, while another 29% demonstrated a good level of environmental performance and compliance.

This report includes a recommendation for the 2014-2015 year.

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1. Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is the Monitoring Report for the period July 2011-June 2014 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Trustpower Limited (the Company) in relation to the Patea Hydroelectric Power Scheme (HEPS). This scheme is located on the Patea River on Maben Rd, near Hurleyville.

This report covers the results and findings of the monitoring programme implemented by the Council in respect of the consents held by the Company that relate to abstractions and discharges of water within the Patea catchment, the air discharge permits held by Trustpower to cover emissions to air from the site, and land use consents to cover the associated structures.

One of the intents of the *Resource Management Act 1991* (RMA) is that environmental management should be integrated across all media, so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective. Accordingly, the Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of the Company's use of water, land and air, and is the first combined annual report by the Council for the Company. Monitoring activities undertaken prior to July 2011 were reported in two separate reports, one covering monitoring of Lake Rotorangi, the other covering monitoring of the Patea River downstream of the dam.

1.1.2 Structure of this report

Section 1 of this report is a background section. It sets out general information about compliance monitoring under the RMA and the Council's obligations and general approach to monitoring sites through annual programmes, the resource consents held by the Company in the Patea catchment, the nature of the monitoring programme in place for the period under review, and a description of the activities and operations conducted at the Company's site.

Section 2 presents the results of monitoring during the period under review, including scientific and technical data.

Section 3 discusses the results, their interpretations, and their significance for the environment.

Section 4 presents recommendations to be implemented in the 2014-2015 monitoring year.

A glossary of common abbreviations and scientific terms, and a bibliography, are presented at the end of the report.

1.1.3 The Resource Management Act 1991 and monitoring

The *Resource Management Act 1991* (RMA) primarily addresses environmental 'effects' which are defined as positive or adverse, temporary or permanent, past, present or future, or cumulative. Effects may arise in relation to:

- (a) the neighbourhood or the wider community around an activity, and may include cultural and social-economic effects;
- (b) physical effects on the locality, including landscape, amenity and visual effects;
- (c) ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;
- (d) natural and physical resources having special significance (for example recreational, cultural, or aesthetic);
- (e) risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Council is recognising the comprehensive meaning of 'effects' inasmuch as is appropriate for each activity. Monitoring programmes are not only based on existing permit conditions, but also on the obligations of the RMA to assess the effects of the exercise of consents. In accordance with section 35 of the RMA, the Council undertakes compliance monitoring for consents and rules in regional plans, and maintains an overview of the performance of resource users and consent holders. Compliance monitoring, including both activity and impact monitoring, enables the Council to continually re-evaluate its approach and that of consent holders to resource management and, ultimately, through the refinement of methods and considered responsible resource utilisation, to move closer to achieving sustainable development of the region's resources.

1.1.4 Evaluation of environmental and administrative performance

Besides discussing the various details of the performance and extent of compliance by the consent holder/s during the period under review, this report also assigns a rating as to each Company's environmental and administrative performance.

Environmental performance is concerned with actual or likely effects on the receiving environment from the activities during the monitoring year. **Administrative performance** is concerned with the Company's approach to demonstrating consent compliance in site operations and management including the timely provision of information to Council (such as contingency plans and water take data) in accordance with consent conditions.

Events that were beyond the control of the consent holder and unforeseeable (that is a defence under the provisions of the RMA can be established) may be excluded with regard to the performance rating applied. For example loss of data due to a flood destroying deployed field equipment.

The categories used by the Council for this monitoring period, and their interpretation, are as follows:

Environmental Performance

- **High** No or inconsequential (short-term duration, less than minor in severity) breaches of consent or regional plan parameters resulting from the activity; no adverse effects of significance noted or likely in the receiving environment. The Council did not record any verified unauthorised incidents involving significant environmental impacts and was not obliged to issue any abatement notices or infringement notices in relation to such impacts.
- **Good** Likely or actual adverse effects of activities on the receiving environment were negligible or minor at most. There were some such issues noted during monitoring, from self reports, or in response to unauthorised incident reports, but these items were not critical, and follow-up inspections showed they have been dealt with. These minor issues were resolved positively, co-operatively, and quickly. The Council was not obliged to issue any abatement notices or infringement notices in relation to the minor non-compliant effects; however abatement notices may have been issued to mitigate an identified potential for an environmental effect to occur.

For example:

- High suspended solid values recorded in discharge samples, however the discharge was to land or to receiving waters that were in high flow at the time;
- Strong odour beyond boundary but no residential properties or other recipient nearby.
- **Improvement required** Likely or actual adverse effects of activities on the receiving environment were more than minor, but not substantial. There were some issues noted during monitoring, from self reports, or in response to unauthorised incident reports. Cumulative adverse effects of a persistent minor non-compliant activity could elevate a minor issue to this level. Abatement notices and infringement notices may have been issued in respect of effects.
- **Poor** Likely or actual adverse effects of activities on the receiving environment were significant. There were some items noted during monitoring, from self reports, or in response to unauthorised incident reports. Cumulative adverse effects of a persistent moderate non-compliant activity could elevate an 'improvement required' issue to this level. Typically there were grounds for either a prosecution or an infringement notice in respect of effects.

Administrative performance

- **High** The administrative requirements of the resource consents were met, or any failure to do this had trivial consequences and were addressed promptly and co-operatively.
- **Good** Perhaps some administrative requirements of the resource consents were not met at a particular time, however this was addressed without repeated interventions from the Council staff. Alternatively adequate reason was provided

for matters such as the no or late provision of information, interpretation of 'best practical option' for avoiding potential effects, etc.

- **Improvement required** Repeated interventions to meet the administrative requirements of the resource consents were made by Council staff. These matters took some time to resolve, or remained unresolved at the end of the period under review. The Council may have issued an abatement notice to attain compliance.
- **Poor** Material failings to meet the administrative requirements of the resource consents. Significant intervention by the Council was required. Typically there were grounds for an infringement notice.

For reference, in the 2012-2013 year, 35% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 59% demonstrated a good level of environmental performance and compliance with their consents. In the 2013-2014 year, 60% of consent holders achieved a high level of environmental performance and compliance with their consents, while another 29% demonstrated a good level of environmental performance and compliance.

1.2 Process description

The Patea HEPS is located on the Patea River, some 43 km upstream of the river mouth (Figure 1). Following the granting of consents in 1978 to construct a hydroelectric power station on the Patea River, work commenced on the 82 m high earth-filled dam. The dam impounds water in the Patea River to create the reservoir known as Lake Rotorangi. Lake Rotorangi is over 46 km long, fairly narrow, and has a surface area of approximately 6 km². The lake has storage of some 6,600 cumec-hours within the 4.5 m operational range, which is small by national standards. The scheme's 30 MW power station is however the largest hydroelectric station in Taranaki.

The original consents for the scheme expired in 2008 and applications for renewal of all consents were received on 19 November 2007. A Council hearing commenced for these consents on 3 June 2009. These consents were granted, but were subsequently appealed on 17 July 2009. This was resolved by the Environment Court, and consents were granted on 17 December 2010.

Under the original consents, Council undertook a significant amount of monitoring of the environment associated with the dam, including Lake Rotorangi. This monitoring was reported in conjunction with compliance monitoring, with these reports included in the bibliography. These reports also provide some detail on historical matters.

Monitoring of the receiving environment is now required by conditions on the new consents, and as such, is coordinated by the Company, who engaged various consultants over the reported period. Council was engaged as one of these consultants, to undertake some of the required monitoring. The most significant component of the receiving environment monitoring undertaken prior to consent renewal was the monitoring of Lake Rotorangi. This annual monitoring is still undertaken by Council, but now through a State of the Environment monitoring programme. It is essentially undertaken on a cost sharing basis, with the Company funding this monitoring once every three years, in accordance with consent conditions.

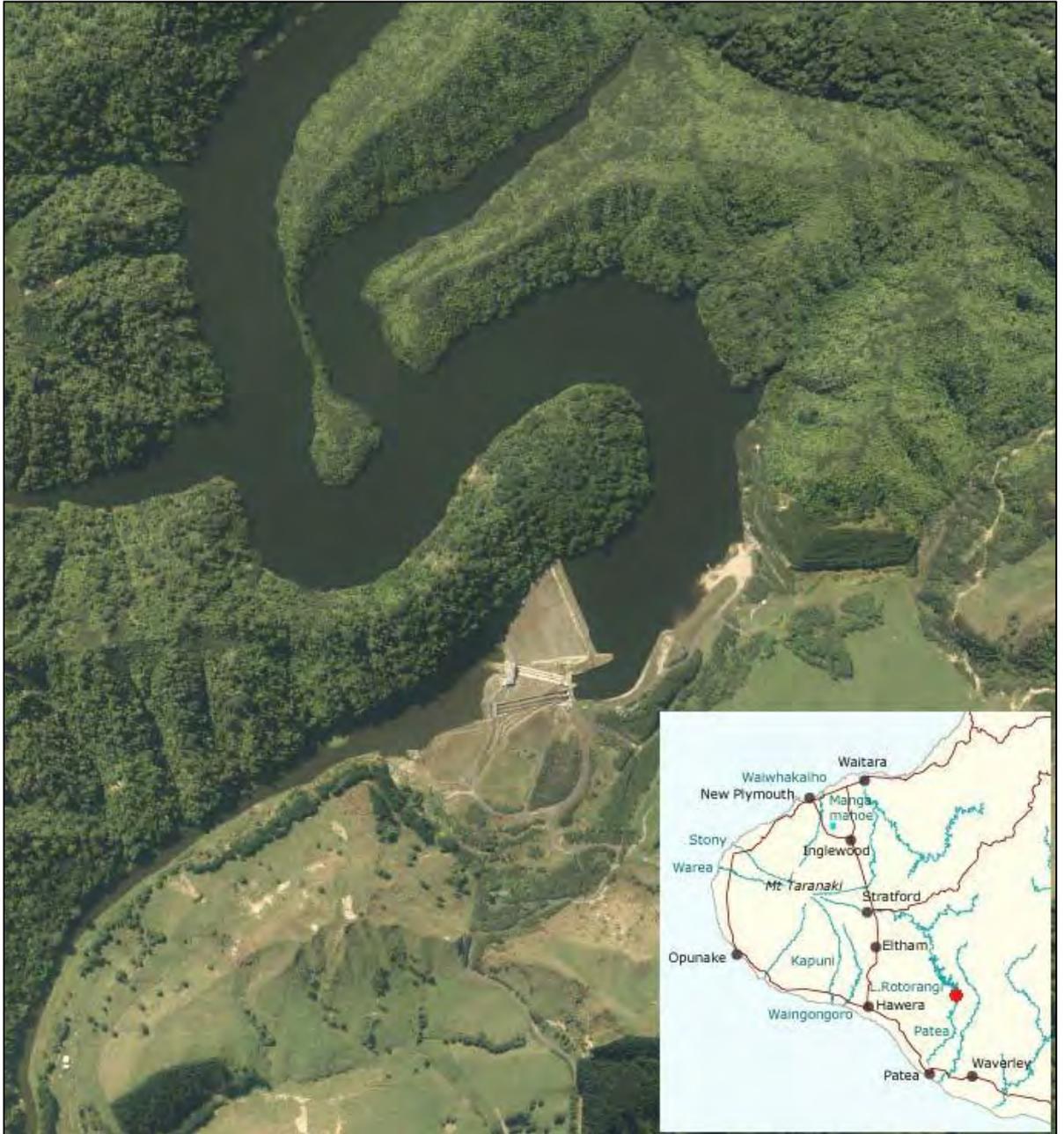


Figure 1 The Patea Dam. The red dot in the inset identifies its location within Taranaki.

1.3 Resource consents

1.3.1 Water abstraction permit

Section 14 of the RMA stipulates that no person may take, use, dam or divert any water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or it falls within some particular categories set out in Section 14.

Trustpower holds water permit **0489-2** to cover the damming and diversion of the Patea River from Lake Rotorangi through the intake and spillways. This permit was issued by the Council on 25 June 2009 under Section 87(e) of the RMA, and following appeal, commenced on 17 December 2010. Trustpower applied to for a variation to this consent, which was granted on 27 March 2012. It is due to expire on 1 June 2040.

This permit includes 63 special conditions, which includes numerous monitoring requirements and associated conditions.

Condition 1 limits the rate of water that can be diverted, while conditions 2 and 3 clarify how this allocation of water does or does not affect the current and future allocation of water upstream of the dam.

Conditions 4 to 8 define the minimum flow that is to be maintained in the Patea River downstream of the dam, and allows for a lower minimum flow when less than normal rainfall reduces inflows.

Conditions 9 to 12 define the minimum and maximum allowable lake levels for winter and summer periods, specifies the required spillway gate settings during a high lake level, and allows for some flexibility in lake levels to allow for a short term electricity shortage. When such a shortage occurs, the consent holder is required to notify Council, and provide an explanation.

Condition 13 requires the consent holder to provide a real time estimate of the level of Lake Rotorangi on the internet, while condition 14 requires the installation of staff gauges at three locations.

Condition 15 requires that in consultation with the Hawera Water Ski Club and Mangamingi Residents, a survey be undertaken to identify any hazards to water skiing, and in reporting this survey provide recommendations on how to avoid remedy or mitigate these hazards. Condition 16 then requires the publication of a full set of maps identifying these hazards to be erected at various locations and distributed to various parties.

Condition 17 requires the consent holder to construct and maintain a floating pontoon to allow improved access for boating at Pukekino Landing while condition 18 requires the electronic recording of the water level of Lake Rotorangi, and the provision of records to Council.

Conditions 19 to 23 relate to the provision of upstream and downstream fish passage facilities, with these facilities to be constructed, managed and maintained in the manner described in the associated report, required by condition 20.

Conditions 24 to 28 describe the requirements for developing a monitoring plan, including any revision of this plan. This plan is to detail the methods to be used when undertaking the receiving environment monitoring required by this consent.

Condition 29 requires the annual monitoring and reporting of the number of each fish species transferred upstream of the dam, and of the success of each spillway opening event for the downstream passage of adult eels, while conditions 30 and 31 requires the monitoring of upstream fish populations, and the reporting of the overall impact of the fish transfer programme, including making recommendations on future management of this transfer programme.

Condition 32 requires monitoring of the ecology of the Patea River downstream of the dam, including the varial zone.

Conditions 33 to 35 requires the monitoring and reporting of the effects of the dam on trout downstream of the dam, and includes consideration of a trout restocking programme, which in itself would need to be monitored.

Conditions 36 and 37 requires monitoring and reporting of the extent, frequency, causes and effects of discharges of de-oxygenated water into the river below the Patea Dam. The report is to include recommendations for mitigating any effects or undertaking further investigations.

Condition 38 requires a one off investigation to determine the potential for fish stranding in the lower river, related to rapid reductions in water level.

Conditions 39 and 40 relate to the monitoring and reporting of sedimentation within Lake Rotorangi, and related to this is condition 41, which requires the consent holder to report on the risk to the Mangamingi Bridge from increased flooding as a result of this sedimentation, with the installation of safety devices also required.

Condition 42 requires an ecological and water quality survey of Lake Rotorangi to be undertaken every three years. This essentially requires Trustpower to fund one third of Councils annual State of the Environment monitoring of Lake Rotorangi.

Conditions 43 to 54 set out the framework for establishing an expert panel, define the role of this panel and how their input will be managed, sets out how their recommendations will be (or not) implemented, and requires stakeholder consultation as a part of this process. Related to this is the requirement for a stakeholders meeting, as required by condition 55.

Conditions 56 and 57 require the maintenance of three boat ramps, and allows for temporary access restrictions.

Signs, alerting users of Lake Rotorangi and the Patea River to fluctuations in flows and water levels floating log debris are to be erected at various locations, as per condition 58, and condition 59 requires maintenance of floating booms to safeguard lake users, and to keep floating debris away from the penstocks.

Conditions 60 to 62 require the consent holder to provide water for an annual jet boat race event in the lower Patea River, where this water is available.

Condition 63 is a review provision.

Trustpower also holds water permit **0491-2** to cover the taking and use of water from Lake Rotorangi for generation. This permit was issued by the Council on 25 June 2009 under Section 87(e) of the RMA, and following appeal, commenced on 17 December 2010. It is due to expire on 1 June 2040.

Condition 1 limits the rate of water that can be diverted, while conditions 2 and 3 clarify how this allocation of water does or does not affect the current and future allocation of water upstream of the dam.

Conditions 4 to 8 define the minimum flow that is to be maintained in the Patea River downstream of the dam, and allows for a lower minimum flow when less than normal rainfall reduces inflows.

Special condition 9 requires a report be submitted that considers a range of options for avoiding adult eel entrapment at the intake, and recommends a one of the options for implementation. Condition 10 requires implementation of this option.

