

Trustpower Ltd
Patea HEP Scheme
Monitoring Programme
Annual Report
2018-2019

Technical Report 2019-77

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Executive summary

Trustpower Ltd (the Company) operates a hydroelectric power station (HEPS) located on the Patea River on Maben Road, near Hurleyville. Water is impounded behind the 82 m high Patea Dam to form Lake Rotorangi. This water is diverted through the 32 MW power station, the largest in Taranaki. This report for the period July 2018 to June 2019 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Company's environmental and consent compliance 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 147 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, the Company demonstrated an overall good level of environmental performance.

The Patea HEPS was visited two times during the monitoring period, being two site inspections. In addition, analysis was conducted of generation data, lake level data, Patea River flow and groundwater abstraction data provided by the Company. The Council also reviewed a number of reports submitted in accordance with consent conditions. There were no hydrological inspections programmed for the 2018-2019 period, but hydrological monitoring was undertaken by maintaining the McColl's Bridge flow recorder. A consent variation granted in the last reported period changed the compliance point for the residual flow from the scheme to McColl's Bridge. This was in response to the loss of the McColl's Quarry flow recorder in the June 2015 flood event. The residual flow was subsequently increased to 2.2 cumecs as a result of the change in location.

The monitoring showed that overall the scheme operated within resource consent requirements for the vast majority of the period being reported. During the reported period, the Company was fully compliant with their residual flow limits, lake levels, and the rise and recession rate restrictions for the lower Patea River.

The Company was required to coordinate a number of investigations and reports during the reporting period. The bulk of the monitoring work required in relation to these was undertaken prior to the 2017-2018 period and those results have been presented in previous compliance reports for the scheme. Monitoring data and draft reports for the 2018-2019 upstream and downstream fish transfers and the lower 2018-2019 lower ecological survey report are currently awaiting finalisation through the stakeholder and expert panel review process and are expected to be completed in early 2020. The Company also provided the Council with the 2018-2019 Lake Rotorangi Sedimentation report, the 2018-2019 Lower Erosion Survey Report, and confirmation on the updating and submission of the 2018-2019 Emergency Management Plan in January 2020.

As was outlined in the 2017-2018 monitoring compliance report no draft information on the annual lakeshore survey (which forms part of the Lake Rotorangi Sedimentation Report) for the 2017-2018 compliance period was received prior to the report being compiled. An investigation was undertaken regarding the reasons for non-submission and enforcement action was being considered at the time of writing that compliance report. It was found through the investigation that the survey work required for September/October 2017 was not undertaken which resulted in an infringement notice being served to the Company.

During the 2018-2019 transfer period, relatively small proportion of the elvers and the majority of whitebait species caught through the trap and transfer programme were released directly above the Patea Dam. This raised concerns with respect to compliance with approved transfer protocols and the appropriateness of the dam as a release site due to predation issues. At the time of writing this report an abatement notice and 14

day letter had been issued to the Company to address the matter surrounding the release of fish to non-approved release locations, namely at the dam. It is likely that one outcome of the abatement notice will be the modification of the Aquatic Monitoring Plan in 2020 to address emergency fish release situations. These enforcement actions will be discussed in the next compliance monitoring report.

The Company's management of the dissolved oxygen monitoring improved and they also funded the stocking of trout into the lower Patea River in spring 2018.

There were two unauthorised incidents recorded in respect of this scheme during the period under review. These were related to the matters as discussed above and this resulted in the issuing of one infringement notice (for non-submission of a Lake Rotorangi Sedimentation report) and the issuing of an abatement notice and 14 day letter (for releasing fish at non-approved locations).

During the monitoring period, the Company demonstrated a good level of environmental performance and a good level of administrative performance with the resource consents as defined in Section 1.1.4.

For reference, in the 2018-2019 year, consent holders were found to achieve a high level of environmental performance and compliance for 83% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 13% of the consents, a good level of environmental performance and compliance was achieved.

In terms of overall environmental and compliance performance by the consent holder over the last several years, this report shows that the consent holder's performance deteriorated slightly during the period being reported, although in general was an improvement compared to the previous monitoring period providing the un-submitted reports are received.

This report includes recommendations for the 2019-2020 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 for the period July 2018 to June 2019 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Trustpower Ltd (the Company) in relation to the Patea Hydroelectric Power Scheme (HEPS). This scheme is located on the Patea River on Maben Road, near Hurleyville.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consent/s held by the Company that relate to abstractions and discharges of water within the Patea catchment, and the air discharge permits covering 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 sixth 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:

- consent compliance monitoring under the RMA and the Council's obligations;
- the Council's approach to monitoring sites through annual programmes;
- the resource consents held by the Company in the Patea River catchment;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted in the Company's site/catchment.

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 2019-2020 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 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); and
- 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 Company, this report also assigns them a rating for their environmental and administrative performance during the period under review.

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 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 during investigations of incidents reported to the Council by a third party 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 during investigations of incidents reported to the Council by a third party. 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 during investigations of incidents reported to the Council by a third party. 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 2018-2019 year, consent holders were found to achieve a high level of environmental performance and compliance for 83% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 13% of the consents, a good level of environmental performance and compliance was achieved.¹

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 the longest man-made lake in New Zealand, being over 46 km long. It is 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 32 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.

¹ The Council has used these compliance grading criteria for 15 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

Under the original consents, the Council undertook a significant amount of monitoring of the environment associated with the dam, including Lake Rotorangi. This monitoring was reported in conjunction with consent 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 has engaged consultants to undertake this work. The Council was also engaged 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 the 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

The Company holds ten resource consents the details of which are summarised in the table below. Summaries of the conditions attached to each permit are set out in Section 3 of this report.

A summary of the various consent types issued by the Council is included Appendix I, as are copies of all permits held by the Company during the period under review.

Table 1 Consents held in relation to the Patea HEP scheme

Consent number	Purpose	Granted	Review	Expires
<i>Water abstraction permits</i>				
0489-2.3	To dam the Patea River (forming Lake Rotorangi) and divert water from Lake Rotorangi through the Scheme's intake structure, the service spillway, auxiliary spillway and emergency spillway, for hydro-electric power generation purposes	17 December 2010 Varied 29 September 2017	2022 or within two months of expert panel recommendation	1 June 2040
0491-2.1	To take and use water from Lake Rotorangi for hydro-electric power generation purposes	17 December 2010 Varied 29 September 2017	2022 or within two months of expert panel recommendation	1 June 2040
7192-1	To take groundwater to provide a domestic water supply to facilities at the Patea Dam, including the powerhouse, dwellings and a camping ground	17 December 2010	2022	1 June 2040
<i>Water discharge permits</i>				
7190-1.1	To discharge water from the Patea power house and the main service spillway to the Patea River for hydro-electric power generation purposes	17 December 2010 Varied 29 September 2017	2022	1 June 2040
7191-1	To discharge water from the Patea Hydro-electric scheme's auxiliary spillway and emergency spillway to the Patea River via spillway creek	17 December 2010	2022	1 June 2040
<i>Air discharge permit</i>				
7193-1	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	30 June 2009	No reviews remaining	1 June 2020
7194-1	To discharge contaminants [combustion products] into the air during the burning of driftwood captured by the Patea Hydroelectric Power Scheme log boom	30 June 2009	June 2022	1 June 2028
<i>Land use permits</i>				

Consent number	Purpose	Granted	Review	Expires
0488-2	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	17 December 2010	2022	1 June 2040
7188-1	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	17 December 2017	2022	1 June 2040
7773-1	To place and use a floating pontoon in Lake Rotorangi, including associated excavation and disturbance of the lake bed, for recreational purposes	26 January 2011	June 2022	1 June 2028

1.4 Monitoring programme

1.4.1 Introduction

Section 35 of the RMA sets obligations upon the Council to gather information, monitor and conduct research on the exercise of resource consents within the Taranaki region. The Council is also required to assess the effects arising from the exercising of these consents and report upon them.

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 Trustpower 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;
- discussion over monitoring requirements;
- preparation for any consent reviews, renewals or new consent applications;
- 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 twice during the monitoring period, for the purpose of undertaking site inspections. With regard to consents for the abstraction of or discharge to water, the main points of interest were plant processes with potential or actual discharges to receiving watercourses, including contaminated stormwater and process wastewaters. Air inspections focused on plant processes with associated actual and potential emission sources and characteristics, including potential odour, dust, noxious or offensive emissions. Sources of data being collected by the Company were identified and accessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council.

The neighbourhood was surveyed for environmental effects. The lake and locations of interest are illustrated in Figure 2.

Hydrological inspections were made a provisional component of the monitoring programme following the flooding in June 2015. These inspections were performed to confirm that residual flows were being provided as required. During the previous reported period a new component was added to the programme, where the consent holder contributed to the maintenance of the McColl's Bridge flow recorder site, maintained 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.

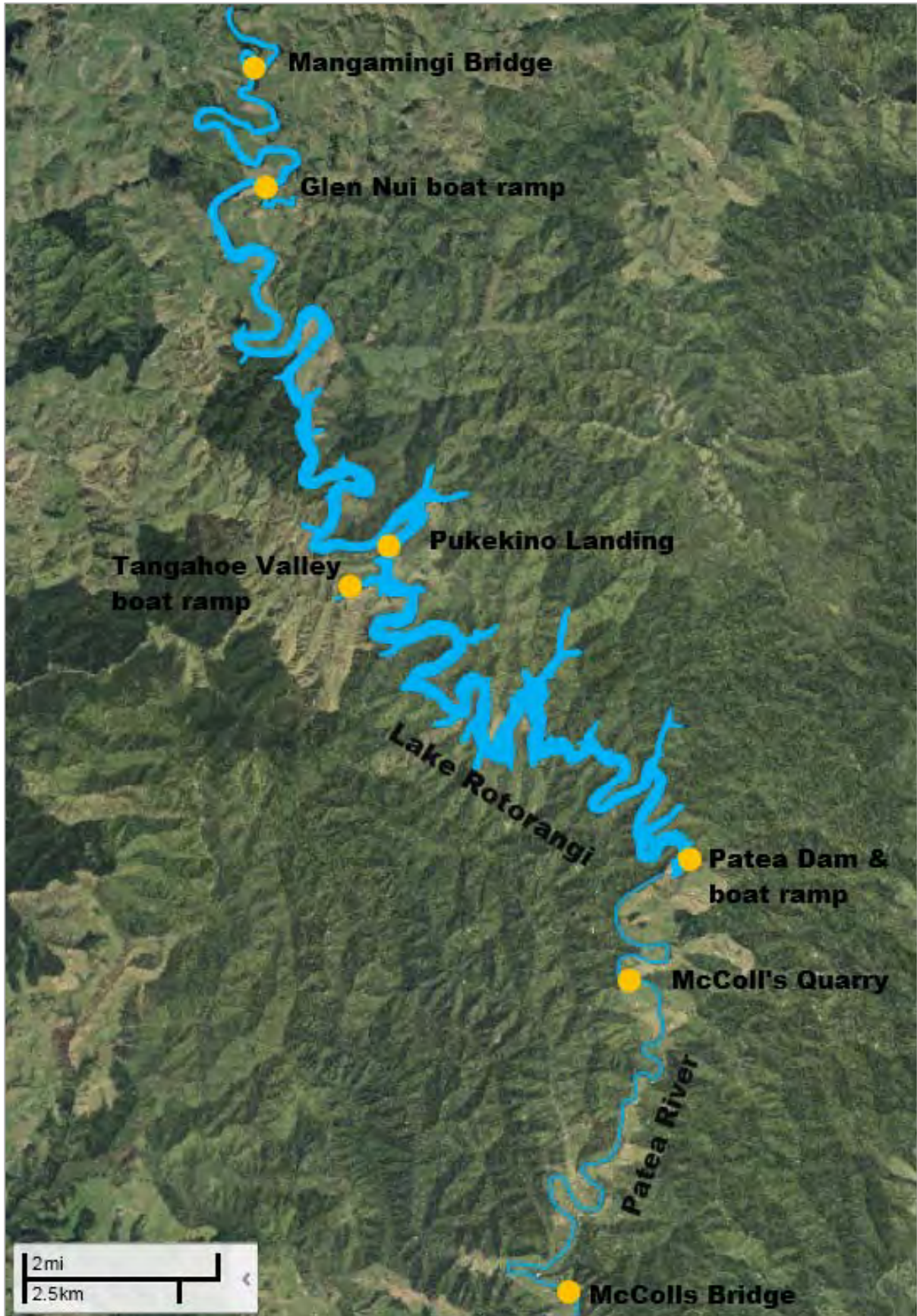


Figure 2 Lake Rotorangi, Patea Dam and the lower Patea River

2 Results

2.1 Water

2.1.1 Inspections

During the site visits various aspects of the scheme were inspected, including the boat ramps on the lake, the dam itself, and various locations where signs were required, including the Patea estuary boat ramp.

The first inspection was undertaken on the 1 February 2019 at the same time as a stakeholder site visit. Flow in the lower Patea River appeared adequate, the lake level was within the normal range, and the spillway was closed at the time. The elver trap was operating and contained many elvers. The adult eel bypass was not operating, owing to it being outside of the season that adult eels were expected to be migrating. Access to the Patea Dam boat ramp was good with very little weed or wood at the lake margins. The log boom was intact with little accumulated debris. The signs at the dam and McColl's bridge were intact. The Glen Nui boat ramp was accessed on 20th February, no obvious issues were observed with access.

The second inspection was performed on 19 June 2019, with flow in the lower Patea River appearing to be adequate, the lake level was within the normal range, and the spillway was closed at the time. The elver trap was operating and contained one elver, although, the trap was no longer being checked due to the migration season being over. The adult eel bypass system was operating which was not unusual for this time of year. On arrival to the dam large dead eels were being removed from the spillway by the Company's staff, this was explained to be a result of the incorrect disposal by contractors of eels caught on the intake screen and not related to the spillway. The log boom was intact with little accumulated debris. A wood pile was beginning to grow for burning purposes. The signs at the dam, McColl's bridge, and estuary were intact, these were all checked over that same week on different days. The Pukekino landing was in good condition. The boat ramp at Tangahoe Valley was accessible and in good condition. At Glen Nui, the staff gauge was not in good condition, the boat ramp was clear and usable, and the signs were intact and readable.

2.1.2 Provision of consent holder data

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

2.1.2.1 Tailrace rise and recession rates

Special conditions of consents 7190-1.1.1 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. When the data is processed, a minimum and maximum flow is calculated, and compliance is determined by checking whether the flow released was between these two figures. The algorithm used to calculate the minimum and maximum flow uses flow data to work out the allowable rate of rise or recession. It is important therefore that when comparing the actual flow with these minimum/maximum flows that the same data record is used as was used in calculating the minimum/maximum flows. The company records flow downstream of the dam in two ways. They record the water level in the tailrace, and this is converted to a flow using a rating curve, called the 'tailrace flow'. They also record the rate of generation, which is converted to flow, and this is added to the recorded spillway flow, also giving a figure for total flow downstream of the station. This is referred to as the 'total station outflow'.