Condition 11 requires the recording of flow in the Patea River at McColl's Quarry, with records to be provided to Council.

Condition 12 requires all water taken, except that taken for cooling purposes, to be discharged back to the river immediately below the dam.

Condition 13 is a review provision.

Trustpower also holds water permit **7192-1** to cover the taking and use of groundwater for domestic use. This permit was issued on 30 June 2009 under Section 87(d) of the RMA. It is due to expire on 1 June 2040.

Condition 1 requires that the activity be undertaken in accordance with the application, while condition 2 limits the daily volume that is to be taken.

Condition 3 requires the installation of a water meter on the bore, and condition 4 requires the taking of records, with these records to be provided to Council.

Condition 5 states that the consent shall lapse if not exercised prior to 30 June 2014, while condition 6 is a review provision.

Copies of these consents are appended to this report.

1.3.2 Water discharge permit

Section 15(1)(a) of the RMA 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.

The Company holds water discharge permit **7190-1** to cover the discharge of water from the Patea power house and spillway to the Patea River, for hydroelectric power generation. This permit was issued by the Council on 25 June 2009 under Section 87(e) of the RMA, and following appeal, commenced on 17 December 2010. It is due to expire on 1 June 2040.

Conditions 1 to 3 require the monitoring and reporting of the Patea River downstream of the dam, in order to assess the extent of erosion that is or is not occurring.

Condition 4 requires that the Patea Dam and associated components and structures are maintained to the standards recommended in the operative New Zealand Society of Large Dams, Dam Safety Guidelines (2000).

Conditions 5 to 7 require the consent holder to provide an Emergency Management Plan to the Taranaki Civil Defence Emergency Management Group, and numerous other parties, with the plan to be reviewed annually.

Condition 8 requires the measurement and recording of the rate of discharge from the Patea Powerhouse and main service spillway, with the records to be provided to Council.

Conditions 9 to 13 define the minimum flow that is to be maintained in the Patea River downstream of the dam, and allows for a lower minimum flow when less than normal rainfall reduces inflows.

Condition 14 requires the consent holder to make an annual payment to the Taranaki Tree Trust for the purpose of providing riparian management in the lower Patea River catchment.

Conditions 15 and 16 set out the allowable rise or recession rates for discharges of greater than 95 cumecs, with reference to the inflows at the time.

Condition 17 states that the consent holder shall financially contribute to the maintenance of the Patea River at Skinner Road and Mangaehu Stream at Bridge hydrographic stations.

Condition 18 is a review provision.

Trustpower also holds water discharge permit **7191-1** to cover the discharge of water from the scheme's auxiliary and emergency spillways to the Patea River. This permit was issued by the Council on 25 June 2009 under Section 87(e) of the RMA, and following appeal, commenced on 17 December 2010. It is due to expire on 1 June 2040.

Conditions 1 to 3 require the monitoring and reporting of the Patea River downstream of the dam, in order to assess the extent of erosion that is or is not occurring.

Conditions 4 and 5 set out the allowable rise or recession rates for discharges of greater than 95 cumecs, with reference to the inflows at the time.

Condition 6 is a review provision.

1.3.3 Air discharge permit

Section 15(1)(c) of the RMA stipulates that no person may discharge any contaminant from any industrial or trade premises into air, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations.

The Company holds air discharge permit **7193-1** to cover the discharge of contaminants to air during abrasive blasting processes, when maintaining the Patea HEPS. This permit was issued by the Council on 30 June 2009 under Section 87(e) of the RMA. It is due to expire on 1 June 2020.

Condition 1 requires the consent holder to adopt the best practicable option, and condition 2 prohibits any offensive or objectionable discharge beyond the boundary of the property.

Condition 3 requires work areas to be cleared of accumulated blasting material at the end of each day, and condition 4 limits the silica and dust content of the sand.

Condition 5 requires that all operators are to be familiar with this consent, condition 6 limits the effects of the discharge on any receiving surface watercourse and condition 7 requires the items or premises to be blasted to be covered as completely as practicable.

Condition 8 requires Council to be notified if abrasive blasting or surface coating is to take place within 100m of a watercourse, and for the consent holder to confirm that there will be no additional measures required in such a case.

Condition 9 limits the suspended particulate matter levels and dust deposition rates beyond the property boundary.

Condition 10 states that the consent shall lapse if not exercised prior to 30 June 2014, while condition 11 is a review provision.

The Company also holds air discharge permit **7194-1** to cover the discharge of contaminants to air during the burning of driftwood captured by the log boom. This permit was issued by the Council on 30 June 2009 under Section 87(e) of the RMA. It is due to expire on 1 June 2028.

Condition 1 requires the consent holder to adopt the best practicable option, and condition 2 requires the consent holder to have due regard to the direction and strength of the wind over the duration of the burning.

Condition 3 prohibits any offensive, objectionable or toxic levels of smoke or odour beyond the boundary of the property.

Condition 4 states that the activity is to undertaken in accordance with the application, and condition 5 requires that the burning is to be supervised at all times.

Condition 6 requires that the consent holder notify Council each time the burning occurs, and condition 7 requires that a record of each burning event is maintained.

Condition 8 states that the consent shall lapse if not exercised prior to 30 June 2014, while condition 9 is a review provision.

Copies of these consents are appended to this report.

1.3.4 Land use permits

Section 13(1)(a) of the RMA stipulates that no person may in relation to the bed of any lake or river use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, on, under, or over the bed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations.

The Company holds land use permit **0488-2** to cover the use of the Patea Dam and associated infrastructure. This permit was issued by the Council on 25 June 2009 under Section 87(e) of the RMA, and following appeal, commenced on 17 December 2010. It is due to expire on 1 June 2040.

Condition 1 requires that the Patea Dam and associated components and structures are maintained to the standards recommended in the operative New Zealand Society of Large Dams, Dam Safety Guidelines (2000).

Conditions 2 to 4 require the consent holder to provide an Emergency Management Plan to the Taranaki Civil Defence Emergency Management Group, and numerous other parties, with the plan to be reviewed annually.

Condition 5 is a review provision.

The Company also holds land use permit **7188-1** to cover the maintenance, repair, alter and reconstruct various structures. This permit was issued by the Council on 25 June 2009 under Section 87(e) of the RMA, and following appeal, commenced on 17 December 2010. It is due to expire on 1 June 2040.

Condition 1 limits the circumstances where maintenance can be undertaken, and condition 2 states that no contaminant shall be released to the river or lake beyond the area being worked, and prohibits the refuelling of equipment on the river or lake bed.

Condition 3 limits the allowable decrease in visual clarity caused by any works, and condition 4 requires that all material removed from the structure and surplus construction materials be removed from the river or lake bed.

Condition 5 states that dewatering of any work site will be for the minimum time necessary and includes a notification requirement, and condition 6 requires the area of disturbance to be minimised.

Condition 7 is a review provision.

The Company also holds land use permit **7773-1** to cover placement and use of a floating pontoon in Lake Rotorangi. This permit was issued by the Council on 26 January 2011 under Section 87(e) of the RMA. It is due to expire on 1 June 2028.

Condition 1 requires the structure to be constructed in accordance with the plan provided to Council, and condition 2 requires the Council be notified prior to installation.

Conditions 3 and 4 requires the area of disturbance to be minimised while taking all reasonable steps to minimise sediment issues.

Condition 5 requires the structure to be removed when no longer required, and condition 6 relates to the potential discovery of archaeological remains during installation.

Condition 7 states that the consent shall lapse if not exercised prior to 30 June 2014, while condition 8 is a review provision.

Copies of these consents are appended to this report.

1.4 Monitoring programme

1.4.1 Introduction

Section 35 of the RMA sets out obligations upon the Council to gather information, monitor, and conduct research on the exercise of resource consents, and the effects arising, within the Taranaki region and report upon these.

The Council may therefore make and record measurements of physical and chemical parameters, take samples for analysis, carry out surveys and inspections, conduct investigations, and seek information from consent holders.

The monitoring programme for the Patea HEPS site consisted of four primary components.

1.4.2 Programme liaison and management

There is generally a significant investment of time and resources by the Council in:

- ongoing liaison with resource consent holders over consent conditions and their interpretation and application;
- in discussion over monitoring requirements;
- preparation for any reviews;
- renewals;
- new consents;
- advice on the Council's environmental management strategies and content of regional plans and;
- consultation on associated matters.

1.4.3 Site inspections

The Patea HEPS was visited seven times during the monitoring period. The main points of interest were maintenance of the fish passage facilities, flow rate in the lower Patea River, and maintenance of the various signs and staff gauges required by consents. At times the inspection included an air component, when the burning of driftwood was occurring. Sources of data being collected by the consent holder were identified and accessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council.

1.4.4 Chemical sampling

Although the monitoring programme included provisional water quality monitoring, no activities were undertaken on site that required this monitoring. This also applied to the emissions from the site and the ambient air quality in the neighbourhood related to the abrasive blasting consent, which was not exercised.

1.4.5 Data review

The consents held for the Patea HEPS included numerous requirements relating to the monitoring of potential effects from the scheme, lower river ecology and fish passage provision and success. A number of these reports were received during the reported period, which were reviewed and, where appropriate, certified by the Council.

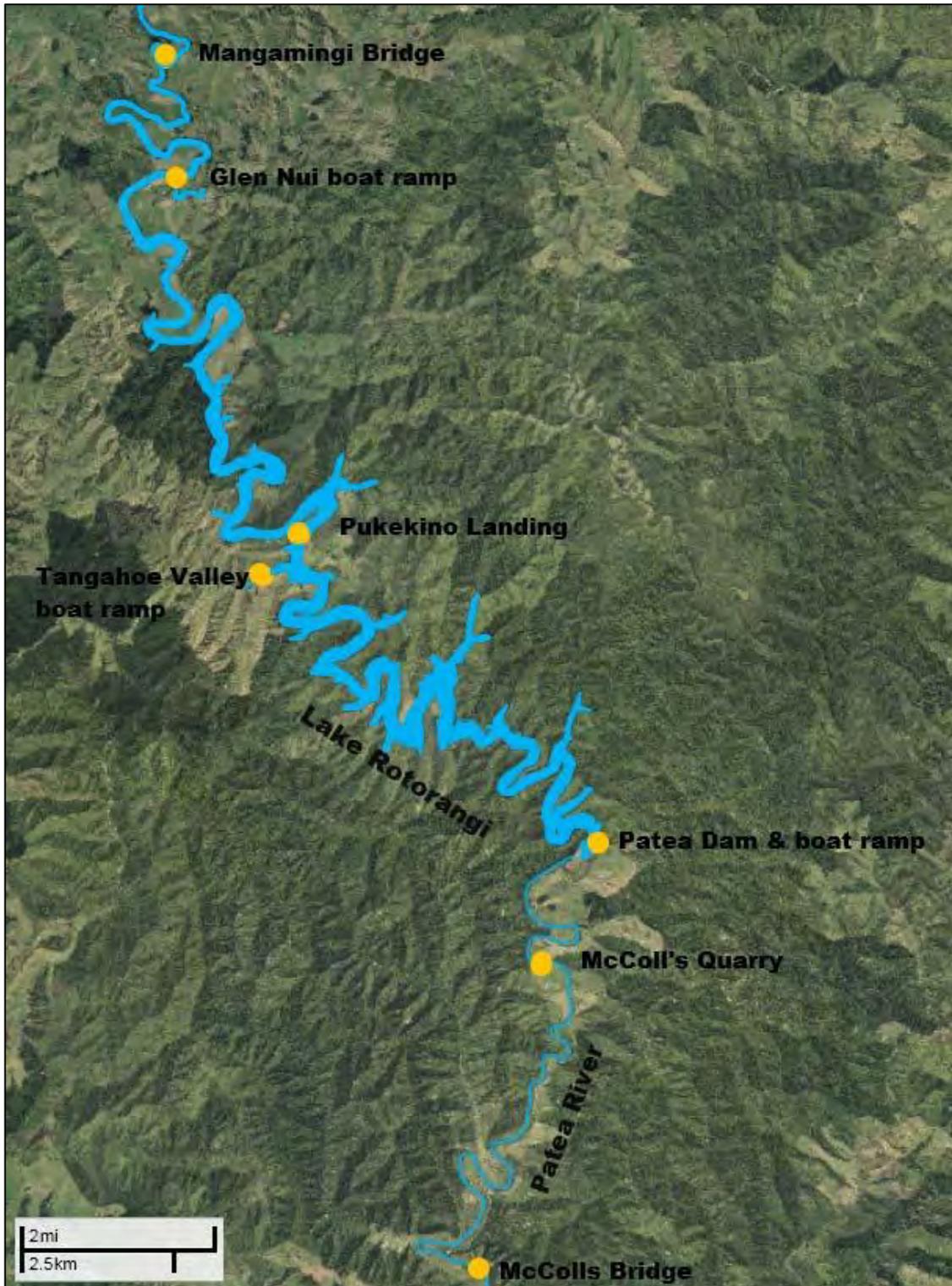


Figure 2 Lake Rotorangi, Patea Dam and the lower Patea River

2. Results

2.1 Water

2.1.1 Inspections

The first inspection of the reported period was undertaken on 23 August 2011. The river appeared low and slightly discoloured at McColl's Bridge, and it was noted that the signs required by consent were not visible at this location. Water flow was increasing during this inspection, and at McColl's Quarry, flow was well in excess of the required minimum. At the Patea Dam, the fish trap contained some flowing water but no fish and only a small number of crayfish were in the trap. The spillway was closed, but owing to the high lake level there was a minor amount of leakage under the gates. At the lake, the intake was adequately protected with a log boom, and both boat ramps were accessible. It was noted that the signs advising of fluctuating lake levels and floating debris were still to be installed at the Patea Dam boat ramp. A relatively small pile of driftwood had been stockpiled for later burning.

At the Pukekino Landing, the new staff gauge had been installed, and it indicated that the lake level was quite high. In addition, the pontoon had been installed, but the access to the pontoon was submerged by approximately 30-40 cm of water (Photo 1). This access restriction to the pontoon was not non-compliant with consent, due to the high lake level. The lake was approximately 1.5 m higher than the maximum level at which the pontoon should provide safe access, as required by consent.



Photo 1 The floating pontoon installed at Pukekino Landing, during a high lake level, 23 August 2011



Photo 2 Logs and other driftwood being burnt at the Patea Dam



Photo 3 The new staff gauge at Glen Nui Boat ramp, 16 August 2013



Photo 4 The Mangamingi Road Bridge, 16 August 2013

On 21 December 2011 the second inspection was undertaken. Lake Rotorangi had a moderate water level, and the spill way gates were closed. The boat ramp at the dam was available for use, and the log boom was intact, with little accumulated debris. Logs and other driftwood that had previously been removed from the log boom were being burnt. It was noted that at times a moderate amount of smoke was being generated, and although the wind was shifting somewhat, there were few people on site, and there was minimal effect from this activity (Photo 2). The river was in high flow, with full or near to full generation occurring. New signs were noted at the boat ramp, although they needed a slight modification to meet all the requirements of the consent, as they did not specify the extent of potential lake level fluctuations. In addition, the signs required at McColl's bridge were yet to be installed. A visit to this bridge in January 2012 found that these signs were in place.

The third inspection, completed on 22 June 2012 found little change from that observed in the previous inspection, with the boat ramps and floating pontoon accessible. However, the following inspection, undertaken on 18 April 2013, found that the floating pontoon had experienced some damage, with one of the bracing wires being detached. This was repaired shortly afterwards.

The following inspection performed on 16 August 2013 noted a very low lake level, with the Glen Nui boat ramp only just accessible with a small boat. The new staff gauge recorded '0' (Photo 3). It was noted that at that time, the lake could have been lowered by approximately 1.25 m, before the minimum lake level was reached, but had the water level been lower, this boat ramp would not have been usable. The low lake level also resulted in the formation of a rapid under Mangamingi Road Bridge (Photo 4). The floating pontoon at the Pukekino Landing was accessible however.

The penultimate inspection of the reported period, completed on 19 December 2013, found that the lake level had recovered, and the Glen Nui boat ramp was easily accessible once again. Signs were present at this boat ramp as required, and shortly



after this inspection, a visit to the Patea River mouth boat ramp confirmed the presence of required signage there also. The final inspection of the reported period was undertaken on 23 June 2014, with signage at the dam still in good condition. At this time the station was shutdown, but adequate residual flow was being provided. McColl's quarry was inspected, and found the staff gauge to be in good condition (Photo 5).

The signs located at the required boat ramps, McColl's Bridge and at the Patea River mouth boat ramp are shown in Photo 6.