Up until June 2015, the Council used the tailrace flow to calculate the allowable rise or recession rates. However, during the flood event that occurred in June 2015, flow in the Patea River exceeded the range of the tailrace recorder, and as result the Council used total station outflow to assess compliance. Through this

process it was realised that this is the most appropriate flow for assessing compliance (as opposed to the tailrace flow). Therefore compliance is now assessed using the total station outflow.

During the 2018-2019 monitoring period, compliance with the rise and recession rate restriction was good. There were some occasions where the actual flow was outside of these limits, but this only occurred at a time when the flows entering the lake changed quickly over a short period of time. This is very difficult to avoid, due to the flashy nature of the rivers draining Mount Taranaki, and meant that the station discharge was only outside of these limits for less than 30 minutes at a time.

2.1.2.2 Residual flow compliance

Consent 0489-2 included a residual flow requirement. This requirement read 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)”

Unfortunately the McColl’s quarry flow recorder site was destroyed during the June 2015 flood resulting in no data being available for this site for the reported period. The Company applied to move the location at which the residual flow limit is set, and where compliance is assessed, to the Council’s flow recorder located at McColl’s bridge. This change came into effect in October 2017, and reads as follows:

“...the exercise of this consent shall not cause the flow in the Patea River, as measured at the ‘McColl’s Bridge’ measuring site (site no. 34305), to be less than 2.2 cubic metres per second (as an hourly average)...”

In order to assess compliance with this condition, data recorded at McColl’s Bridge was assessed (Figure 3). This analysis shows that flows were maintained above the minimum of 2.2 cumecs throughout the reported period.

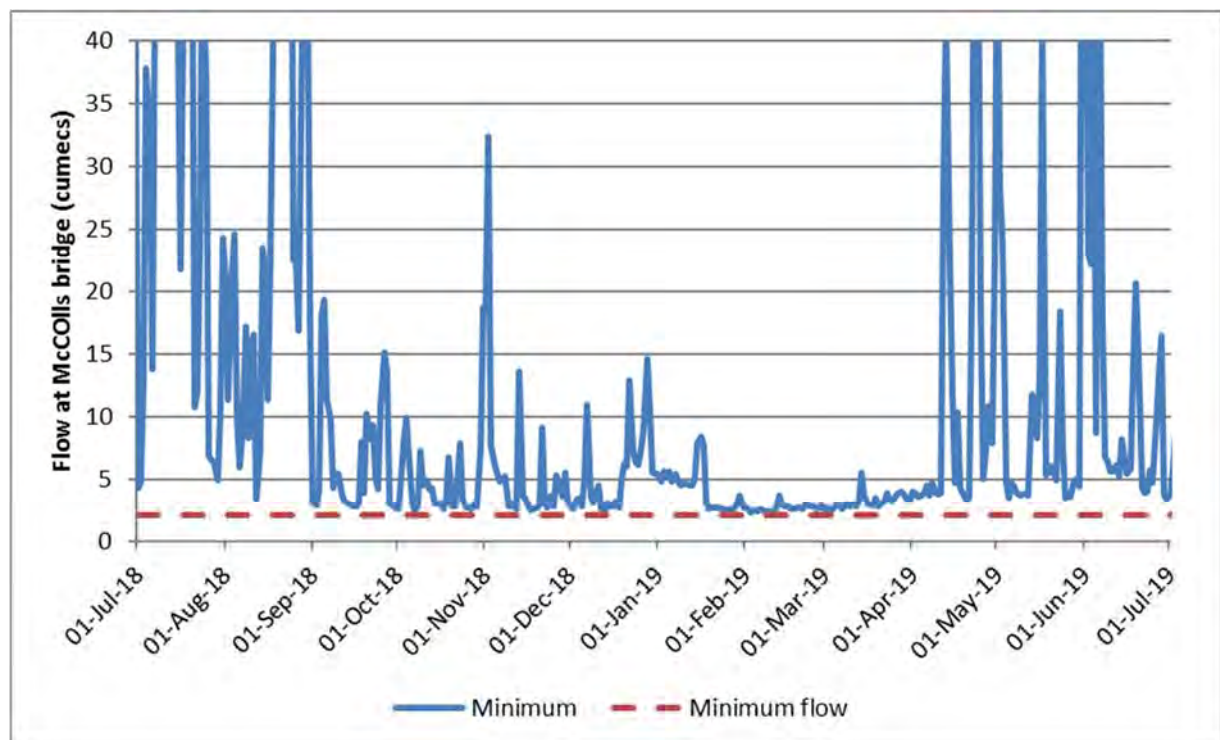


Figure 3 Daily minimum flow in the lower Patea River recorded at McColl’s Bridge, 1 July 2018-1 July 2019

2.1.2.3 Lake Level Management

Consent 0489-2.3 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, with the exception of a short time frame (264 hours) under special circumstances only, and it is not to drop below 75 m at all. In winter (16 April to 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. Figure 4 presents the lake level data for the entire 2018-2019 period.

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 in winter and in summer.

Figure 5, a good example from the 2017 -2018 monitoring period, 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.

Table 2 Number of days that lake level was below set levels in relation to consent conditions

Season	Lake level	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Summer (15 December-15 April)	<76 m	0	0	0	0	0	0	16	0
	<75 m	0	0	0	0	0	0	0	0
Winter (16 April-14 December)	<76 m	37	40	30	41	55	6	55	40
	<75 m	8	0	4	2	14	0	13	0

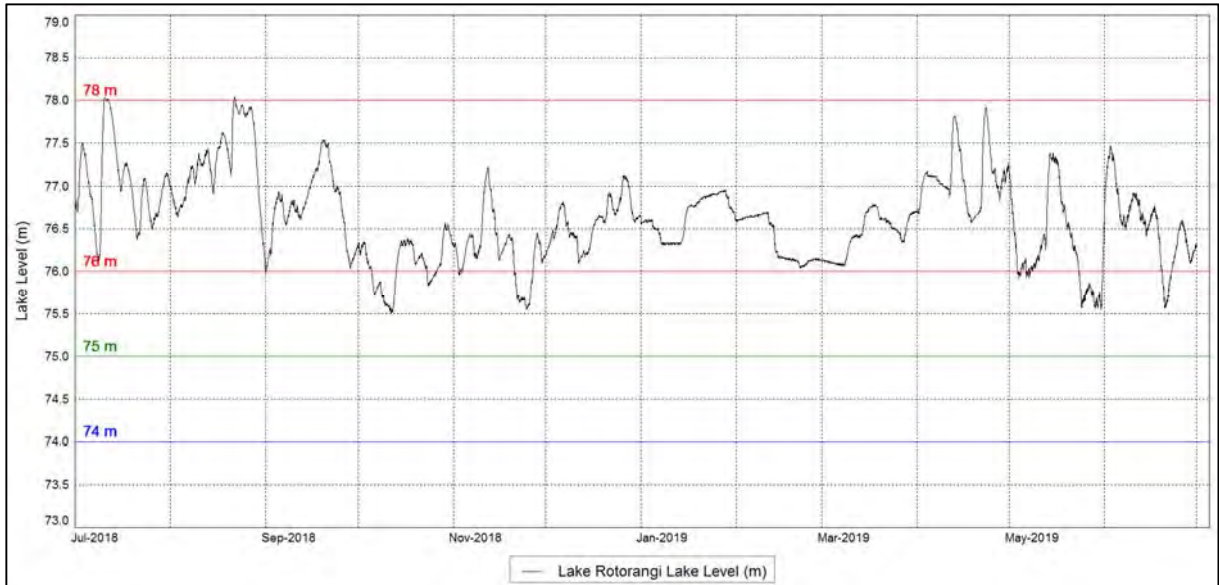


Figure 4 The change in water level of Lake Rotorangi during the 2018-2019 monitoring period

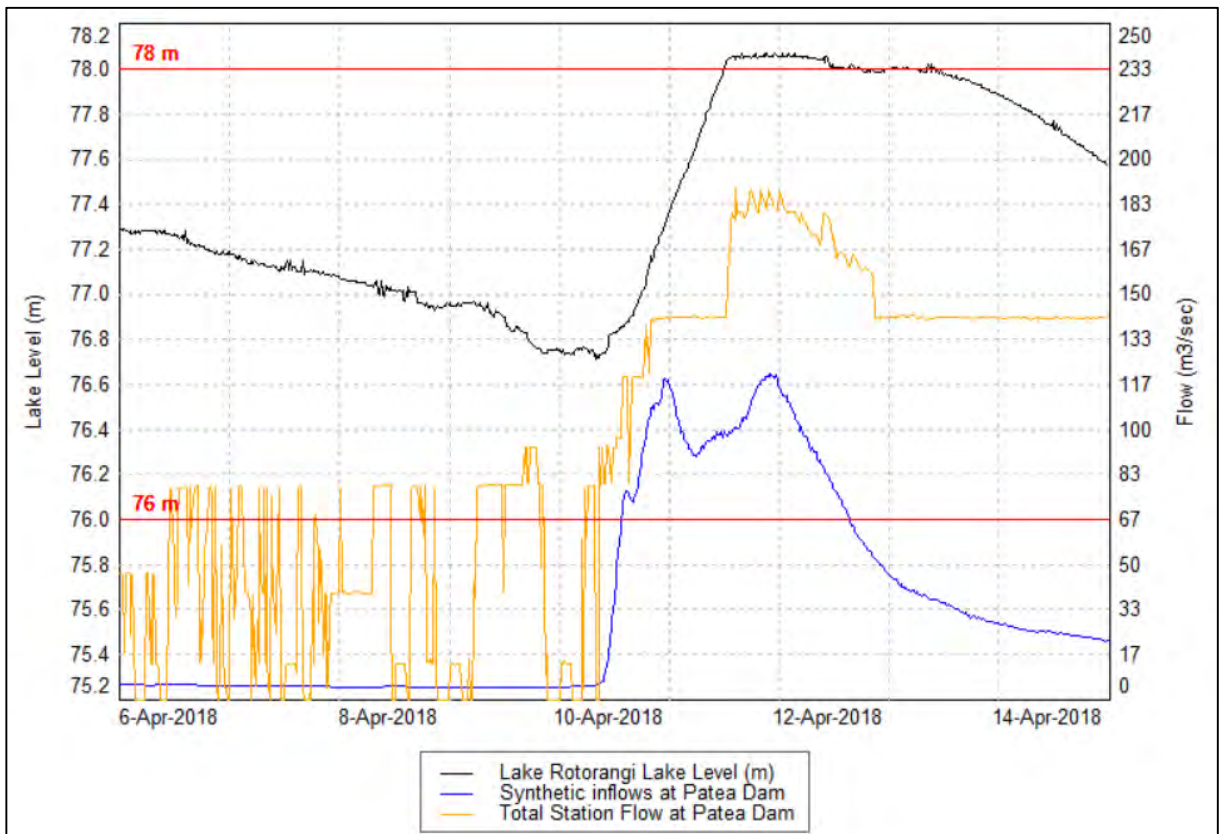


Figure 5 The relationship between lake levels, inflows and tailrace flows (generation flow plus spill-flow). Example from 2017-2018 monitoring period

2.1.2.4 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, were analysed to provide an average daily abstracted volume. Figure 6 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. In general the highest rate of take at the lake is usually recorded around January and February,

coinciding with the busiest time at the Lake Rotorangi camp ground, which is supplied water by this groundwater abstraction, however, this was not the case this year for unknown reasons.

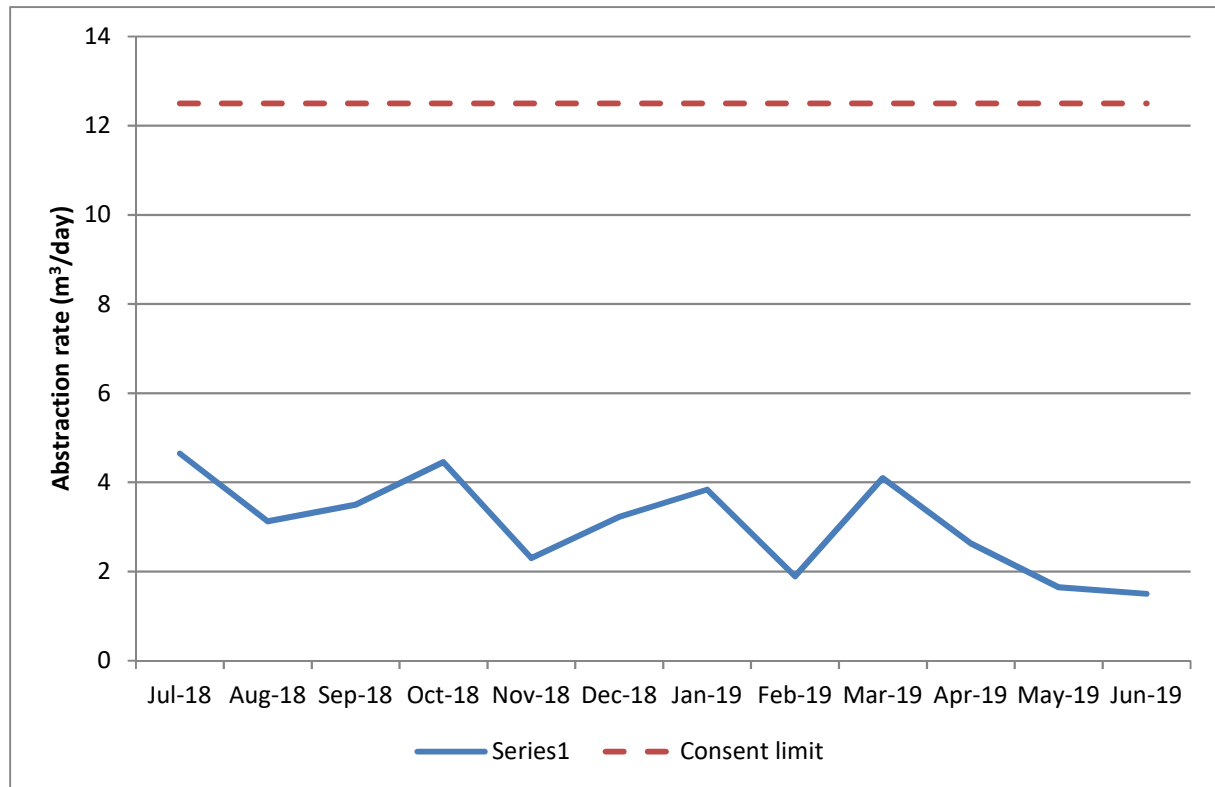


Figure 6 Average daily groundwater volume taken during the 2018-2019 period

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 Company 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. There is a significant number of reports related to this scheme, so it is not practical to present all details within this compliance report, however, all final reports are available on request.