Photo 5 The staff gauge at McColl's Quarry

In addition to these compliance monitoring inspections, two hydrological gaugings were undertaken at McColl's quarry during the reported period (Photo 7). The first, undertaken on 9 April 2013, gauged the flow at 2,020 l/sec. When the standard gauging error of 7% is added to this flow, the result is only 60 l/sec above the minimum flow. The other gauging, undertaken on 21 February 2014, gauged the flow at 4,066 l/sec, well above the minimum flow of 2,100 l/sec.



Photo 6 Hazard signs erected by Trustpower
 Top left: At McColl's bridge
 Top right: At Patea River mouth boat ramp
 Bottom: At Patea Dam, Pukekino Landing and Glen Nui boat ramp

Notice of Ramp

Maritime Safety Rules
 You should be aware of all Maritime Safety Rules as they apply to the operation of any vessel on a lake or river. These are some of the important ones:

- 1. The Captain** is responsible for the safety of the crew.
- 2. The Captain** must be at least 16 years of age and hold a valid licence.
- 3. The Captain** must ensure that the vessel is properly equipped with the necessary safety equipment.
- 4. The Captain** must ensure that the vessel is properly maintained and that all safety equipment is in good working order.
- 5. The Captain** must ensure that the vessel is properly operated and that all safety equipment is used correctly.
- 6. The Captain** must ensure that the vessel is properly stored and that all safety equipment is in good working order.

Fish & Game Regulations
 A licence is required to fish for trout and perch and to hunt game birds such as mallard ducks. Licences must be produced on request of a Fish & Game Ranger. Hunters and anglers must comply with game laws and control fish regulations as detailed in the current North Island Sports Fish & Game Regulations booklet. Breaches of regulations carry a maximum fine of \$5,000 and may result in forfeiture of equipment, including boats and vehicles.

NO SHOOTING within 500m of Dam Wall or of a Public Road

NO DUMPING RUBBISH

Biosecurity

Pest Plants Biosecurity Act 1993

Pest Fish

STOP THE SPREAD

CHECK CLEAN DRY

20.12.2011 10:16



Photo 7 Gauging the flow at McColl's quarry.

2.1.2 Provision of company data

The Company provides data on discharge rates, abstraction rates and lake levels on a monthly basis. This data is summarised below.

Tailrace rise and recession rates

Special conditions of consents 7190-1 and 7191-1 set the limits on flow rise and recession rates into the lower Patea River by defining the relationship between flows in the Patea River above the lake and dam outflows. During the 2011-2014 period, there were no significant breaches and three minor breaches of special condition 15 of consent 7190-1 and special condition 4 of consent 7191-1. These breaches are summarised in Table 1.

Figure 3 shows the flood event of 22 September 2013. This graph shows that the margin for error when inflows rapidly rise or recede is very small, and this is what has generated the breach. This graph also shows how small the breach was in relation to the required flows, and also how well flows were controlled throughout this flood event. As a result this was considered a minor breach which did not require follow up action.

Table 1 Summary of breaches of flow rise and recession rates in the 2011-2014 period

Date	Time	Tailrace rise or recession rate m ³ /s/hr	Breach Significance
16 July 2012	1000-1100	64.2	Minor
	1100-1200	52.7	
22 September 2013	0700-0800	104.6	Minor
	1900-2000	-61.8	

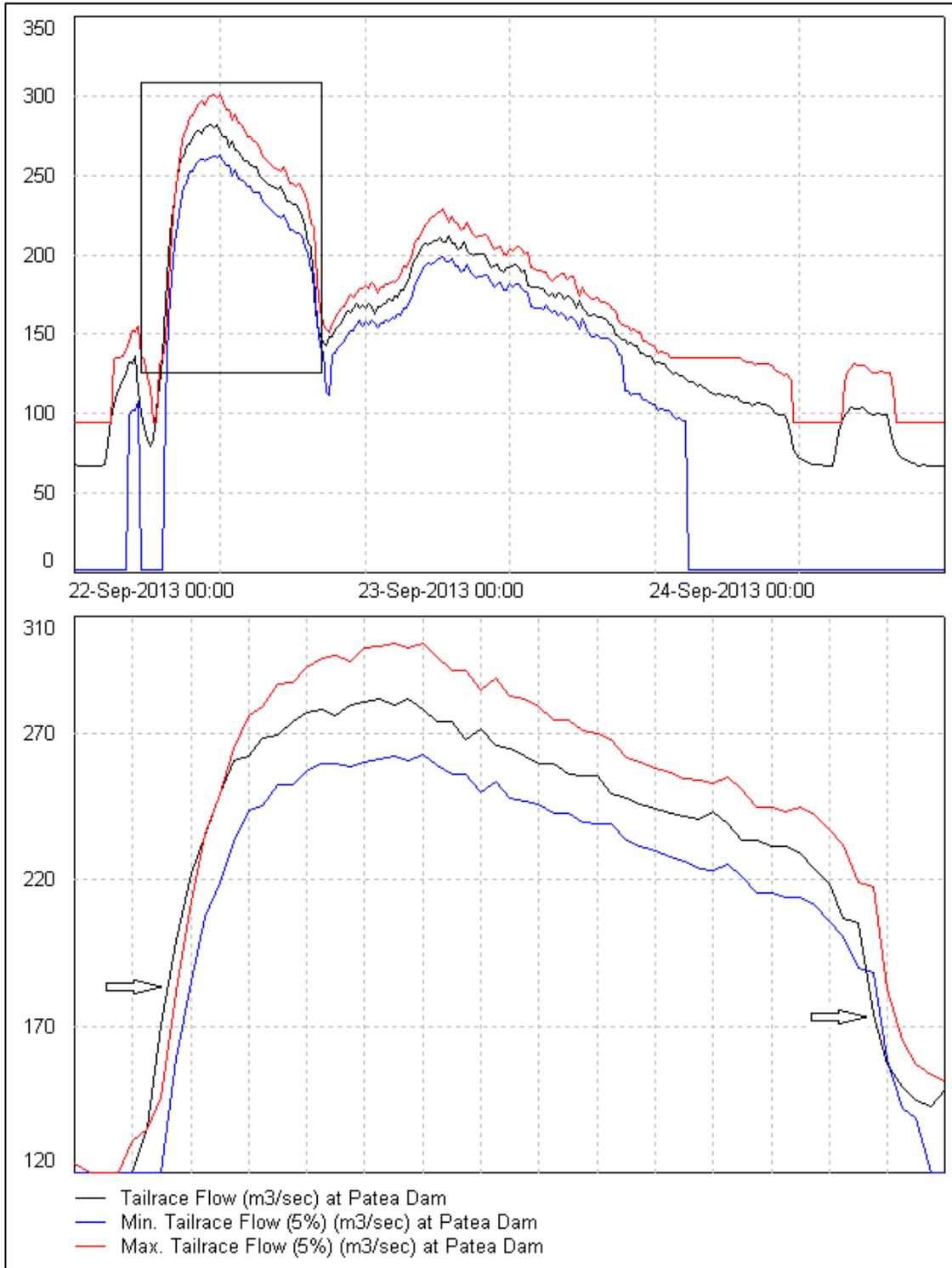


Figure 3 Tailrace flow from 22 September to 25 September 2013, compared with maximum and minimum allowable tailrace flow.

The bottom graph is an expansion of the boxed flow period (top graph), with the arrows indicating where flows exceeded the maximum and allowable tailrace flow (left) and minimum allowable tailrace flow (right).

Residual flow compliance

Consent 0489-2 includes a residual flow requirement. This requirement reads as follows:

“...the exercise of this consent shall not cause the flow in the Patea River, as measured at the McColl’s quarry’ measuring site to be less than 2.1 cubic metres per second (as an hourly average)”

Due to the variable nature of the flow in the lower Patea River, it is difficult to coordinate gaugings with low flows. Therefore the principal means of determining compliance with this condition is to assess the flow data provided by the Company. It should be noted that all flow recording equipment is allowed a 5% margin of error, and as such, the recorded flow would need to be below 1.995 cumecs to be considered non-compliant. The flow records submitted to Council show that compliance has generally been good, with only two incidents which resulted in insufficient flow in the lower Patea River. The first such incident occurred on 4 September 2011 (Figure 4), and was as a result of an outage on the 110 kV line. This occurred early in the implementation of the new residual flow condition (since the new consents were granted), and as such were attributed to ‘teething issues’. Although registered as an incident, no enforcement action was considered necessary.

The second incident occurred at the start of 2014 (Figure 5). On 5 January, a failure in the flow recording equipment resulted in the automated controls receiving incorrect flow data. As a result, at times the automatic control incorrectly believed it was releasing sufficient residual flow. This equipment failure was only detected by the Company on 11 February 2014, at which time they immediately increased generation to ensure adequate residual flow was being provided. The Company provided to Council data recorded by NIWA at this site to replace the lost data. This data indicated that between 5 January and 11 February 2014, the minimum daily recorded flow was below 1.995 cumecs on four days. This incident indicated to the Council that the Trustpower recorder had been recording inaccurately prior to 5 January 2014, and this resulted in a significant investigation, which is summarised in section 2.4.

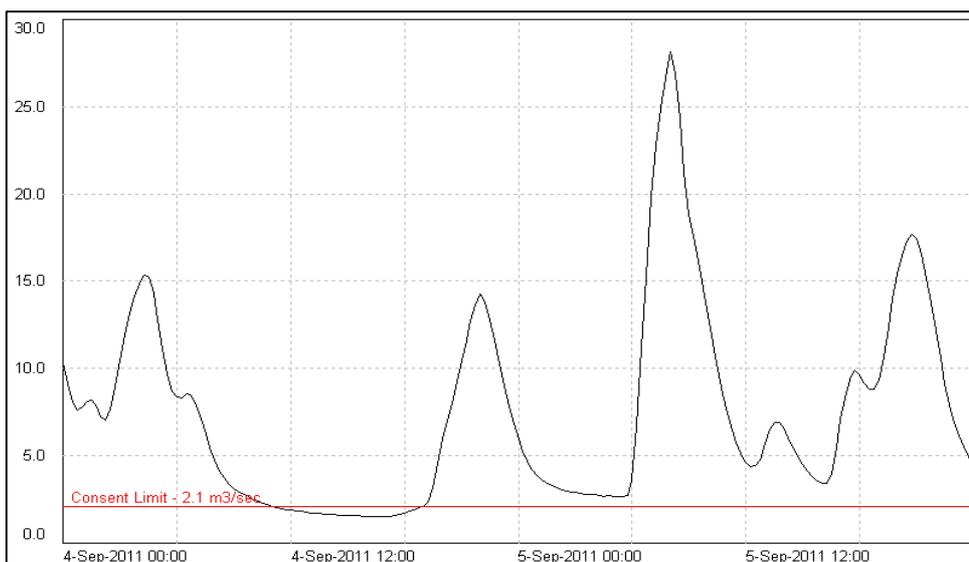


Figure 4 Recorded flow in the Patea River at McColl’s Quarry, between 4 September 2011 and 6 September 2011

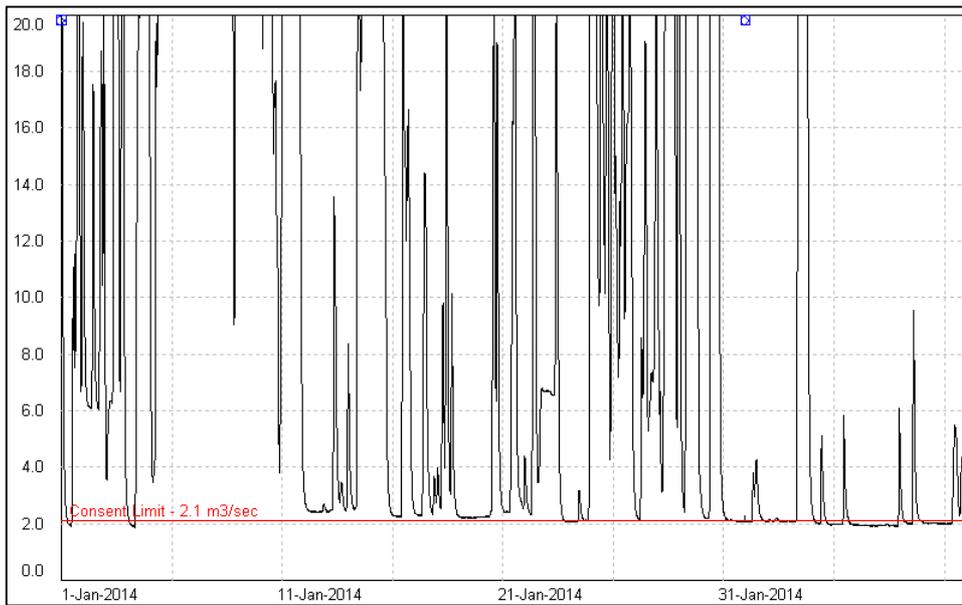


Figure 5 Recorded flow in the Patea River at McColl's Quarry, between 1 January 2014 and 11 February 2014

Lake Level Management

Consent 0489-2 sets the maximum and minimum allowable lake levels, having some regard for season, although some flexibility is allowed.

During the summer period (15 December to 15 April), the lake level is not to drop below 76 m for a total of 264 hours, and it is not to drop below 75 m at all. In winter (16 April – 14 December), the lake level is not to drop below 76 m on more than 125 days, and below 75 m on more than 40 days.

Table 2 presents a summary of lake levels for the reported period, and shows that lake levels were maintained in accordance with this consent condition.

Table 2 Summary of lake levels in relation to consent conditions

Season (allowable number of hours/days per season when lake level is less than _m)	Lake level	2011-12	2012-13	2013-14
Summer 15 December – 15 April (<76m for no more than 264 hours, not less than 75m)	<76m	0	0	0
	<75m	0	0	0
Winter 16 April – 14 December (<76m on no more than 125 days, <75m on no more than 40 days)	<76m	37	40	30
	<75m	0	0	0

Figure 6 shows how the lake level changes with changing in-flows, and change in generation rates and spillway flows. It is clear that the lake can fill relatively quickly when a flood occurs in the headwaters, reflecting the relatively small amount of storage in Lake Rotorangi.

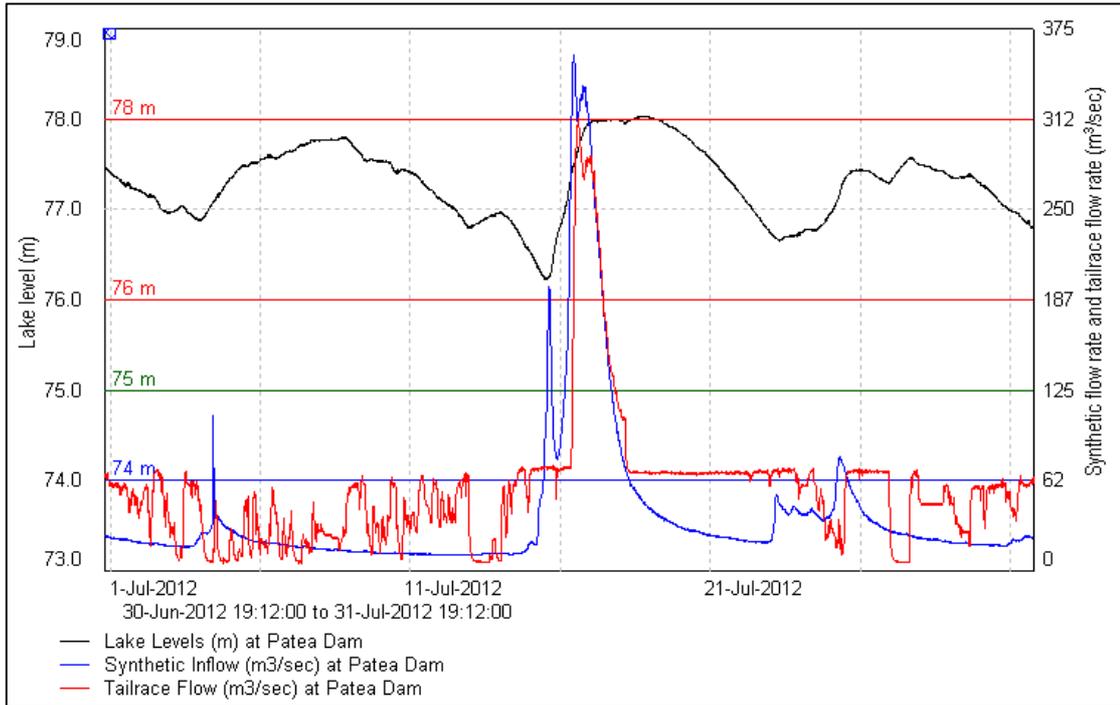


Figure 6 The relationship between lake levels, inflows and tailrace flows (generation flow plus spill-flow)

Groundwater abstraction

Consent 7192-1 limits the daily groundwater volume that is to be taken for domestic water supply at the Patea Dam, and requires records be taken of this abstraction. These records, provided as monthly totals, was analysed to provide an average daily abstracted volume. Figure 7 summarises the data provided to Council. This data indicates that at no time did the average abstraction volume exceed the limit of 12.5 m³/day.