Table 3 Reports required to be submitted to Council by the Company over the reported period

Consent	Condition(s)	Requirement	Detail	Comments/Council Reference
0489-2.3	23	Aquatic Monitoring Plan	Six Year Review	Draft report received in May 2018. Updated report received November 2018 that includes stakeholder and expert panel comments. Upstream Fish Populations survey results are also presented in this report for Condition 29.

Consent	Condition(s)	Requirement	Detail	Comments/Council Reference
	28	Fish transfers	Details the work undertaken, and success of upstream fish transfer and spillway opening for downstream eel migration.	<p>2016-2017: Draft report finalised this monitoring period.</p> <p>2017-2018: Draft report finalised this monitoring period.</p> <p>2018-2019: Draft report received and reviewed by stakeholders but not yet finalised. Expected to be received in early 2020 after stakeholder and expert panel comments are addressed and finalised.</p> <p>Timeframe for reporting extended by Council to allow for stakeholder review/engagement. Final results to be discussed in 2019-2020 compliance report.</p>
	29	Upstream fish populations	Detail the results of the six-year survey of upstream fish populations	<p>First draft received in 2016-2017 period. Another draft report was received in January 2018 to reflect stakeholder and expert panel comments. Council compiled another set of comments in May 2018.</p> <p>The report was then resubmitted as part (not all details from the January 2018 report were added but Council comments from May 2018 were added to conclusions) of the Aquatic Monitoring Plan Six Year Review document in November 2018.</p>
	31	Downstream ecology	Identify and quantify the ecology of the lower Patea River, including the varial zone.	<p>2016-2017: Final draft received and finalised this monitoring period.</p> <p>2017-2018: No report required.</p> <p>2018-2019: Draft report received and reviewed by stakeholders but not yet finalised. Expected to be received in early 2020 after stakeholder and expert panel comments are addressed and finalised.</p> <p>Timeframe for reporting extended to allow for stakeholder review/engagement. Final results to be discussed in 2019-2020 compliance report.</p>
	36	Dissolved Oxygen	Interim report	Finalised interim report received this monitoring period.
	39	Lake Sedimentation	Present the results of sedimentation monitoring of Lake Rotorangi	<p>2017-2018: Lakeshore survey report was not received for 2017-2018 monitoring period. Council Investigation in this monitoring period found that work was not undertaken which lead to enforcement action resulting in an infringement notice.</p> <p>Report for 2018-2019 lakeshore survey received in January 2020.</p> <p>Report for 2018-2019 biennial bathymetric survey received in January 2020.</p>

Consent	Condition(s)	Requirement	Detail	Comments/Council Reference
	42	Lake Eutrophication	Carry out an ecological and water quality survey of Lake Rotorangi every three years	Sampling undertaken during 2017-2018 monitoring period. Draft report provided to Company by Council in December 2019 following delays by Council who undertake work for the Company. Draft report expected to be distributed in early 2020 for stakeholder and expert panel review. Final results to be discussed in next compliance report. Draft results are presented in this report.
7190-1.1 & 7191-1	1	Lower Patea River erosion	Present results of lower Patea River erosion monitoring	Visual inspection & photographic survey of cross sections. 2017-2018 report received and finalised during 2018-2019 monitoring period. 2018-2019 report received and finalised in January 2020.

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

- Mangamingi Bridge flood risk-condition 40, consent 0489-2.3 (There is no set date to meet this condition, however, discussion with the Company is ongoing to set a timeframe for reporting)
- Trout stocking monitoring-condition 34, consent 0489-2.3
- Dissolved oxygen monitoring-condition 36, consent 0489-2.3
- Summary report for trap and transfer plus recommendations-condition 30, consent 0489-2.3

2.1.3.1 Aquatic Monitoring Plan Six Year Review

Condition 23 of Patea HEPS Resource Consent 0489-2 required the development of an Aquatic Monitoring Plan that detailed the techniques, methodologies and procedures to be followed to ensure that the monitoring and investigations complied with the relevant consent conditions. Condition 30 required a report that reviews the work that had been undertaken to achieve compliance with Conditions 18 to 20, which relate to the provision of upstream and downstream fish passage, as follows:

- “Within 6 years of the commencement of this consent, the consent holder shall prepare and submit to the Chief Executive, Taranaki Regional Council and to the Expert Panel a report that:
- a. details the work that has been undertaken to achieve compliance with conditions 18 to 20;
 - b. reports the contribution made by the upstream and downstream fish passage systems to the achievement of the objective set out in condition 18;
 - c. assesses the effects of the Patea Dam and Lake Rotorangi on fish populations and the benefits of the work that has been undertaken to maintain and enhance these populations; and
 - d. makes recommendations about mitigating the effects of the Patea Dam and Lake Rotorangi on upstream fish populations, including:
 1. the value of continuing the facilitation of fish passage;
 2. the species that should be targeted for any ongoing facilitation of passage;
 3. any changes to the programme that would help achieve compliance with condition 18; and
 4. alternative measures and/or programmes for avoiding, remedying or mitigating the effects of the Patea Dam blocking fish passage, in the event that the focus on facilitation of fish

passage is shown to be unsuccessful in establishing and maintaining populations as required by condition 18.

- e. includes any comments received on the draft report by the Expert Panel in relation to matters under (a) to (d) above.”

The first draft report was received in May 2018, with an updated report provided to reflect stakeholder and expert panel comments received in November 2018. Presented below is the executive summary from that report, please note however that each of these sections of the review report are discussed in more detail throughout this annual compliance report, this presents some contradictions as a result of ongoing developments with the management of the scheme:

Upstream Fish passage

Condition 18(a) requires the on-going operation and maintenance of a trap and transfer programme to facilitate passage of the target native fish species up stream at the Patea Dam, with annual reporting as required by Condition 28(a).

No changes are recommended to the current methodology of providing upstream fish passage.

Modifications to the upstream release sites have been suggested (Section 4.2), however discussion with TRC and other stakeholders is required before these are implemented to confirm that they are appropriate (both ecologically and culturally).

Condition 18(b) requires undertaking one reseedling of juvenile lamprey to the upper catchment to facilitate transfer of adult lamprey upstream.

In August 2015 there was a large capture and transfer of adult lamprey from below the dam into Lake Rotorangi. Investigations into the feasibility of juvenile lamprey 'reseedling' has indicated that this is not a practicable option. Trustpower will investigate the use of lamprey pheromone detectors to confirm whether or not lamprey are present in the Patea River catchment upstream of Patea HEPS. A report will be prepared detailing the results of monitoring and recommendations for future actions. This report will be provided to stakeholders for comment.

Downstream eel passage

Condition 18(c) requires the on-going operation and maintenance of a system to facilitate the non-lethal downstream passage of adult eels from upstream of the Patea Dam to below the tailrace.

No changes are recommended to the current methodology of providing downstream eel passage, which consists of both spillway opening and a bypass diversion system. In relation to Condition 28(b), monitoring of the efficacy of the bypass diversion system was to be undertaken during the adult eel migration in 2017, using the methodology detailed in the Monitoring Plan. However this was delayed due to circumstances beyond Trustpower's control, and is now intended to be completed during the 2019 downstream migration season. The proposed method differs from that in the Monitoring Plan, so will be circulated prior to the survey for comment. Following the survey an addendum to this Year 6 review report, or a second supplementary report, will be prepared to present the results of this monitoring.

Baseline assessment of upstream populations of target fish species for trap and transfer

The two surveys of target native fish species populations upstream of the Patea HEPS required by Condition 29 have been completed, and there is no further requirement for monitoring. However, Trustpower consider there is value in repeating this survey in six years (2023) to monitor the continued success of the upstream trap and transfer programme. As per Expert Panel recommendations this should include surveys at sites in Mt Taranaki National Park, and also (in particular for banded kokopu) in Mangaotuku Stream, streams adjacent to Mangaotuku Stream and in small streams near the Glen Nui fish release site.

Downstream ecology

Condition 31 requires surveys of macroinvertebrates, macrophytes and fish to be carried out every two years downstream of the Patea Dam (including in the varial zone).

The next survey is to be undertaken in February/March 2019, which will coincide with dissolved oxygen and water temperature monitoring in the lower river, and will follow two trout restocking events. For consistency, it is therefore recommended that the current downstream ecology survey method remain unchanged for the 2019 survey. However, after the 2019 survey consideration should be given to a reduction in the frequency and/or scale of downstream ecology monitoring (noting that this would require a change to consent Condition 31).

Native fish stranding

The native fish stranding survey required by Condition 37 has been completed and there is no further requirement for surveying.

Dissolved oxygen investigation

Condition 36(b) requires a final report detailing the dissolved oxygen and temperature characteristics of the study reach and any likely adverse effects of low dissolved oxygen concentration within 36 months of the commencement of the investigation.

Monitoring began in October 2016 and an interim report is due in October 2018, with the final report required by April 2020. Following this an addendum to this Year 6 review report, or a second supplementary report, will be prepared to present the results of this monitoring.

Effects on trout

The requirements for trout restocking to occur under Condition 32 have been met and consequently a restocking programme has begun.

Success and effects of trout restocking

Condition 33 required the development of a trout restocking programme in consultation with Fish and Game and the Department of Conservation.

This was completed in December 2015. It has been agreed that annual trout restocking will occur in Spring until 2021, however the numbers of trout to be released each year (if any) is subject to availability, and the frequency of release shall be decided in consultation with Fish and Game New Zealand (Taranaki Region) and the Department of Conservation (and will be reviewed after five years of monitoring). Based on these requirements, it is recommended that the target frequency for restocking be annually from 2017 to 2021 (i.e., for five years), with the proviso that this may change following consultation.

Preparation of an annual report on the restocking programme is required by August each year, and a review of the effectiveness of the restocking programme will be undertaken by August 2022 (five years after restocking commences). Following this an addendum to this Year 6 review report, or a second supplementary report, will be prepared to present the results of this monitoring.

Lake Rotorangi sedimentation

Condition 38 requires annual inspections of the Lake Rotorangi lakeshore and photographic surveys of 15 permanent cross sections, and at least once every two years a bathymetric survey of these cross sections.

The annual lakeshore survey was undertaken in September/October 2017, and the next lakeshore and bathymetric survey is to be undertaken in September/October 2018.

Lake Rotorangi eutrophication and aquatic weeds

Condition 41 requires an ecological, water quality and aquatic weed survey to be carried out in Lake Rotorangi at least once every three years.

The Taranaki Regional Council will complete monitoring for the 2018–2019 period in June 2018 and reporting will follow this.

2.1.3.2 Monitoring of upstream and downstream fish migration

This section will discuss briefly the outcome of the last three compliance monitoring periods. The summary is based on the finalised fish migration reports from the previous two monitoring periods and the near final

results for this monitoring period. The final reports for the upstream and downstream transfers are available on request and provide greater insight into the operation itself, including any comments made by stakeholders and the expert panel.

In the last annual compliance report it was outlined that the 2016-2017 trap and transfer report was yet to be finalised through the expert panel and stakeholder review process. Discussions with the Company during this monitoring period confirmed that there was no further stakeholder inputs into the draft report, therefore, there was no major differences between the draft and final version. The report was certified as finalised by the Council on the 9 April 2019 and is presented as final in this report.

A draft report of the 2017-2018 upstream and downstream migration results was received within this monitoring period under review with the Company confirming the process for consultation with stakeholders and expert panel during this monitoring period. The finalised 2017-2018 report was received on 10 July 2019 following stakeholder and expert panel input. These results are presented as final in this report.

At the time of writing this annual compliance report the draft 2018-2019 upstream and downstream migration report had been submitted to all stakeholders for review, with all comments being passed on to the Company for their and the expert panels perusal. It is expected that the final copy of the report will be received in the early months of 2020, in the next compliance monitoring period. The Company has undertaken considerable effort to ensure in this monitoring period that input from all stakeholders has been captured. Although this has resulted in delays (as approved by the Council) in an approved finalised report it has been seen as a positive step forward in terms of stakeholder engagement and therefore the late finalisation of this report will not be considered to be a compliance matter. The actual upstream and downstream fish transfer numbers presented in the draft report (with the exception of whitebait numbers which are currently being adjusted due to a reporting error) will not be changed through the reporting review and finalisation process, therefore, they have been presented in this report. Any comments on the actual management of the transfer process will be addressed in the 2019-2020 annual compliance report.

A relatively small proportion of the elvers and the majority of whitebait species caught were released directly above the Pate Dam site during the 2018-2019 period. This raised concerns with respect to compliance with approved transfer protocols and the appropriateness of the dam as a release site due to predation issues. At the time of writing this report an abatement notice and 14 day letter had been issued to the Company to address the matter surrounding the release of fish to non-approved release locations, namely at the Patea Dam. It is likely that one outcome of the abatement notice will be the modification of the Aquatic Monitoring Plan in 2020 to address emergency fish release situations. These enforcement actions will be discussed in the next compliance monitoring report.

The results show that the last three reported on seasons have had comparably very variable results when both compared to each other and the results since the consents were renewed. The variability is seen across the numbers of shortfin eel and longfin eel elver and juvenile banded kokopu, although all of the results are within historical range (Table 4). Overall there has been relatively both high and low bad numbers of koaro and banded kokopu transferred, with no positive identifications of other species found within the sample identification process. Eels have continued to be the most predominant catch, with shortfin eel the most abundant species transferred, which is typical.

Although the 2015-2016 monitoring report stated that fish were also transferred into the Mangatoromiro Stream where it flows under Rawhitiroa Road, this was subsequently changed to Lake Rotorangi at the Glen Nui boat ramp. This release site was added to the programme to ensure that banded kokopu are released in a location more reflective of their expected pre-dam distribution.

As reported previously, adult lamprey were transferred in the 2015-2016 period. No adult lamprey were transferred in the 2016-2017, 2017-2018, or 2018-2019 monitoring periods. No observations of the species including both adults or juveniles have been made at the scheme since the 2015-2016 transfer.