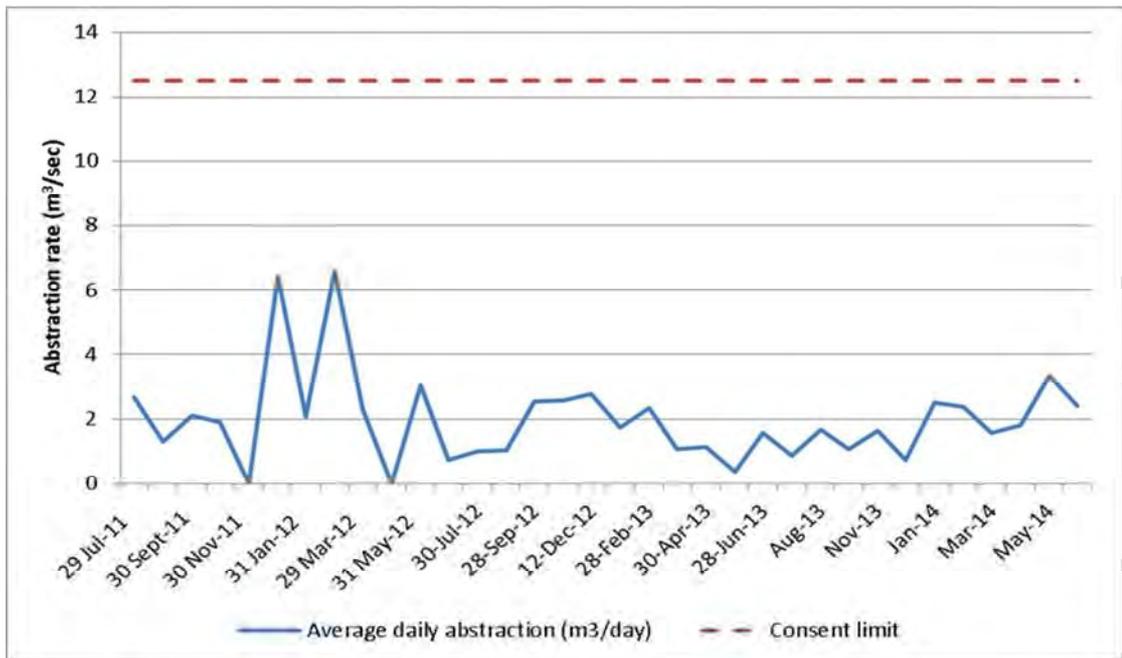


Figure 7 Average daily groundwater volume taken during the 2011-2014 period.

2.1.3 Results of receiving environment monitoring

The Council did not undertake any receiving environment monitoring in the reported period. The receiving environment monitoring undertaken prior to the scheme gaining new consents is now undertaken in a separate programme, or by the consent holder as a requirement of consent. In addition, there were no works undertaken during the reported period that could have disturbed water quality to the extent where additional monitoring was required.

During the reported period, the Company were required to undertake and report on a number of monitoring projects. These are summarised in Table 3.

Table 3 Reports submitted to Council by Trustpower over the reported period

Consent	Condition(s)	Requirement	Detail	Comments/TRC reference
0489-2	15	Hazard Survey	Survey those areas in Lake Rotorangi used for water skiing, identify lake bed features that can present a hazard to skiers, and recommend remedial measures	Completed August 2011 Doc# 1074293, 1074294, 1074295
	20 & 21	Fish passage report	Describe the upstream and downstream fish passage systems that the consent holder will adopt	Doc# 1461921, 1461923
	24-28	Monitoring plan	Details the techniques, methodologies and procedures that will be employed in the ecological and flow fluctuation monitoring	Doc# 1461930
	29	Fish transfers	Detail the work undertaken, and success of upstream fish transfer and spillway opening for downstream eel migration	2011-12 period Doc #1461933 2012-13 period Doc #1461935 2013-14 period Doc #1464267
	30	Upstream fish populations	Survey and report on the estimated densities of each of the target species upstream of Lake Rotorangi	Doc# 1461965 & 1461967
	32	Downstream ecology	Identify and quantify the ecology of the lower Patea River, including the varial zone. Two reports to be submitted in reported period	2012 Doc # 1461952 2013 Doc # 1461944
	33	Effects on trout	Investigate the effects of the Patea Dam and hydroelectric power scheme on trout downstream of the dam. Three reports required in reported period.	Report received but not certified by Council. Expecting revised version in 2015-16 period.
	36 & 37	Dissolved oxygen investigation	Investigate and report on the extent, frequency, causes and effects of discharges of de-oxygenated water in to the river below the Patea Dam	Report received but not certified by Council. Expecting revised version in 2015-16 period.
	38	Fish stranding	Investigate and report on the effects of the rapid reduction in water level in the Patea River on the frequency and ecological significance of native fish becoming stranded.	Doc# 1461955
	39 & 40	Lake sedimentation	Monitor and report on sedimentation of Lake Rotorangi	2011-12 Doc #1464384 2012-13 Doc #1461975 2013-14 Doc #1461977
0491-2	42	Lake eutrophication	Carry out an ecological and water quality survey of Lake Rotorangi every three years	Doc# 1111924 & 1083598
	9	Adult eel deterrent measures	Discuss the feasibility of various measures to deter adult eels from entering the intake, and present a recommendation for which measure will be employed at the Patea Dam	Presented in conjunction with reporting requirements for consent 0489-2 Doc# 1461921
7191-1	1	Patea River erosion	Monitor the lower Patea River for erosion, including an annual visual inspection and photographic survey of the lower river, and a biennial cross section survey – three reports required in report period	2011-12 Not Completed with agreement from Council 2012-13 Doc #1461974 2013-14 Doc #1464378

Other than the annual reporting requirements, reports that are to be submitted to the Council in the following years are as follows:

- Upstream fish populations – six year follow up;
- Final trout report;
- Final DO report and
- Mangamingi Bridge flood risk

It is possible that these reports may include recommendations for further monitoring.

Hazard Survey

Lake Rotorangi was surveyed for hazards between Glen Nui and Patea Dam by surveying an area, where possible, between the lake bank and 10 m depth. The majority of the lake edge is steep, in some areas the cliff face above the water continues more than 10 m below water level and could not be sounded. A low lake level allowed a visual survey of the lake bank to be undertaken and photographed. From analysis of the survey data and photographs, a safe navigation line has been determined around the lake. This safe navigation line attempts to bound areas where weed or tree stumps and branches are hazardous to recreational lake users. A number of significant hazards were identified and numbered on the associated plans. Shallow areas were noted to extend out from most headlands with the lake bed rising quickly. The identified hazards were mapped, and these maps are attached in Appendix II.

Upstream and Downstream fish migration provision

The report which details how upstream fish passage is to be provided for the target species recommended using the currently existing trap, but that it be altered if necessary, to ensure all target species can enter the trap, and non-target species are discouraged from entering the trap. Those target species will then be transported by road into the headwaters, where they will be released at various release locations. The location will be selected to suit the target species trapped at the time.

Adult eels, which have in the past either passed over the main spillway or through the turbines, will be catered for with a relatively novel design, with a piped conveyance system that will take them through the dam, but around from the turbines. This will be operated in conjunction with the spillway opening method.

The consent holder was also required to transfer juvenile lamprey into the headwaters of the Patea Catchment. Some preliminary investigations were undertaken by the Council to estimate how many juvenile lamprey would be required in the headwaters to provide sufficient pheromone to attract adults up the Patea River. Data provided by NIWA (Cindy Baker pers. comm.) indicated that juvenile lamprey release between 10 and 60 ng/larva/hour, and that adult lamprey require a concentration of between 0.05 ng per litre. At a mean flow of 29 cumecs, this would require a headwater population of between 88,000 and 530,000 juvenile lamprey. This was not achievable and as such, the Council is not currently seeking compliance with this condition. As an alternative, it may be possible to artificially create the pheromone, which could then be released into the river at a controlled rate. However, this requires further research. There is also the option of transferring adults from another catchment, in the hope that they will spawn and establish a population of juveniles in the headwaters.

Monitoring of upstream and downstream fish migration

Table 4 Summary of fish transferred into the Patea River catchment headwaters

Species	2011-12	2012-13	2013-14	Total
Koaro	400	386	34	820
Banded kokopu	1,327	1,362	385	3,074
Unidentified climbing whitebait	182	0	7	189
Longfin eel	8,613	50,766	23,471	82,850
Shortfin eel	84,639	183,711	169,599	437,949
Unidentified elvers	45	0	0	45

Table 4 presents a summary of all fish transferred upstream of the dam since the 2011-2012 period. This shows that there have been good numbers of koaro and banded kokopu transferred, although eels were by far the most predominant catch. Shortfin eel were the most abundant species transferred, which is typical.

In terms of the transfer of adult eels over the spillway, the numbers were highly variable. This reflects not only the variable nature of the adult eel migration, and



difficulty in predicting its occurrence, but also the development of an effective procedure for monitoring and undertaking the transfer. In the 2011-2012 period, 59 eels were transferred, compared with 594 in the 2012-2013 period and 1,884 in the 2013-2014 period. It is likely the small number of eels recorded in the 11-12 period was related to limited monitoring of the transfer.

However, it is likely that not all adult eels survived their passage past the dam, as observed during a visit to the lower Patea River on 12 May 2013. There were a number of dead eels observed caught in bank side vegetation at least one metre above the water level at that time (Photo 8).

Photo 8 A dead eel observed hanging in bankside vegetation, lower Patea River, 12 May 2013.

Upstream fish populations

The Council undertook a survey of target fish species populations in the Patea River catchment, upstream of the Patea Dam and Lake Rotorangi, and in the neighbouring Waitara River catchment. Thirty-two sites were surveyed in each catchment using electric fishing and/or spotlighting methods in at least 200 riffles and 100 pools, and covering a total area of 7,911 m² in the Waitara River catchment and 6,004 m² in the Patea River catchment. All but one of the seven target native fish species was captured in the Waitara River catchment. Banded kokopu were absent, however they were captured in the Patea River catchment, along with two other of the target species (longfin and shortfin eels).

The recommendations in the report do not completely agree with the expert panel recommendations. The expert panel recommended that:

- the paired catchment approach to assess success of the Patea Dam trap and transfer operation is not undertaken in the follow up survey.
- the transfer sites are reviewed after year 2 of the trap and transfer operations.
- the six-year survey to determine the success of the trap and transfer operations requires more careful site selection to ensure appropriate habitats are sampled and that the survey sites are distributed according to the transfer and release effort at each release site.
- more survey effort will be required within the Patea River catchment than was undertaken in the baseline survey as the majority of the target species are occurring in relatively low numbers in the trap and will be well dispersed around a large catchment making detection difficult.
- further surveys of the Waitara River catchment at this time do not appear warranted.

It is anticipated that this will be resolved prior to the start of the six year survey, which is to be completed by June 2017.

Downstream ecology

Two ecological surveys were undertaken in the lower Patea River during the reported period. These surveys recorded a diverse and abundant fish community, with over 5000 fish recorded in the 2013 survey. Ten fish species were recorded, with common bully, common smelt, inanga, longfin eel, shortfin eel and perch caught commonly, and length frequency data indicating that these species were actively recruiting. Five macrophyte species were recorded in the lower river, and macroinvertebrate sampling found that the communities were dominated by *Potamopyrgus* snails, *Aoteapsyche* caddisflies or dipteran taxa, depending on the habitat type. The varial zone, which was surveyed for macroinvertebrates only, had a much lower invertebrate density than the permanently wetted areas.



Photo 9 Seine netting the Patea River at McColl's Quarry

Fish stranding

Five stranding surveys were undertaken in the lower Patea River. Although fish were found stranded in the survey areas, minimal habitat was identified in the river which had a high potential to result in fish stranding, and based on the low numbers of stranded fish observed during the survey, native fish mortality during most low flow events would be very low.

Lake eutrophication

Four water quality sampling surveys were performed during the reporting period, three of which followed several recent freshes in the catchment which impacted on aspects of water clarity along the lake. Surveys were carried out at two sites, one in the middle reaches near the Tangahoe Valley Boat Ramp, the other at the lower end of the lake, near the dam.

Lake condition, in terms of lake productivity, continued to be within the category of mesotrophic to possibly mildly eutrophic (mildly nutrient enriched). However, taking into account the influence of suspended silt in this reservoir, and the reduced chlorophyll levels, the classification is more appropriately mesotrophic.

Thermal stratification was recorded during late summer - autumn at the mid and lower lake sites, with dissolved oxygen depletion measured in the lower waters of the hypolimnion at both sites (anoxia in the middle and depletion in the lower reaches of the lake). Oxygen depletion continued into winter at the lower lake site. Lake overturn had not occurred completely at the lower lake site by the time of the winter survey although water temperatures were uniform throughout the water column. However, overturn was apparent at the mid lake site in winter. These conditions have been typical of this reservoir-type lake to date. Trends in Lake Rotorangi water quality for the period 1990 to 2006 suggested that while there has been a very slow rate of increase in trophic level, the lake would be classified as mesotrophic in terms of its biological condition. An update of this trend report (for the period 1990 to 2011) confirmed this very slow, insignificant rate of increase in trophic level.

Throughout the monitoring year phytoplankton densities were moderate to low. The main limiting factors for communities within the lake probably continue to be plant nutrient availability and frequency of river freshes. A very sparse macroinvertebrate fauna was found amongst the fine sediments of the deeper lake sites where only those

taxa able to tolerate lengthy periods of very low dissolved oxygen levels have been recorded.

The macrophyte survey identified the oxygen weed *Egeria densa* as the dominant macrophyte throughout the majority of the lake. Only two other species were recorded as dominant in areas, being *Lagarosiphon major* and *Ceratophyllum demersum* (hornwort). This is the first record of hornwort in Lake Rotorangi, and in addition to those species recorded by the Council, an additional three new species were recorded by NIWA in April 2012 when commissioned by the Company to assess the hornwort community. It is unlikely that these species will ever become abundant. Hornwort on the other hand is considered highly invasive, and is expected to eventually become dominant, out-competing *E. densa* and *L. major*.

2.2 Riparian planting

As per special condition 14 of consent 3369, the consent holder makes an annual donation to the Taranaki Tree Trust. This is to mitigate the effects of downstream erosion by contributing to riparian management in the lower Patea River catchment. When consent was granted, the payment was set at \$7,500, but is expected to be inflation adjusted in subsequent years.

At the time of compiling this report, fourteen landholders in the lower Patea catchment had been subsidised 50% of the cost of plants planted within the catchment for riparian protection in the 2010-2014 period. To date, Trustpower have provided just over \$24,000 towards subsidising riparian planting in this catchment, of which every dollar has been allocated.

2.3 Stakeholders meetings

Two stakeholder meetings were held during the reported period, on 11 December 2012 and 4 January 2014. Stakeholders who attended these meetings included representatives from Ngaati Ruanui, Fish and Game, the Department of Conservation and Taranaki Regional Council.

Both meetings essentially served to keep the stakeholders up to date with the significant amount of monitoring undertaken, while also keeping them abreast of any compliance issues that may have arisen. These meetings also gave the stakeholders the opportunity to ask questions, and to discuss the monitoring requirements in depth.

2.4 Investigations, interventions, and incidents

The monitoring programme for the period was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with the consent holder. During the period matters may arise which require additional activity by the Council, for example provision of advice and information, or investigation of potential or actual courses of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance

with consents, which may damage the environment. The Incident Register includes events where the Company concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

Complaints may be alleged to be associated with a particular site. If there is potentially an issue of legal liability, the Council must be able to prove by investigation that the identified company is indeed the source of the incident (or that the allegation cannot be proven).

In the 2011-2014 period, the Council was required to undertake a significant additional investigation, and recorded two incidents, in association with the Company's conditions in resource consents or provisions in Regional Plans.

The first recorded incident occurred in November 2011, when a power outage, combined with a number of other factors, resulted in insufficient flow in the Patea River. This incident was attributed to 'teething issues' following the issuing of a renewed consent, and although registered as an incident, no enforcement action was considered necessary.

The second incident was also related to insufficient flow in the lower Patea River. However, in this case, it was principally due to an over reliance and inadequate supervision of the automated system which controls generation and flow rates. This incident which is briefly discussed in section 2.1.2, resulted in a large scale investigation into the accuracy of the McColl's Quarry recorder. During this investigation, Council requested various data sets and detail around equipment maintenance, and the assessment of this data raised significant concerns about the accuracy of the Company's dataset.