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

Species	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	Total
Koaro	400	386	34	19	807	164	28	0	1,838
Banded kokopu	1,327	1,362	385	42	7,950	3,036	59	Not yet finalised	Not yet finalised
Unidentified climbing whitebait	182	0	7	41	3	103	0	Not yet finalised	Not yet finalised
Longfin eel	8,613	50,766	23,471	23,400	148,532	56,222	105,406	67,106	483,516
Shortfin eel	84,639	183,711	169,599	237,174	595,839	229,951	354,817	206,375	2,062,105
Unidentified elvers	45	0	0	0	0	0	0 (2,719)	0 (60)	45 (2,779)

(numbers in brackets represent mortalities within the trap with presented records starting from the 2017-2018 period, this does not include the mortalities that result from the required lab identification process)

In terms of the transfer of adult eels over the spillway, the numbers are variable between years. This in part reflects the variable nature of the adult eel migration, difficulty in predicting its occurrence, and also likely reflects the success rates of the long standing historical transfer programme. The summary data is presented in Table 5. In the 2015-2016 period, 311 eels were passed down the spillway and 54 eels were passed down through the new eel diverter. This compares to 59 eels transferred in the 2011-2012 period, 594 in the 2012-2013 period, 1,884 in the 2013-2014 period, and 614 in the 2014-2015 period. It is likely the small number of eels recorded in the 2011-2012 period was related to limited monitoring of the transfer. In the 2016-2017, 2017-2018, and 2018-2019 period, 20 eels, 60 eels, and 460 eels, were recorded migrating past the Patea Dam respectively, with the total including those seen going over the spillway or through the operating eel bypass. In the 2016-2017 monitoring period the migration period was marked with a number of flood events, which resulted in the spillway being open for a number of consecutive days. It is likely that the majority of eels migrated downstream at this time and were not recorded. It is expected that most years will in general have higher numbers of downstream migrants than that which are reported on due to the often difficult conditions of monitoring migrants going down the spillway or due to unmonitored spill events.

The 2016 adult eel migration was the first migration period when the eel diverter was used throughout. Monitoring of the efficacy of this new device has not yet been undertaken, and was intended to be undertaken during the adult eel migration in 2018, using a variation on the methodology detailed in component 3 of the Aquatic Monitoring Plan. However this was delayed due to excessive flows through the catchment. This monitoring was then intended to be completed during the 2019 migration, however, the scheme experienced an earlier than usual timing of eel migrations. This resulted in a situation where there were doubts there was going to be enough eels available in the transfer holding tank for when the consultants would be available to do the work, so again the survey was postponed. Another methodology was then presented by the Company as a response to the postponement which was aimed at testing the system using no migratory eels, however, this did eventuate as a result of the stakeholder engagement phase of approval.

The selected adult eel migration monitoring methodology has yet to be finalised at the time of writing this report, however, it is expected that the survey will be undertaken in the late summer months of 2020.

Observed mortalities of adult eels have not in general been previously reported on as part of this compliance report or in the trap and transfer reports. The performance of the scheme in terms of preventing mortalities for migrating eels will continue to increase in importance as a result of the growing numbers of maturing eels within the upper catchment following on from the long term upstream elver transfer programme. The Company will now provide the number and dates of observed mortalities at the scheme on a yearly basis as part of the trap and transfer reports which may be used to better inform eel transfer management practices (Table 5).

Table 5 Summary of adult eels that migrated downstream of the Patea Dam between 2011-2019

Monitoring year	Number of monitored spill events	Number of days where unmonitored spill events occurred	Number of eels recorded passing over spillway	Number of eels passed through bypass	Number of mortalities recorded at the scheme	Total (excluding mortalities)
2011-2012	Unknown	Unknown	59	-	*	59
2012-2013	15	12	594	-	*	594
2013-2014	40	4	1,884	-	*	1,884
2014-2015	13	23	613	1	*	614
2015-2016	3	21	311	54	*	365
2016-2017	4	16	14	6	*	20
2017-2018	5	9	18	42	41	60
2018-2019	5	12	392	68	24	460
*not reported on during this season						

2.1.3.3 Upstream fish communities

In summer 2017, the upstream fish community survey was repeated. The first draft report for this work was received in the 2016-2017 monitoring period. Another report was received in January 2018 to reflect stakeholder and expert panel comments. Council compiled another set of comments in May 2018 following the release of a document that was submitted as final. The report was then resubmitted as part (not all details from the January 2018 report were added but Council comments from May 2018 were added to the conclusions) of the Aquatic Monitoring Plan Six Year Review document in November 2018. This report was finalised during this monitoring period as part of the 6 yearly review of the Aquatic Monitoring Plan.

The results show that longfin and shortfin eel populations in the headwaters had both increased in abundance, and had an improved size class distribution since the 2012 survey was completed. In addition, adult koaro were recorded in the upper Patea River, a species that had died out in the upper catchment prior to the change in transfer methodology. Although there was no improvement in the banded kokopu population, and no other target species recorded in the headwaters, the results of this survey show clear improvement in the upstream fish communities since 2012. The executive summary findings for the upstream fish communities results in the Aquatic Monitoring Plan Six Year Review stated the following:

The two surveys of target native fish species populations upstream of the Patea HEPS required by Condition 29 have been completed, and there is no further requirement for monitoring. However, Trustpower consider there is value in repeating this survey in six years (2023) to monitor the continued success of the upstream trap and transfer programme. As per Expert Panel recommendations this should include surveys at sites in Mt Taranaki

National Park, and also (in particular for banded kokopu) in Mangaotuku Stream, streams adjacent to Mangaotuku Stream and in small streams near the Glen Nui fish release site.

2.1.3.4 Upstream and downstream fish migration provision

The Company has already provided details of how fish are to be transferred upstream, and how adult eels are to be transferred downstream (TRC, 2015). In addition, the transfer of juvenile lamprey is not yet required, as the number of lamprey required to produce sufficient amounts of attractant pheromone makes this an impractical requirement. However, the Company will continue to investigate alternative methods for attracting adult lamprey to the dam, such as the release of synthetic pheromones at the dam. This requirement will be revisited in the upcoming monitoring periods, to determine whether additional work is required. This decision was made in consultation with stakeholders, principally the Department of Conservation and Ngaa Rauru.

The Company is making progress on undertaking pheromone monitoring for lamprey within the Rotorangi catchment, outlining that they have allocated funding for up to 20 sites. They are working with the National Institute of Water and Atmospheric Research (NIWA) on a site selection methodology, with an aim to sample in January or February 2020. The Company has also reached out for possible assistance on the pheromone monitoring from multiple stakeholders including the Council and Department of Conservation. It is likely that this topic will be discussed in the 2019-2020 monitoring period.

The adult eel conveyance system was installed in the 2014-2015 period, and commissioned prior to the 2016 adult eel migration. Monitoring of this system is required, to ensure that the fish moving through it are doing so uninjured. Although this monitoring was originally planned for the late summer 2018 migration, it was delayed due to unsafe conditions below the dam preventing the initial monitoring from being completed. Monitoring was then rescheduled for the summer of 2019 with an updated methodology. A migration timing issue, where the eels seemingly migrated earlier than anticipated, resulted in an insufficient number of eels gathering at the scheme for when the survey was planned, which meant that monitoring again needed to be postponed. The Company proactively followed up on this by seeking stakeholder approval for another updated monitoring methodology where they would catch non-migratory eels and run them through the system to test its effects on bypassing eels, however, difficulty with stakeholder engagement did not see this eventuate. It is now expected that the monitoring methodology will be confirmed in the 2019-2020 monitoring period after the methodology options can be better discussed with stakeholders. The survey will now be undertaken between March and May 2020.