On 9 April 2014, the Company provided results for all gaugings undertaken at McColl's quarry. These gauging results indicated that the Company had been recording flows higher than actual flows (Table 5). In addition, five gaugings recorded a flow less than the minimum of 2.1 cumecs, with the lowest recorded flow being 1.506 cumecs, or 72% of the required flow. At the time of this gauging, the recorded flow was 3.428 cumecs, 128% higher than the gauged flow.

On 30 May 2014, the Council received hourly average flow data at McColl's quarry, collected by NIWA, for the period 1 January 2011 to 11 May 2014. The data was supplied on a 'without prejudice' basis. The average flow recorded by all three recorders was compared over seven time periods, which were bookended by periods of stable flow. This is important as a period of stable flow removes the influence of flow attenuation on the data. The Trustpower recorder at McColl's quarry failed and was repaired between record 5 and 6 in Table 6 below. The data in this table shows that prior to the recorder failing, the Company recorded mean flows higher than both the NIWA recorder and the TRC recorder downstream, but once the recorder was fixed, this was no longer the case, with it recording similar flows to the NIWA recorder, and less than the TRC recorder. Figure 8 below shows the discrepancies in mean flow between sites, and includes a 5% error bar.

Table 5 Gauging results provided by the Company, ordered from lowest gauged flow to highest

Date	Time	Stage (mm)	Gauged Flow (l/s)	Recorded stage (mm)	Recorded flow (l/s)	Difference in stage height (mm)	Difference in flow (l/s)
31-Jan-13	11:21:00	1,261	1,506	1,311	3,428	50	1,922
18-Feb-14	15:00:00	1,265	1,800	1,261	2,460	-4	660
16-Mar-12	14:15:00	1,262	1,832	1,300	3,220	38	1,388
09-Apr-13	11:54:00	1,260	1,940	1,320	3,420	60	1,480
20-Feb-13	15:28:00	1,257	1,955	1,330	3,570	73	1,615
22-Sep-11	12:00:00	1,260	2,233	1,260	2,616	0	383
12-Jan-12	10:54:00	1,418	5,084	1,450	5,570	32	486
12-Jan-12	10:42:00	1,442	5,533	1,480	5,950	38	417
12-Jan-12	10:25:00	1,495	6,248	1,520	6,800	25	552
23-Apr-12	12:45:00	1,764	13,570	1,810	13,180	46	-390
09-Dec-11	12:50:00	2,000	20,397	2,030	19,490	30	-907
09-Dec-11	8:10:00	2,080	23,113	2,120	22,520	40	-593
08-Oct-13	15:07:00	2,518	39,462	2,520	37,210	2	-2,252
11-Jul-12	12:55:00	2,605	41,361	2,650	41,630	45	269

This indicates that the Company's recorder had been recording incorrectly for quite some time prior to the equipment failure. It was apparent that the recorder was reading a water level that was too high, resulting in an incorrect flow being calculated. This is supported by the results from the gauging visits, with every inspection prior to 2014 observing a stage level less than that recorded.

Daily minima data was also checked. Any days where no data existed for at least one of the three sites site were removed from the comparison. Prior to the original incident that sparked this investigation, the Company reported no instances when the flow at McColl's quarry dropped below 1.995 cumecs over this time period.

Table 6 Average flow recorded at three flow recorders in the lower Patea River, over seven time periods.

Record	Start Date & Time	End date & time	McColl's quarry (Trustpower)	McColl's quarry (NIWA)	McColl's Bridge (TRC)
1	24/12/12 0345	25/12/12 1300	2.837	2.308	2.034
2	02/02/13 0145	04/02/13 0530	2.854	2.000	2.005
3	09/02/13 1530	10/02/13 1730	2.719	1.929	1.977
4	09/03/13 0645	13/03/13 0700	3.010	2.036	2.024
5	22/12/13 0115	27/12/13 0900	3.175	2.14	2.122
6	14/02/14 0000	04/03/14 2015	4.342	4.228	4.547
7	14/02/14 0000	25/03/14 1745	4.160	3.979	4.185

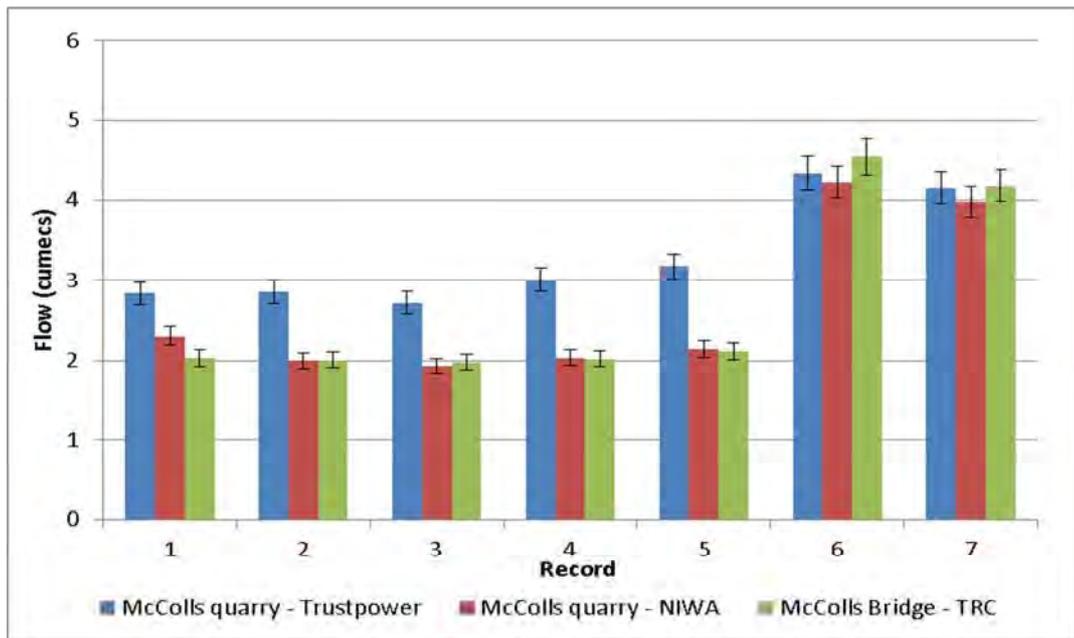


Figure 8 Average flows recorded at the three recorder stations over seven time periods, including 5% error bars

It should be noted that the NIWA data included data to which a new rating curve was retrospectively applied for a period of approximately twelve months. This was therefore not 'live' data, and not available to Trustpower operators in real time. The analysis found that of the 1,173 days of data, flow recorded by NIWA at the McColl's quarry site dropped below 1.995 cumecs on 156 days. On 55 of these days, flow also dropped below 1.995 cumecs at McColl's bridge. The earliest such breach occurred on 23 November 2011. There were two root causes that resulted in these low flows, being the recorder losing calibration and recording a stage height that was too high, and that the rating curve used to calculate the flow was not adequately maintained.

This investigation resulted in a number of meetings between Trustpower and Council. During these meetings it became apparent to the Council that the Company was unaware that the recorder had not been maintained appropriately, and that inaccurate data was being recorded. As a result it was determined that this was not a deliberate non-compliance. However, it is important that both Council and the Company acknowledge the seriousness of this incident, as it involved the collection of inaccurate data over a significant period of time, and this was made clear to the Company during the meetings. Ultimately, as the NIWA data was provided on a 'without prejudice basis', it was considered more appropriate to focus on the cause behind the non-compliance, and on the incident that instigated this investigation.

In response to this non-compliance, the Council decided to issue three representative infringement notices and an abatement notice, while also charging the Company full investigative costs, which were significant. Compliance with the abatement notice could only be achieved once certain points had been clarified, primarily relating to what a recorder accuracy of 5% actually referred to. These points were clarified in a discussion document¹. Follow up on the abatement notice requirements found that Trustpower were meeting the requirements.

¹ Discussion with Trustpower regarding compliance assessment – 5% error. Document Number 1389716

3. Discussion

3.1 Discussion of site performance

The Patea HEPS is of a large scale with regards to other Taranaki hydroelectric power schemes, but relatively small scale when compared nationally. The resource consents held for the Patea HEPS are numerous, and there a large number of conditions that need to be complied with.

With regards to operation of the scheme, the consent conditions are relatively simple. In essence, the Company is restricted in the amount of water that can be taken from Lake Rotorangi for generation, but must maintain certain lake levels and also ensure a minimum flow is maintained in the lower Patea River. Overall, when the scheme is operating normally and there have been no equipment failures, the data provided by Trustpower indicated the scheme operated well within these limits.

The most complex aspect to the consent conditions are the various monitoring and reporting requirements. These can be broken into two broad categories, ecological monitoring and monitoring of water flows and levels. The ecological monitoring and reporting included numerous investigations, which were coordinated and completed largely in line with consent requirements. In a number of cases delays were experienced, and at times the requirements of the consents were not strictly followed. In each of these cases Trustpower liaised closely with Council, and these minor departures from the consent requirements were approved, as they were largely related to complications not realised at the time the consents were granted.

Over the reporting period the Company presented seventeen documents/reports to the Council in fulfilment of the monitoring requirements. Two other reports were submitted (effects on trout, dissolved oxygen investigation) but following Council review, were returned to the Company, as they did not meet the consent requirements. This iterative process was not explicitly provided for in the timeframes set out by the consent, however is necessary to ensure the reports included the required detail. As such a delay in presenting the final reports was approved.

With regards to the monitoring of water flows and levels, the Company provided records of flow in the lower Patea River, the level of Lake Rotorangi, discharge rates from the Patea Powerhouse and spillway and also volumes of water taken from groundwater for domestic use. These records were all provided when required, and to the accuracy required. The only exception is for the recording of flows in the lower Patea River, which experienced equipment failure at the start of 2014, resulting in the loss of approximately one month worth of data. This incident and the ensuing investigation cast significant doubt on the accuracy of this recorder, and resulted in the issuance of three infringement notices and one abatement notice. Since this incident, Trustpower has been more active in managing this site, and in supervising the contractor engaged to maintain this site. Compliance with the abatement notice was being achieved at the time of preparing this monitoring report.

It should be noted that the primary Company representatives based in Tauranga were very cooperative, and assisted in this investigation by providing whatever information was requested. Overall, these representatives have maintained good channels of communication with Council, with numerous requests for consent condition

clarification, and numerous notifications of potential consent non-compliance. They have also frequently consulted with stakeholders, and organised a number of stakeholder meetings, as required by consent.

Trustpower also have a team of local staff who have numerous responsibilities, including responding to alarms at the Patea HEPS, and implementing some of the more tangible consent requirements, such as the installation of signs. Through inspections and liaison with these staff, it is apparent to Council that this team is very proactive in ensuring consent compliance. For example, signs have been erected and maintained as required at numerous locations, the floating pontoon has been installed and maintained at Pukekino Landing and a significant amount of work has gone into implementing both the upstream and downstream fish passage systems.

The Company has an emergency management plan which is reviewed annually, and forwarded to all parties as required by consent. This emergency management plan covers such emergencies such as floods, earthquakes and volcanic eruption.

Overall, the scheme has been operated well, and site performance has been good. The only area of concern related to the recording of flow at the McColl's Quarry site. Unfortunately, it appears that Trustpower relied too heavily on a contractor and automated alarms, which resulted in the inaccurate recording of flows and loss of data. It is this incident that has most influenced the Company's compliance rating for the reported period.

3.2 Environmental effects of exercise of consents

Although the Council did little in the way of receiving environment monitoring, the monitoring undertaken by the Company and observations made during inspections provided a valuable insight into the environmental effects of the scheme.

The lower river ecological monitoring found that the lower Patea River supports a significant native fishery and moderate macrophyte communities, but a relatively low quality macroinvertebrate community. This is relatively typical for those rivers that are subject to flow regulation from a hydroelectric dam. Although there is some risk of fish stranding in the lower reaches due to flow variation, it was concluded that this risk was not significant, as the amount of habitat in which fish could be stranded was limited in the lower river.

With regards to fish migration, a survey of upstream fish communities determined that the dam has severely restricted the passage of native fish into the Patea headwaters, with only longfin and shortfin eels recorded in any numbers. However, over the reported period, the Company has operated a trap and transfer system, which has resulted in thousands of galaxiids and eels being transferred in to the Patea River headwaters. It is expected that the fish survey that is to be undertaken in the near future will illustrate how successful this trap and transfer programme has been.

Downstream passage of adult eels has been harder to achieve. The Company released water down the spillway on numerous occasions, and monitoring indicated that this can be an effective means of transferring adult eels past the dam. However, there were still observations made during the reported period of dead eels in the Patea River downstream of the dam. The Company has installed a adult eel bypass system which

will be used for the first time in the autumn of 2015. Subsequent monitoring will determine how effective this system is.

The scheme also provides a significant recreational resource to the public, in terms of Lake Rotorangi, with the lake being a popular water skiing, jet skiing, swimming and kayaking location. The Company has undertaken a survey of lake hazards, and publicised the findings, in an effort to reduce the risk to lake users. In addition, the company has maintained the boat ramps to be accessible across most lake levels, although sedimentation is becoming an issue at the Glen Nui and Tangahoe Valley boat ramps.

The scheme also impacts on the recreational value of the lower Patea River. A condition of consent requires Trustpower to provide water for an annual jet boat race event when requested to do so. Trustpower met this requirement (Photo 10).

The lower river also provides an important fishery, with whitebaiting popular in certain locations. The lower river also contains brown trout, which can grow to a large size (Photo 11). However it is apparent the numbers of brown trout in the lower river are low. A well conditioned wild rainbow trout was also captured in the lower river in 2013.



Photo 10 Jet boat racing on the lower Patea River, July 2012. Source: Taranaki Daily News.



Photo 11 Two good sized brown trout captured in the lower Patea River. Source: Fish and Game Taranaki

3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Tables 7 to 16.

Table 7 Summary of performance for consent 0489-2 Dam the Patea River

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limits rate of water that can be diverted	Review of data provided to Council.	Yes
2 & 3. Clarify how this allocation of water does or does not affect the current and future allocation of water upstream of the dam Location of discharge point	Procedural	N/A
4. Requires a flow of 2.1 cumecs in the Patea River	Review of data provided to Council.	No
5. Limits how often flow can be less than 2.1 cumecs during occasions of abnormally low rainfall	Review of data provided to Council.	N/A - Did not meet criteria in monitored period
6. Requires an explanation should condition 5 be engaged	Receipt of explanation	N/A – Did not engage condition 5
7. Allows for a lower residual flow should upstream allocation increase	Procedural & Data review	N/A
8. Sets the absolute minimum flow in the lower Patea River at 1.8 cumecs	Review of data provided to Council.	Yes
9. Sets out the minimum and maximum lake levels	Review of data provided to Council.	Yes
10. Requires the spillway gates to be managed in relation to lake levels	Review of data provided to Council, inspections and liaison with Company	Yes
11. Requires notification and explanation if lake level being lowered beyond normal seasonal operating range	Notification received	N/A
12. Set out lake level restrictions until hazards have been adequately managed	Review of data provided to Council.	Yes
13. Provide a real time estimate of lake level on internet	Liaison with Council	Yes
14. Install and maintain staff gauges in lake	Inspections	Yes
15. Complete and report on hazard survey of Lake Rotorangi	Receive report	Yes
16. Requires publication of maps detailing the identified hazards	Inspections, liaison with Company	Yes

17.	Construct and maintain a floating pontoon at Pukekino Landing	Inspections	Yes
18.	Measure and record lake level, and provide records to Council	Review of data provided to Council.	Yes
19.	Take all reasonable steps to avoid scheme presenting a migration barrier for target fish species	Inspections and liaison with Company	Yes
20-22.	Present report detailing how condition 19 will be achieved	Receipt of report	Yes
23.	Implement the fish passage systems detailed in report within 12 months	Inspections – note delay allowed for downstream passage system	Yes
24-27.	Prepare a monitoring plan following prescribed process	Receipt of monitoring plan	Yes
28.	Allows a review of monitoring plan, and prescribes required process	Receipt of revised monitoring plan – not revised in period	N/A
29.	Reports annually on the success of the fish transfer programme	Receipt of annual report	Yes
30.	Surveys and reports on the estimated densities of the target species upstream of the dam	One report to be received within 9 months of consent commencing, another in the sixth year after commencement	Yes
31.	Review report of the fish transfer system, including recommendations	Receipt of report within six years of consent commencing	Not yet due
32.	Monitor and report on the downstream ecology of the Patea River	Receipt of two reports in monitoring period	Yes
33.	Investigate and report on the effects of the dam on trout in the lower Patea River	Receipt of reports	Yes – final report returned to Company for review
34.	Undertake a trout restocking programme if required	Inspections, liaison with Company	Not yet determined as necessary
35.	If trout restocking undertaken, develop and implement monitoring programme	Receipt of monitoring programme, liaison with Company	N/A
36&37	Monitor and report on dissolved oxygen investigation	Receipt of report, liaison with Company	Yes – not yet complete
38.	Monitor and report on the potential for fish stranding	Receipt of report	Yes
39&40.	Monitor and report on the sedimentation of Lake Rotorangi	Receipt of report	Yes
41.	Report on the flooding risk to the Mangamingi Bridge and install safety devices	Receipt of report, liaison with Company	Not yet received

42.	Ecological and water quality survey of Lake Rotorangi every three years	Receipt of report, liaison with Company	Yes
43-52	Sets out how the expert panel will be established and coordinated	Liaison with company	Yes
53.	Requires certain reports to be circulated to stakeholders for consultation	Liaison with company	Yes
54.	Requires that stakeholder comments are provided to Council	Receipt of comments, liaison with Company	Yes
55.	Annual meeting of stakeholders	Attend meeting	Yes
56.	Maintain boat ramps	Inspections	Yes
57.	Allows temporary restriction of access at boat ramps, notification required	Notification received, inspections	Not implemented during reported period
58.	Erect signs at various locations warning of flow and lake level fluctuations and log debris at	Inspections	Yes
59.	Maintain floating booms at the dam	Inspection	Yes
60-62.	Provide water for an annual jet boat race event	Liaison with Company	Yes
63	Review condition	No review sought	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent			Improvement required
Overall assessment of administrative performance in respect of this consent			High

N/A = not applicable

Table 8 Summary of performance for consent 0488-2 Use the Patea Dam and associated infrastructure.

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Maintain dam in accordance with guidelines	Liaison with Company	Yes
2. Provide an Emergency Management Plan to the TCDEMG	Liaison with Company and TCDEMG	Yes
3. Forward copy of plan to various parties	Liaise with Company	Yes
4. Undertake annual review of plan	Liaise with Company	Yes
5. Review condition	No review sought	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 9 Summary of performance for consent 0491-2 Take and use water from Lake Rotorangi

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limits rate of water that can be diverted	Review of data provided to Council.	Yes
2 & 3. Clarify how this allocation of water does or does not affect the current and future allocation of water upstream of the dam Location of discharge point	Procedural	N/A
4. Requires a flow of 2.1 cumecs in the Patea River	Review of data provided to Council.	No
5. Limits how often flow can be less than 2.1 cumecs during occasions of abnormally low rainfall	Review of data provided to Council.	N/A - Did not meet criteria in monitored period
6. Requires an explanation should condition 5 be engaged	Receipt of explanation	N/A – Did not engage condition 5
7. Allows for a lower residual flow should upstream allocation increase	Procedural & Data review	N/A
8. Sets the absolute minimum flow in the lower Patea River at 1.8 cumecs	Review of data provided to Council.	Yes
9. Report on options to deter adult eels from the intake, and recommend one option for implementation.	Receipt of report	Yes
10. Implement deterrent measures recommended in report within 12 months.	Inspections, liaison with Company	Yes – delay approved by Council
11. Measure and record the flow in the lower Patea River, provide records to Councils	Inspections, Review of data provided to Council	No
12. All water taken to be returned to river	Inspections	Yes
13. Review condition	No review sought	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		Improvement required
Overall assessment of administrative performance in respect of this consent		Improvement required

Table 10 Summary of performance for consent 7188-1 Maintain the Patea Dam

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Activity is for maintenance or minor upgrades	Inspections	Yes
2. No contaminant other than sediment to be released to river or lake	Inspections	Yes
3. Limits the decrease in visual clarity	Inspections where appropriate	Not assessed
4. Remove all excess material from river or lake	Inspections	Yes
5. Any dewatering for minimum time necessary	Inspections	No dewatering undertaken
6. Minimise the area of disturbance	Inspections	Yes
7. Review condition	No review sought	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 11 Summary of performance for consent 7190-1 Discharge water from the Patea HEPS

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Survey the erosion of the lower Patea River	Liaison with Company	Yes
2. Alter frequency of surveys is criteria met	Procedural	N/A
3. Provide survey results	Receipt of report	Yes
4. Maintain the dam in accordance with guidelines	Liaison with Company	Yes
5. Provide an Emergency Management Plan to the TCDEMG	Liaison with Company and TCDEMG	Yes
6. Forward copy of plan to various parties	Liaise with Company	Yes
7. Undertake annual review of plan	Liaise with Company	Yes
8. Measure and record the rate of discharge from the Patea powerhouse and main service spillway provide records to Councils	Inspections, Review of data provided to Council	No
9. Requires a flow of 2.1 cumecs in the Patea River	Review of data provided to Council.	No

10. Limits how often flow can be less than 2.1 cumecs during occasions of abnormally low rainfall	Review of data provided to Council.	N/A - Did not meet criteria in monitored period
11. Requires an explanation should condition 5 be engaged	Receipt of explanation	N/A – Did not engage condition 5
12. Allows for a lower residual flow should upstream allocation increase	Procedural & Data review	N/A
13. Sets the absolute minimum flow in the lower Patea River at 1.8 cumecs	Review of data provided to Council.	Yes
14. Annual payment to Taranaki Tree Trust	Liaison with Company, Taranaki Tree Trust	Yes
15. Rise rate limit and recession rate limit during high flows	Review of data provided to Council	Yes (minor breaches only)
16. Prescribes how spillway gates are to operate during receding flow	Review of data provided to Council	Yes
17. Contribute to the maintenance of two hydrographic stations	Liaison with Company	Yes
18. Review condition	No review sought	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		Improvement required
Overall assessment of administrative performance in respect of this consent		Improvement required

Table 12 Summary of performance for consent 7191-1 Discharge water through auxiliary and emergency spillways

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Survey the erosion of the lower Patea River	Liaison with Company	Yes
2. Alter frequency of surveys is criteria met	Procedural	N/A
3. Provide survey results	Receipt of report	Yes
4. Rise rate limit and recession rate limit during high flows	Review of data provided to Council	Yes (minor breaches only)
5. Prescribes how spillway gates are to operate during receding flow	Review of data provided to Council	Yes
6. Review condition	No review sought	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 13 Summary of performance for consent 7192-1 Take groundwater for domestic use

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Undertake activity in accordance with application	Inspections, liaison with Company	Yes
2. Limits daily volume taken	Review of data provided to Council	Yes
3. Install water meter	Inspections, liaison with Company	Yes
4. Take records of water taken	Review of data provided to Council	Yes
5. Lapse provision	Consent exercised in time	N/A
6. Review condition	No review sought	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 14 Summary of performance for consent 7193-1 Discharge contaminants related to abrasive blasting processes – consent not exercised during period under review

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option	Inspections	N/A
2. No offensive or objectionable discharge beyond boundary	Inspections	N/A
3. Clear work area at end of each day	Inspections	N/A
4. Sand content not to contain more than 5% silica or 2% dust	Inspections, liaison with Company	N/A
5. Ensure operators understand consent	Inspections, liaison with company	N/A
6. Discharge not to cause various effects on surface water	Inspections	N/A
7. All items to be blasted to be screened as completely as practicable	Inspections	N/A
8. Notify Council if blasting within 100m of water	Notification received, liaison with Company	N/A
9. Limits on suspended particulate matter and dust deposition	Inspections	N/A
10. Lapse provision	Date not yet past	N/A
11. Review condition	No review sought	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		N/A
Overall assessment of administrative performance in respect of this consent		N/A

Table 15 Summary of performance for consent 7194-1 Discharge contaminants related to the burning of driftwood

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option	Inspections	Yes
2. Due regard to be had to the direction and strength of wind at the time	Inspections, liaison with Company	Yes
3. No offensive or objectionable discharge beyond boundary	Inspections	Yes
4. To be undertaken in accordance with application	Inspections	Yes
5. Burning to be supervised	Inspections	Yes
6. Council to be notified	Receipt of notification	Yes
7. Maintain a record of each burning event	Liaison with Company	Yes
8. Lapse provision	Consent has been exercised	N/A
9. Review condition	No review sought	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 16 Summary of performance for consent 7773-1 Place and use a floating pontoon at Pukekino Landing

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. To be constructed in accordance with application	Inspections	Yes
2. Council to be notified	Receipt of notification	Yes
3. Minimise the area of disturbance	Inspections	Yes
4. Take all reasonable steps to reduce sediment discharges	Inspections	Yes
5. Remove structure if no longer required	Structure still required	N/A
6. Steps to be taken should archaeological remains be discovered.	No such remains discovered	N/A
7. Lapse provision	Consent has been exercised	N/A
8. Review condition	No review sought	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

During the monitoring period, the Company demonstrated a poor level of environmental and poor level of administrative performance with the resource consents as defined in Section 1.1.4. This rating related principally to the provision and monitoring of the flow in the Patea River, which was not managed well for the majority of the reviewed period. Other components of the Patea HEPS were operated well, and the Company completed a significant amount of investigative and reporting work as required by consent. At the time of compiling this report, all aspects of the scheme were being operated well, although some discussions were underway regarding management of the boat ramps.

Using the environmental performance classifications as defined in section 1.1.4, Trustpower's performance for the 2011-2014 period is 'improvement required'. The Company was issued with three infringement notices and one abatement notice.

3.4 Recommendations from the 2010-2011 Annual Reports

In the 2010-2011 Annual Reports for the Lower River monitoring programme and Lake Rotorangi monitoring programme, it was recommended:

1. THAT an appropriate compliance monitoring programme be formulated in accordance with the requirements of specific conditions attached to the recently renewed consents.
2. THAT the Lake Rotorangi physicochemical and biological water quality monitoring programme continue as a component of both 2 (above) and the TRC State of the Environment

These recommendations were implemented.

3.5 Alterations to monitoring programmes for 2014-2015

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account the extent of information made available by previous authorities, its relevance under the RMA the obligations of the Act in terms of monitoring emissions/discharges and effects, and subsequently reporting to the regional community. The Council also takes into account the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within Taranaki emitting to the atmosphere/discharging to the environment.

It is proposed that in response to the poor management of the Patea River minimum flow, the inspection component of the 2014-15 monitoring programme be augmented. It is recommended that monthly inspections at the McColl's quarry hydrological monitoring site are included, in order to take a staff gauge reading, to assess the accuracy of the Company's recorder. In addition, due to complaints received in the 2014-15 period regarding access at the Tangahoe Valley boat ramp (to be discussed in the next monitoring report), three additional but provisional inspections are recommended for inclusion in the programme, to inspect accessibility at the Patea Dam, Tangahoe Valley and Glen Nui boat ramps during low lake levels.

3.6 Exercise of optional review of consent

There are no resource consents held in relation to the Patea HEPS that allow for a review in 2015.

4. Recommendations

1. THAT monitoring of consented activities in relation to the Patea HEPS be amended from that undertaken in 2014-2015 by including monthly inspections of the McColl's Quarry hydro site and three provisional inspections of the Patea, Tangahoe Valley and Glen Nui boat ramps, to be undertaken if the lake level recedes to a level where access may be restricted.

Glossary of common terms and abbreviations

The following abbreviations and terms may be used within this report:

Biomonitoring	Assessing the health of the environment using aquatic organisms.
Cumec	A volumetric measure of flow- 1 cubic metre per second (1 m ³ s ⁻¹).
Cumec-hours	A measure of volume. One cumec-hour is the equivalent of 1m ³ /s ⁻¹ sustained for one hour (3,600m ³).
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
E.coli	Escherichia coli, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Ent	Enterococci, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre of sample.
Fresh	Elevated flow in a stream, such as after heavy rainfall.
g/m ³	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
l/s	Litres per second.
m ²	Metres ²
MCI	Macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats.
Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
NH ₄	Ammonium, normally expressed in terms of the mass of nitrogen (N).
NO ₃	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.

Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
PM ₁₀	Relatively fine airborne particles (less than 10 micrometre diameter).
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	<i>Resource Management Act 1991</i> and including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
UI	Unauthorised Incident.
UIR	Unauthorised Incident Register – contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.

For further information on analytical methods, contact the Council's laboratory.

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Appendix I

Resource consents held by Trustpower Ltd in relation to the Patea HEPS

Discharge Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: TrustPower Limited
Private Bag 12023
TAURANGA 3143

Consent Granted
Date: 30 June 2009

Conditions of Consent

Consent Granted: To discharge contaminants [combustion products] into the air during the burning of driftwood captured by the Patea Hydroelectric Power Scheme log boom at or about (NZTM) 1735050E-5621586N

Expiry Date: 1 June 2028

Review Date(s): June 2012, June 2016, June 2022

Site Location: Patea Hydroelectric Power Scheme, Maben Road, Hurleyville, Patea

Legal Description: Pt Sec 7 Blk VI Opaku SD

Catchment: Patea

General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

1. Notwithstanding any other condition of this consent the consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. In order to help prevent or minimise adverse effects of the activity, due regard shall be had to the direction and strength of the wind over the duration of the burning, including regard to any available weather forecast.
3. The exercise of this consent shall not give rise to any offensive, objectionable or toxic levels of smoke or odour at or beyond the boundary of the property on which the activity is occurring.
4. The exercise of this consent shall be undertaken in accordance with the documentation submitted in support of application 4826. In the case of any contradiction between the documentation submitted in support of application 4826 and the conditions of this consent, the conditions of this consent shall prevail.
5. The consent holder, or an authorised agent shall supervise the burning at all times.
6. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least three working days before any burning occurs. Notification shall include the consent number and the name and contact details of the person who will be supervising the burning, and be emailed to worknotification@trc.govt.nz.
7. The consent holder shall maintain a record of each burning event, including: the date, time and duration; the wind conditions [strength and direction] over the duration of the burning; any problems or issues that occurred; and details of any complaints received about the burning. This record shall be made available to the Chief Executive, Taranaki Regional Council upon request.

Consent 7194-1

8. This consent shall lapse on 30th June 2014, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
9. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2012 and/or June 2016 and/or June 2022, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 30 June 2009

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Discharge Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: TrustPower Limited
Private Bag 12023
TAURANGA 3143

Consent Granted
Date: 30 June 2009

Conditions of Consent

Consent Granted: To discharge contaminants [including water/dust and particulate matter] into the air from moveable wet and dry abrasive blasting processes during the maintenance of plant and equipment at the Patea Hydroelectric Power Scheme at or about (NZTM) 1734677E-5621431N

Expiry Date: 1 June 2020

Review Date(s): June 2012, June 2014, June 2016

Site Location: Patea Hydroelectric Power Scheme, Maben Road,
Hurleyville, Patea

Legal Description: Secs 1 & 2 SO 12618 Sec 1 SO 12962 & Pt Sec 6 Pt Sec
7 Blk VI Opaku SD

Catchment: Patea

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

1. Notwithstanding any other condition of this consent, the consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. Any discharge to air from the exercise of this consent shall not give rise to any offensive, objectionable or toxic levels of dust or odour at or beyond the boundary of the property on which the abrasive blasting or associated activity is occurring.
3. As far as is practicable, work areas and surrounding areas shall be cleared of accumulations of blasting material at the end of each blasting session or, where a blasting session extends over more than a day, at the end of a working day.
4. Sand used for dry abrasive blasting shall contain:
 - (i) less than 5% by dry weight free silica; and
 - (ii) less than 2% by dry weight dust able to pass through a 0.15 micron sieve.
5. The consent holder shall ensure that all operators of abrasive blasting equipment understand and comply with the all the conditions of this consent prior to the commencement of any work for which this consent is required.
6. The discharge shall not give rise to any of the following effects in any surface watercourse:
 - a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
 - b) any conspicuous change in the colour or visual clarity;
 - c) any emission of objectionable odour;
 - d) the rendering of fresh water unsuitable for consumption by farm animals;
 - e) any significant adverse effects on aquatic life;
 - f) an increase in suspended solids of more than 10 g/ m³;

Consent 7193-1

- g) turbidity above 4 nephelometric turbidity units [NTU], except that if the turbidity within the water body is above 3.2 NTU, no more than 25% increase in NTU;
 - h) any increase in the concentration of zinc, lead, arsenic, chromium or thorium-based products.
7. All items or premises to be blasted shall be screened as completely as practicable by covers, tarpaulins, cladding, , to contain dust emissions and depositions to the satisfaction of the Chief Executive, Taranaki Regional Council, so as to ensure compliance with conditions 1 and 2.
 8. Where abrasive blasting or surface coating is to take place within 100 metres of a watercourse, the consent holder shall notify the Chief Executive, Taranaki Regional Council, prior to any operation commencing. The Chief Executive, Taranaki Regional Council, may require additional measures to prevent, minimise or mitigate any potential for adverse environmental effects. It shall be the responsibility of the consent holder to ascertain such measures prior to commencing an abrasive blasting operation, and to comply with any and all such measures at all times. Notification in accordance with this condition shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.
 9. The suspended particulate matter shall not exceed 3 mg/m³ [measured under ambient conditions], and the deposition of dust shall not exceed 0.13 g/m²/day beyond the property boundary or beyond 50 metres of the discharge when sited on public amenity areas, whichever is less.
 10. This consent shall lapse on 30th June 2019, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
 11. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2012 and/or June 2014 and/or June 2016, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 30 June 2009

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Water Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: TrustPower Limited
Private Bag 12023
TAURANGA 3143

Consent Granted
Date: 30 June 2009

Conditions of Consent

Consent Granted: To take groundwater to provide a domestic water supply to facilities at the Patea Dam, including the powerhouse, dwellings and a camping ground at or about (NZTM) 1734794E-5621358N

Expiry Date: 1 June 2040

Review Date(s): June 2016, June 2022, June 2028, June 2034

Site Location: Patea Hydroelectric Power Scheme, Maben Road,
Hurleyville, Patea

Legal Description: Pt Sec 7 Blk VI Opaku SD

Catchment: Patea

Consent 7192-1

General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

1. The exercise of this consent shall be undertaken substantially in accordance with the documentation submitted in support of application 4824. If there is any conflict between the documentation submitted in support of application 4824 and the conditions of this consent, the conditions of this consent shall prevail.
2. The volume of water taken shall not exceed 12.5 cubic metres per day at a rate not exceeding 1 litre per second.
3. The consent holder shall install and maintain a water meter on the bore that records the volume of water taken to an accuracy of $\pm 5\%$. The meter shall be installed before the consent is exercised.
4. The consent holder shall maintain a record of the volume of water taken each month. The record shall include date of meter reading, pumping hours and volume pumped, and make these records available to the Chief Executive, Taranaki Regional Council, no later than 31 July of each year, or upon request.
5. This consent shall lapse on 30th June 2014, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

Consent 7192-1

6. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2016 and/or June 2022 and/or June 2028 and/or June 2034, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 30 June 2009

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Land Use Consent
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: TrustPower Limited
Private Bag 12023
TAURANGA 3143

Decision Date: 26 January 2011

Commencement
Date: 26 January 2011

Conditions of Consent

Consent Granted: To place and use a floating pontoon in Lake Rotorangi,
including associated excavation and disturbance of the
lake bed, for recreational purposes at or about (NZTM)
1729790E-5627396N

Expiry Date: 1 June 2028

Review Date(s): June 2016, June 2022

Site Location: Pukekino Road, Ohangai

Legal Description: Sec 2 SO 12968 [Site of structure]

Catchment: Patea

Tributary: Lake Rotorangi

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General condition

- a. The consent holder shall pay to the Taranaki Regional Council [the Council] all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act.

Special conditions

1. The structure shall be constructed in accordance with a plan by Anchorage Pontoons Ltd for TrustPower, Pontoon with hinged gangway, provided to the Council on 23 December 2010. In the case of any contradiction between the drawing and the conditions of this consent, the conditions of this consent shall prevail.
2. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 2 working days prior to the commencement and upon completion of the initial installation. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.
3. The consent holder shall ensure that the area and volume of streambed disturbance is, as far as practicable, minimised and any areas that are disturbed are, as far as practicable, reinstated.
4. The consent holder shall take all reasonable steps to:
 - a. minimise the amount of sediment discharged to the stream;
 - b. minimise the amount of sediment that becomes suspended in the stream; and
 - c. mitigate the effects of any sediment in the stream.

Undertaking work in accordance with *Guidelines for Earthworks in the Taranaki region*, by the Taranaki Regional Council, will achieve compliance with this condition.

5. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure is no longer required. A further resource consent may be required to authorise the removal of the structure, and the consent holder is advised to seek advice from the Council on this matter.
6. In the event that any archaeological remains are discovered as a result of works authorised by this consent, the works shall cease immediately at the affected site and tangata whenua and the Chief Executive, Taranaki Regional Council, shall be notified within one working day. Works may recommence at the affected area when advised to do so by the Chief Executive, Taranaki Regional Council. Such advice shall be given after the Chief Executive has considered: tangata whenua interest and values, the consent holder's interests, the interests of the public generally, and any archaeological or scientific evidence. The New Zealand Police, Coroner, and Historic Places Trust shall also be contacted as appropriate, and the work shall not recommence in the affected area until any necessary statutory authorisations or consents have been obtained.

Consent 7773-1

7. This consent shall lapse on 31 March 2016, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
8. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2016 and/or June 2022 for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 26 January 2011

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Discharge Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: TrustPower Limited
Private Bag 12023
TAURANGA 3143

Decision Date: 25 June 2009

Commencement
Date: 17 December 2010

Conditions of Consent

Consent Granted: To discharge water from the Patea Hydro-electric scheme's auxiliary spillway and emergency spillway to the Patea River via spillway creek at or about (NZTM) 1734751E-5621514N

Expiry Date: 1 June 2040

Review Date(s): As per special condition 6

Site Location: Patea Hydroelectric Power Scheme, Maben Road,
Hurleyville, Patea

Legal Description: Secs 1 & 2 SO 12618 Sec 1 SO 12962 & Pt Sec 6 Pt Sec
7 Blk VI Opaku SD

Catchment: Patea

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

1. The consent holder shall monitor the Patea River below the Patea Dam to assess the extent of erosion that is or is not occurring. The survey shall include:
 - (a) an annual visual inspection of the full length of the Patea River downstream of the Patea Dam;
 - (b) an annual photographic survey of the 13 permanent cross section locations; and
 - (c) a biennial channel cross-section survey of the 13 permanent cross-section sites. The cross-sections sites referred to in this consent are shown on Figure Two, attached to and forming part of this consent.
2. In the event that two consecutive surveys conducted in accordance with condition 1 (c) show no significant change in cross-section shape then the frequency of the channel cross-section survey shall be changed to five yearly intervals.
3. The consent holder shall provide the results of the monitoring undertaken in accordance with conditions (1) and (2), including a comparison with the previous survey, to the Chief Executive, Taranaki Regional Council within 60 days of the survey being completed.
4. The mean hourly rise or recession rate for all flows greater than 95 cubic metres per second, into the Lower Patea River (being the reach of the Patea River immediately below the Patea Hydro Electric Power Scheme), from the tailrace/stilling basin (as determined from the tailrace/stilling basin data) shall:
 - (a) for flows up to and including 135 cubic metres/second, not vary by more than 50%, plus or minus 20 cubic metres/second/hour, from the reference rate of change as defined in condition 4(b); and

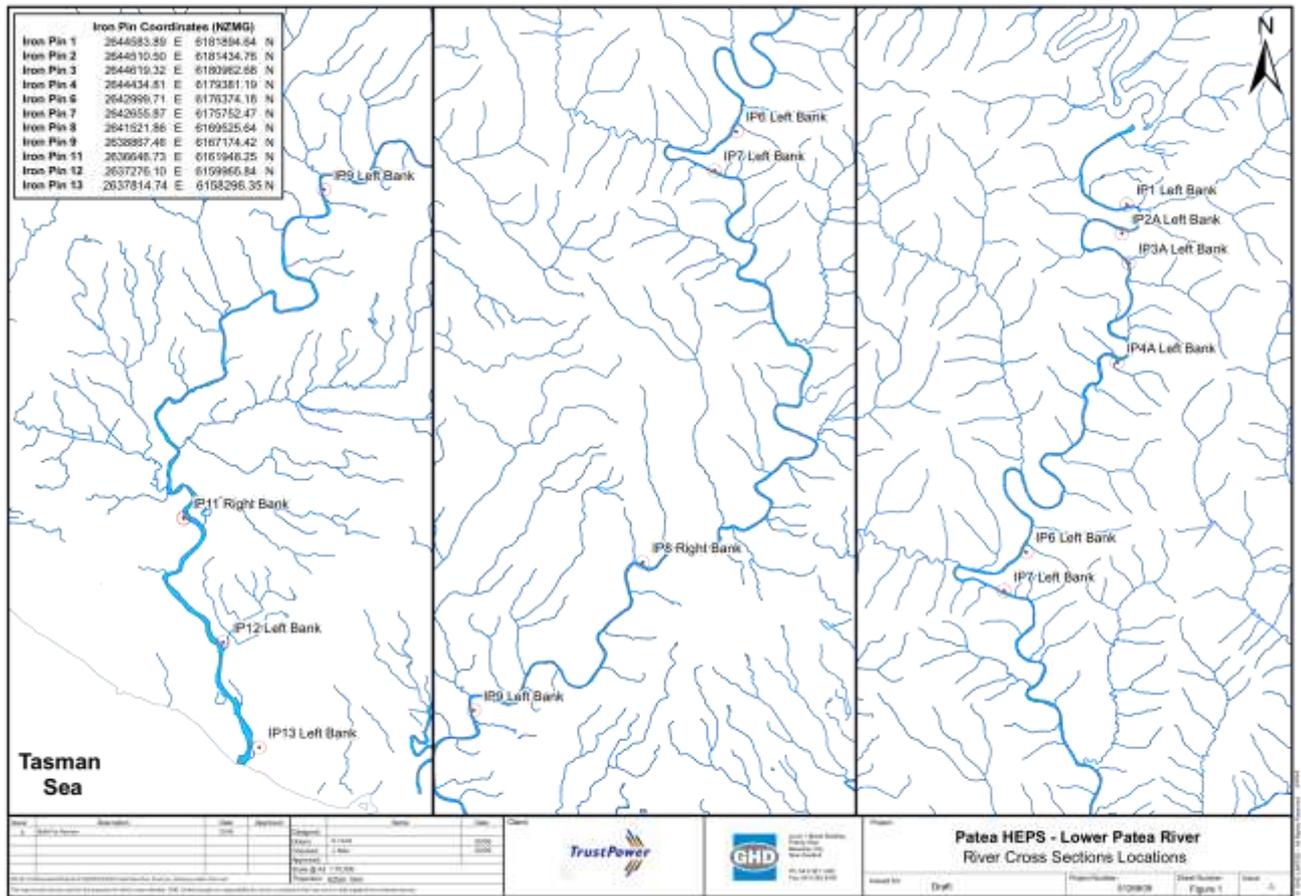
- (b) for flows greater than 135 cubic metres/second, not vary by more than 50% from a reference rate of change defined as the sum of any two mean hourly flow rise or recession rates, one of the two rates as determined (at any time through the preceding 6 hours) from the 'Patea River at Skinner Road hydrographic station' data [site no, 34308], and the other rate as determined (at any time through the preceding 6 hours) from the 'Mangaehu Stream at Bridge' hydrographic station data [site no. 34309].
5. Whenever the spillway gate or spillway gates are re-opened during sustained recessions where the sum of the two mean hourly recession rates as determined in condition 4(b) is continuously negative, the discharge from the spillway shall, irrespective of the current lake level, conclude with a continuous discharge of not more than 50 cubic metres/second for a period of not less than 6 hours or until, after 4 hours of the period, the mean lake-level has fallen below 78 metres above mean sea level and not less than 90 millimetres below the mean lake level at the time the spillway gates were opened.
6. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review 2 years from commencement of consent; during the sixth year and every 6 years thereafter, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which it was not appropriate to deal with at the time the consent was granted.

Signed at Stratford on 17 December 2010

For and on behalf of
Taranaki Regional Council

Director-Resource Management

FIGURE TWO – LOWER PATEA RIVER CROSS SECTIONS



Discharge Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: TrustPower Limited
Private Bag 12023
TAURANGA 3143

Decision Date: 25 June 2009

Commencement
Date: 17 December 2010

Conditions of Consent

Consent Granted: To discharge water from the Patea power house and the main service spillway to the Patea River, for hydro-electric power generation purposes at or about (NZTM) 1734751E-5621514N

Expiry Date: 1 June 2040

Review Date(s): As per special condition 18

Site Location: Patea Hydroelectric Power Scheme, Maben Road,
Hurleyville, Patea

Legal Description: Secs 1 & 2 SO 12618 Sec 1 SO 12962 & Pt Sec 6 Pt Sec
7 Blk VI Opaku SD

Catchment: Patea

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

1. The consent holder shall monitor the Patea River below the Patea Dam to assess the extent of erosion that is or is not occurring. The survey shall include:
 - (a) an annual visual inspection of the full length of the Patea River downstream of the Patea Dam;
 - (b) an annual photographic survey of the 13 permanent cross section locations; and
 - (c) at least once every two years a channel cross-section survey of the 13 permanent cross-section sites. The cross-section sites referred to in this condition are shown on Figure Two, attached to and forming part of this consent.
2. In the event that two consecutive surveys conducted in accordance with condition 1 (c) show no significant change in cross-section shape then the frequency of the channel cross-section survey shall be changed to five yearly intervals.
3. The consent holder shall provide the results of the monitoring undertaken in accordance with conditions (1) and (2), including a comparison with the previous survey, to the Chief Executive, Taranaki Regional Council within 60 days of the survey being completed.
4. The consent holder shall maintain the Patea Dam and all its appurtenant components and ancillary / appurtenant structures to the standards recommended in the operative New Zealand Society of Large Dams, Dam Safety Guidelines (2000) operative at 20 May 2009.

5. Within 6 months of the commencement of this consent, the consent holder shall, after reasonable consultation with the Taranaki Civil Defence Emergency Management Group, provide an Emergency Management Plan to the Taranaki Civil Defence Emergency Management Group addressing abnormal or excessive release of flows from the Patea Dam. The Plan shall include reference to the following matters:
 - (a) identification of modes of such flows, potential size and duration of releases and the probability of their occurrence; and
 - (b) the modelling of downstream effects of such discharges particularly on private property; and
 - (c) contingency plans for alerting communities and authorities in such events.
6. A copy of the Emergency Management Plan shall be forwarded by the consent holder to the South Taranaki District Council, the Stratford District Council, the New Plymouth District Council, the Hawera station of New Zealand Police and to New Plymouth station of the New Zealand Fire Service within 7 days of being provided to the Taranaki Civil Defence Emergency Management Group.
7. The consent holder shall undertake an annual review of the Emergency Management Plan. Where amendments are made to the Plan, they will be notified to the parties listed in condition 6 within 7 days.
8. The consent holder shall separately measure and electronically record the rate of discharge from the Patea Powerhouse and from the main service spillway at intervals not exceeding 15 minutes to an accuracy of $\pm 5\%$. These records shall be provided to the Chief Executive of Taranaki Regional Council, at monthly intervals or upon reasonable request.
9. Subject to conditions 10-13 below, the exercise of this consent shall not cause the flow in the Patea River, as measured at the 'McColl's Quarry' measuring site [site no 34304], to be less than 2.1 cubic metres per second (as an hourly average) [the 'minimum flow'].
10. Notwithstanding condition 9 above, following unusually long periods of less than normal rainfall in the Patea River catchment the exercise of this consent may cause the flow in the Patea River to be less than the minimum flow, provided that the flow in the Patea River as measured at the 'McColl's Quarry' measuring site [site no 34304] is not less than 2.1 cubic metres per second (as an hourly average):
 - (a) at any time during more than 5 out of any 10 consecutive calendar years; or
 - (b) for more than 72 hours in any 30 day period.
11. On any occasion when the exercise of this consent causes the flow in the Patea River to be less than the minimum flow in accordance with condition 10 the consent holder shall, within 14 days, provide the Chief Executive, Taranaki Regional Council with documentation showing that the breach of the minimum flow was a direct result of an unusually long period of less than normal rainfall in the Patea River catchment.

12. In the event that any future upstream water takes (not consented as at 6 May 2009) in combination with existing takes, cause the total inflow to Lake Rotorangi to be less than 2.1 cubic metres per second, the minimum flow referred to in condition 9 shall, at times when the total inflow to Lake Rotorangi is less than 2.1 cubic metres per second, be temporarily reduced by a rate equivalent to the estimated combined rate of take by such future upstream water takes.
13. At no time shall the exercise of this consent cause the flow in the Patea River, as measured at the 'McCull's Quarry' measuring site [site no 34304], to be less than 1.8 cubic metres per second (as an hourly average).

Advice Note: For the avoidance of doubt, it is recorded that the intent of condition 12 is to provide relief to the consent holder if a future allocation of some or all of the 0.305 m³/s referred to in condition 3 of consents 0491-2 and 0489-2 causes a reduction in lake inflows below 2.1 m³/s. During those times, the minimum flow below the Patea Dam can be temporarily reduced to reflect the lower inflows. If any future consents are granted on terms that require any future consent holder to cease taking at times when the consent holder is restricted by the minimum flow then the downstream minimum flow will not be affected.

Advice Note: Nothing in this consent precludes the consent holder from submitting (on any basis permitted by the Act) on any future consent or re-consenting applications to take water from the Patea River catchment upstream of Patea Dam. For the avoidance of doubt, any such future applications need to be considered on their merits.

14. In accordance with the proposal made in the application the consent holder shall mitigate the effects of downstream erosion by, within 60 days of the commencement of this consent, and once per year thereafter, making an annual payment of \$7,500 [GST exclusive and inflation adjusted] to the Taranaki Tree Trust for the purpose of providing riparian management in the lower Patea River catchment.
15. The mean hourly rise or recession rate for all flows greater than 95 cubic metres/second, into the Lower Patea River (being the reach of the Patea River immediately below the Patea Hydro Electric Power Scheme), from the tailrace/stilling basin (as determined from the tailrace/stilling basin data) shall:
 - (a) for flows up to and including 135 cubic metres/second, not vary by more than 50%, plus or minus 20 cubic metres/second/hour, from the reference rate of change as defined in condition 15(b); and
 - (b) for flows greater than 135 cubic metres per second, not vary by more than 50% from a reference rate of change defined as the sum of any two mean hourly flow rise or recession rates, one of the two rates as determined (at any time through the preceding 6 hours) from the Patea River at Skinner Road hydrographic station data [site no, 34308], and the other rate as determined (at any time through the preceding 6 hours) from the Mangaehu Stream at Bridge hydrographic station data [site no. 34309].

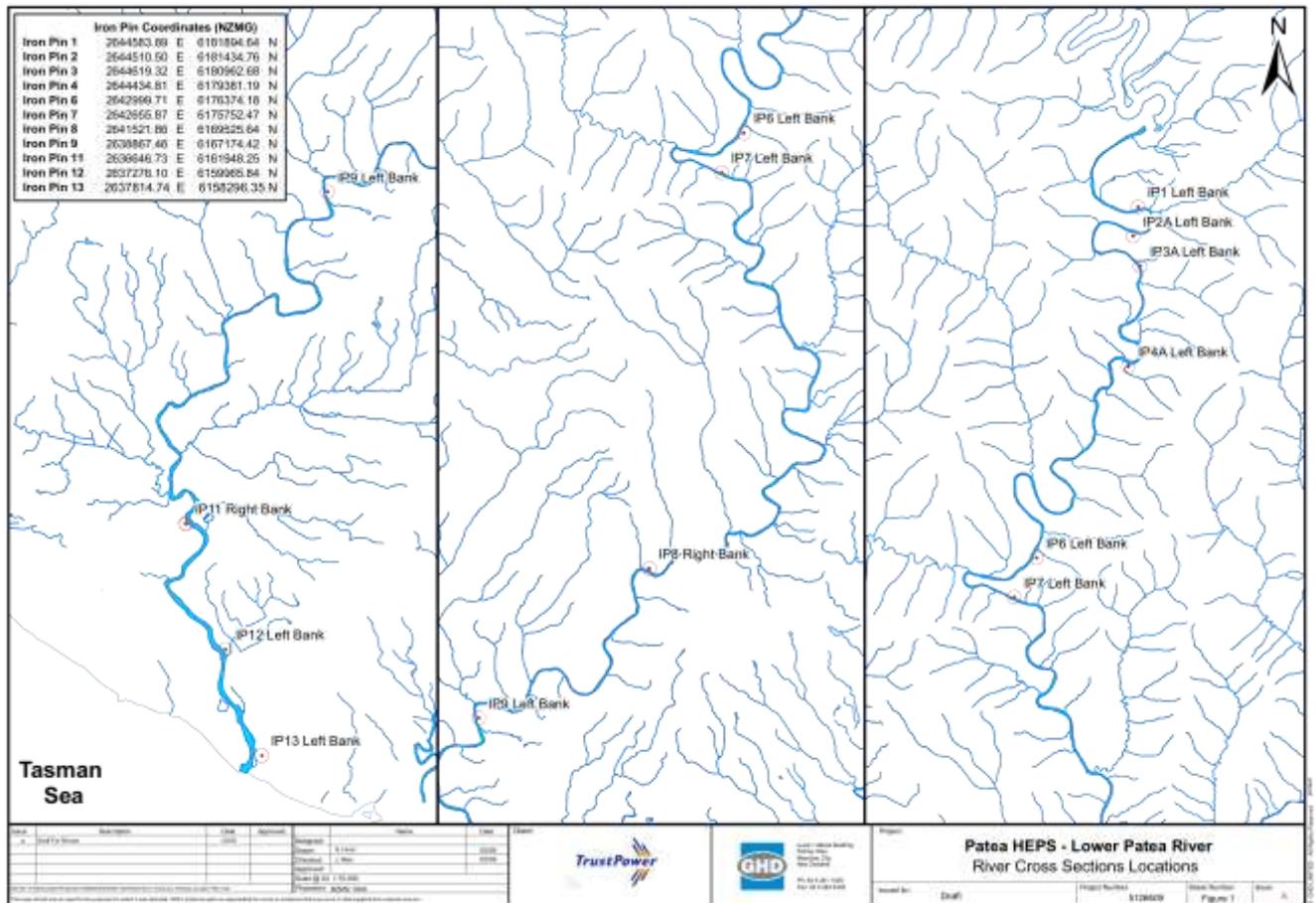
16. Whenever the spillway gate or spillway gates are re-opened during sustained recessions where the sum of the two mean hourly recession rates as determined in condition 15(b) is continuously negative, the discharge from the spillway shall, irrespective of the current lake level, conclude with a continuous discharge of not more than 50 cubic metres/second for a period of not less than 6 hours or until, after 4 hours of the period, the mean lake-level has fallen below 78 metres above mean sea level and not less than 90 millimetres below the mean lake level at the time the spillway gates were opened.
17. The cost of maintaining the hydrographic stations 'Patea River at Skinner Road' [site no. 34308] and 'Mangaehu Stream at Bridge' [site no. 34309] shall be shared equally between the consent holder and the Taranaki Regional Council.
18. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review 2 years from commencement of consent; during the sixth year and every 6 years thereafter, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which it was not appropriate to deal with at the time the consent was granted.

Signed at Stratford on 17 December 2010

For and on behalf of
Taranaki Regional Council

Director-Resource Management

FIGURE TWO – LOWER PATEA RIVER CROSS SECTIONS





Land Use Consent
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

CHIEF EXECUTIVE
PRIVATE BAG 713
47 CLOTEN ROAD
STRATFORD
NEW ZEALAND
PHONE: 06-765 7127
FAX: 06-765 5097
www.trc.govt.nz

Please quote our file number
on all correspondence

Name of
Consent Holder: TrustPower Limited
Private Bag 12023
TAURANGA 3143

Decision Date: 25 June 2009

Commencement
Date: 17 December 2010

Conditions of Consent

Consent Granted: To maintain, repair, alter and reconstruct structures and works [including but not limited to the Patea dam, log boom, auxiliary spillway, emergency spillway, flood channels, river training works and boat ramps] in, on, under or over the bed of the Patea River and Lake Rotorangi at or about (NZTM) 1734751E-5621514N

Expiry Date: 1 June 2040

Review Date(s): As per special condition 7

Site Location: Patea Hydroelectric Power Scheme, Maben Road,
Hurleyville, Patea

Legal Description: Secs 1 & 2 SO 12618 Sec 1 SO 12962 & Pt Sec 6 Pt Sec
7 Blk VI Opaku SD

Catchment: Patea

Tributary: Lake Rotorangi

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

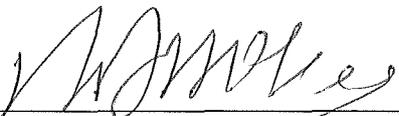
1. The activity is for the purpose of maintaining the structure and associated structures and equipment in good repair or working order or for minor upgrading.
2. No contaminant [other than sediment] shall be released to the area of river or lake bed beyond the area being worked from equipment being used for the activity, and no refuelling of equipment shall take place on any area of the river or lake bed.
3. Based on measurements using a black disc, sediment disturbance shall not give rise to a decrease in visual clarity of water of more than 50% beyond a distance of 100 metres from the work site.
4. All material removed from the structure and excess construction materials shall be removed from the river or lake bed as soon as practicable following the completion of the work.
5. Dewatering of any work site shall be for the minimum time necessary to undertake the work. If dewatering for more than 48 hours is expected to be necessary the consent holder shall notify the Council before the work begins. Notification shall include the consent number and a brief description of the activity being undertaken and be emailed to worknotification@trc.govt.nz.
6. The consent holder shall ensure that the area and volume of river bed and lake bed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.

Consent 7188-1

7. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review 2 years from commencement of consent; during the sixth year and every 6 years thereafter, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which it was not appropriate to deal with at the time the consent was granted.

Signed at Stratford on 17 December 2010

For and on behalf of
Taranaki Regional Council



Director-Resource Management

Land Use Consent
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: TrustPower Limited
Private Bag 12023
TAURANGA 3143

Decision Date: 25 June 2009

Commencement
Date: 17 December 2010

Conditions of Consent

Consent Granted: To use the existing Patea Dam and associated infrastructure in, on, under or over the bed of the Patea River and Lake Rotorangi for hydroelectric power generation purposes at or about (NZTM) 1734751E-5621514N

Expiry Date: 1 June 2040

Review Date(s): As per special condition 5

Site Location: Patea Hydroelectric Power Scheme, Maben Road,
Hurleyville, Patea

Legal Description: Secs 1 & 2 SO 12618 Sec 1 SO 12962 & Pt Sec 6 Pt Sec
7 Blk VI Opaku SD

Catchment: Patea

Tributary: Lake Rotorangi

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

1. The consent holder shall maintain the Patea Dam and all its appurtenant components and ancillary / appurtenant structures to the standards recommended in the operative New Zealand Society of Large Dams, Dam Safety Guidelines (2000) operative as at 20 May 2009.
2. Within 6 months of the commencement of this consent, the consent holder shall, after reasonable consultation with the Taranaki Civil Defence Emergency Management Group, provide an Emergency Management Plan to the Taranaki Civil Defence Emergency Management Group addressing abnormal or excessive release of flows from the Patea Dam. The Plan shall include reference to the following matters:
 - (a) identification of modes of such flows, potential size and duration of releases and the probability of their occurrence; and
 - (b) the modelling of downstream effects of such discharges particularly on private property; and
 - (c) contingency plans for alerting communities and authorities in such events.
3. A copy of the Emergency Management Plan shall be forwarded by the consent holder to the South Taranaki District Council, the Stratford District Council, the New Plymouth District Council, the Hawera station of New Zealand Police and to New Plymouth station of the New Zealand Fire Service within 7 days of being provided to the Taranaki Civil Defence Emergency Management Group.

Consent 0488-2

4. The consent holder shall undertake an annual review of the Emergency Management Plan. Where amendments are made to the Plan, they will be notified to the parties listed in condition 3 within 7 days.
5. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review 2 years from commencement of consent; during the sixth year and every 6 years thereafter, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent which it was not appropriate to deal with at the time the consent was granted.

Signed at Stratford on 17 December 2010

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Water Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: TrustPower Limited
Private Bag 12023
TAURANGA 3143

Decision Date: 25 June 2009

Commencement
Date: 17 December 2010

Conditions of Consent

Consent Granted: To take and use water from Lake Rotorangi for hydro-
electric power generation purposes at or about (NZTM)
1734751E-5621514N

Expiry Date: 1 June 2040

Review Date(s): As per special condition 13

Site Location: Maben Road, Hurleyville, Patea

Legal Description: Secs 1 & 2 SO 12618 Sec 1 SO 12962 & Pt Sec 6 Pt Sec
7 Blk VI Opaku SD

Catchment: Patea

Tributary: Lake Rotorangi

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

1. Subject to the availability of such flows after any upstream uses currently authorised and any uses subsequently authorised in accordance with conditions 2 and 3 below, the consent holder is authorised to take and use up to: 75 cubic metres per second of water for hydro-electric power generation purposes; and 25 cubic metres per second of water for fish passage purposes.
2. Nothing in this consent or the associated consents shall be deemed to:
 - (a) create an allocation of water to the exclusion of the exercise or renewal of any consents to dam, divert, take and/or use water in the Patea River catchment upstream of the Patea Dam which existed at 6 May 2009 up to the rates and volumes provided for in those consents as at that date; or
 - (b) create an allocation of water to the exclusion of the carrying out of any permitted activity to dam, divert, take and/or use water in the Patea River catchment upstream of the Patea Dam which is authorised in Regional Plans as at 6 May 2009, whether or not that activity was in existence as at May 2009;
 - (c) This consent and associated consents shall not be exercised in such a manner as to limit the exercise of any consent or permitted activity referred to above.
3. The total amount of water authorised to be dammed, diverted, taken and/or used pursuant to this consent and associated consents and the total volume allocated under this consent and associated consents, excludes such water as may be authorised to be taken, diverted and or used, by any other persons upstream of Patea Dam pursuant to a water permit granted during the term of this consent, and nothing in this consent or any of the associated consents shall preclude the grant of such additional consents during the term of this consent. Provided that this exclusion shall be limited to a maximum rate of abstraction for upstream consents not existing as at May 2009, not exceeding 0.305 cubic metres per second.

Consent 0491-2

4. Subject to conditions 5-8 below, the exercise of this consent shall not cause the flow in the Patea River, as measured at the 'McCull's Quarry' measuring site [site no 34304], to be less than 2.1 cubic metres per second (as an hourly average) [the 'minimum flow'].
5. Notwithstanding condition 4 above, following unusually long periods of less than normal rainfall in the Patea River catchment the exercise of this consent may cause the flow in the Patea River to be less than the minimum flow, provided that the flow in the Patea River as measured at the 'McCull's Quarry' measuring site [site no 34304] is not less than 2.1 cubic metres per second (as an hourly average):
 - (a) at any time during more than 5 out of any 10 consecutive calendar years; or
 - (b) for more than 72 hours in any 30 day period.
6. On any occasion when the exercise of this consent causes the flow in the Patea River to be less than the minimum flow in accordance with condition 5 the consent holder shall, within 14 days, provide the Chief Executive, Taranaki Regional Council with documentation showing that the breach of the minimum flow was a direct result of an unusually long period of less than normal rainfall in the Patea River catchment.
7. In the event that any future upstream water takes (not consented as at 6 May 2009) in combination with existing takes, cause the total inflow to Lake Rotorangi to be less than 2.1 cubic metres per second, the minimum flow referred to in condition 4 shall, at times when the total inflow to Lake Rotorangi is less than 2.1 cubic metres per second, be temporarily reduced by a rate equivalent to the estimated combined rate of take by such future upstream water takes.
8. At no time shall the exercise of this consent cause the flow in the Patea River, as measured at the 'McCull's Quarry' measuring site [site no 34304], to be less than 1.8 cubic metres per second (as an hourly average).

Advice Note: For the avoidance of doubt, it is recorded that the intent of condition 7 is to provide relief to the consent holder if a future allocation of some or all of the 0.305 m³/s referred to in condition 3 of consents 0491-2 and 0489-2 causes a reduction in lake inflows below 2.1 m³/s. During those times, the minimum flow below the Patea Dam can be temporarily reduced to reflect the lower inflows. If any future consents are granted on terms that require any future consent holder to cease taking at times when the consent holder is restricted by the minimum flow then the downstream minimum flow will not be affected.

Advice Note: Nothing in this consent precludes the consent holder from submitting (on any basis permitted by the Act) on any future consent or re-consenting applications to take water from the Patea River catchment upstream of Patea Dam. For the avoidance of doubt, any such future applications need to be considered on their merits.

9. Within 12 months of the commencement of this consent the consent holder shall have prepared and submitted a comprehensive report to the Chief Executive of the Taranaki Regional Council, that:

Consent 0491-2

- (a) describes the feasibility of installing deterrent measures at the intake structure of the Patea Dam that will, to the greatest extent practicable avoid the entrapment of adult eels;
 - (b) describes the alternate measures considered and assesses the strengths and weaknesses of each measure; and
 - (c) recommends a deterrent measure for deflecting adult eels from the intake structure of the Patea Dam.
10. Within 12 months of receiving certification from the Chief Executive, Taranaki Regional Council that the report addresses all the matters set out on condition 9, the consent holder shall implement the deterrent measures recommended in the report required by condition 9.
11. The consent holder shall measure and electronically record the flow passing downstream of the Patea Dam, at the McColl's Quarry Site [site no. 34304], to an accuracy of $\pm 5\%$ at intervals not exceeding 15 minutes. These records shall be provided to the Chief Executive of Taranaki Regional Council at monthly intervals or upon reasonable request.
12. All the water taken, except that taken for cooling purposes, shall be discharged back into the river immediately below the Patea Dam.
13. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review:
 - (a) 2 years from commencement of consent; during the sixth year and every 6 years thereafter; and/or
 - (b) within 30 days of receiving the report required by condition 9; and/orfor the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which it was not appropriate to deal with at the time the consent was granted.

Signed at Stratford on 17 December 2010

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Appendix II

Lake Rotorangi Hazard Maps