2.1.3.5 Downstream ecology

As outlined in last 2017-2018 monitoring compliance report, the March 2017 survey results were still being reviewed, these were then finalised in this monitoring period. The 2017 results showed a diverse and abundant fish community, with ten fish species recorded, with common smelt, inanga, longfin eel and shortfin eel caught commonly, and length frequency data indicating that these species were actively recruiting. Five macrophyte species were recorded in the lower river, with total cover and channel clogginess both lower at the Quarry site than at the Bridge site. The area covered by native macrophyte species was similar at both sites, both less than 3%. The invertebrate results were indicative of 'poor' to 'fair' quality habitat, with no clear patterns emerging over the four surveys completed to date.

At the time of writing this annual compliance report the draft 2018-2019 downstream ecology report had been submitted to all stakeholders for review, with all comments being passed on to the Company for their and the expert panels perusal. It is expected that the final copy of the report will be received in the early months of 2020, in the next compliance monitoring period. The Company has undertaken considerable effort to ensure in this monitoring period that input from all stakeholders has been captured. Although this has resulted in delays (as approved by the Council) in an approved finalised report it has been seen as a positive step forward in terms of stakeholder engagement and therefore the late finalisation of this report

will not be considered to be a compliance matter. The results of the survey presented in the draft report will not be changed through the reporting review and finalisation process, therefore, various extracts are presented in this report. Any comments on the actual outcomes from the survey will be addressed in the 2019-2020 annual compliance report. Below are selected draft conclusions from the draft report:

*“Six macrophyte species were identified during monitoring, with two of these being native species. Native *Potamogeton ochreatus* was found at both sites for the first time during the ecological surveys. The persistence of native charophytes at both sites is also positive as they can often be completely replaced by invasive introduced species. Macrophyte cover in March 2019 was lower at the Quarry site than the Bridge site, and also lower than that observed at both sites in previous years. Reductions in macrophyte cover are likely related to disturbance caused by large floods (and slips) in the Patea River in June 2015 and more recently in March 2018”*

*“Macroinvertebrate communities were sampled in three habitats- riffles, woody debris and macrophytes. As in previous years, *Potamopyrgus* snails, *Hydropsychid* (*Aoteapsyche*) caddisflies and/or Dipteran taxa dominated the community depending on the habitat type. Overall, macroinvertebrate community scores (MCI, SQMCI and QMCI) were typically indicative of ‘poor’ to ‘fair’ quality habitat. Statistical analysis was undertaken to identify significant differences in macroinvertebrate communities between monitoring years, sites and zones (varial and non-varial).*

In riffle habitat, most invertebrate metrics did not show a clear pattern with variation between monitoring years, sites and zones in the number of invertebrates, number of taxa, number and percentage of EPT taxa, MCI, and QMCI scores. For example, QMCI scores in the non-varial zone were higher than in the varial zone in 2013, but not in other years. QMCI scores were consistently higher at the Quarry site than at the Bridge site in all years.

In woody debris habitat, there was also no clear pattern in variation between monitoring years, sites and zones for some invertebrate metrics.

Macrophyte habitat does not include varial zone sampling so invertebrate metrics were compared between sites and years. The number of taxa did not differ significantly between sites or years. The number of invertebrates was significantly higher in 2019 than in all other years. There were also significant differences in the number and percentage of EPT taxa between some years, with 2016, 2017 and 2019 being lower than some previous years. This may be related to the disturbance to macrophyte habitat that occurred due to flooding in June 2015. MCI scores were significantly higher at the Bridge site than the Quarry site. In contrast, SQMCI scores were significantly higher at the Quarry site than the Bridge site.”

“Fish communities were sampled using four techniques-seine netting, minnow traps, fyke nets and electric fishing. However, fish handling difficulties were experienced in 2019 that meant that not all fish number and length measurement data was able to be collected, and therefore fish density estimates were not always able to be calculated and length frequency data could not be compiled. Across all fishing techniques and survey years, a total of 12 fish species have been caught (or observed). The majority of the fish were native, with three introduced species (perch, rudd and trout). Of the total 12 species, only three have not been caught at both sites (giant bully and rudd have only been caught at the Quarry site and trout at the Bridge site, although a trout was potentially observed at the Quarry site in 2019). Length-frequency data in previous years for common bully, common smelt, inanga, longfin and shortfin eels and redfin bully indicates that active recruitment of these species is occurring. For the remaining six species (giant bully, grey mullet, torrentfish, trout, perch and rudd) the number of individuals caught has been too low to assess recruitment. In general, the numbers of fish caught has been quite variable, which makes it difficult to draw any conclusions about differences between years and sites. For those species that have been caught regularly in relatively high numbers (common bully, inanga, longfin and shortfin eels) there are generally no significant differences in abundance/densities between years or sites.”

2.1.3.6 Lake Eutrophication

During the writing of this compliance report, the Council provided the Company with a draft Lake Rotorangi water quality monitoring report for their perusal in December 2019, the report is based on survey work undertaken during the 2017-2018 monitoring period. The Council undertakes the majority of the monitoring and reporting for this task with financial, reviewing, and finalisation input from the Company. This report was provided to the Company after significant delay due to an internal communication issue at the Council, where the State of the Environment report that this report is to be closely based was not adjusted accordingly and provided for use to the Company. As the late submission of the report is due to a Council error this cannot be considered as a compliance issue. At the time of writing this report, the Company was engaging a consultant to review the report on their behalf and it is expected that finalisation of the report, following stakeholder and expert panel review, will occur in the early months of 2020. The final results of the report will be presented in the 2019-2020 compliance monitoring report. The presented below information is from the draft report findings. It is not expected that there will be much change from that presented below and the final report, however any changes, or added information will be clearly outlined in the 2019-2020 compliance report.

Four water quality sampling surveys were performed at two sites during the 2017-2018 period. The first of the two sites surveyed is located in the mid reaches of the lake, while the second site is located nearer to the dam.

Changes in thermal stratification during the year were largely similar to that typically recorded in previous surveys of this reservoir-type lake. Thermal stratification was beginning to form at both sites during the spring surveys, and was well developed during the 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. Oxygen depletion remained evident in winter at the lower lake site. Lake overturn had not occurred completely at the lower lake site by the time of the winter surveys, although water temperatures were uniform throughout the water column. These conditions have been typical of the lake on most occasions to date.

During the monitoring period, phytoplankton richnesses (diversity) were low to moderate, coincident with low to moderate chlorophyll-a levels. 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 has been 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.

An autumn 2018 macrophyte survey identified the oxygen weed *Egeria densa* as the dominant macrophyte in the lower part of the lake. The other species recorded as dominant was *Ceratophyllum demersum* (hornwort), in parts of the mid-section of the lake. *Lagarosiphon major*, which had been recorded in all previous surveys, was not found, possibly as a result of the high turbidity at the time of the survey. Hornwort, which was first recorded in the 2012 survey and had increased markedly at the time of the 2015 survey, was not recorded to have extended beyond the mid-section in the 2018 survey. It had been predicted that hornwort will eventually become dominant, out-competing *E. densa* and *L. major*. While this is not expected to cause significant impacts on the ecology of Lake Rotorangi or on the hydro-electric scheme, there is now greater potential for it to spread to nearby lakes, where such impacts could be much more severe, e.g. Lake Rotokare. The next macrophyte survey of Lake Rotorangi is due to be performed in the 2020-2021 period.

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 sediment in this reservoir, and the moderately low chlorophyll levels, the classification is more appropriately mesotrophic. Previous trending of these water quality data over time found a very slow rate of increase in trophic level. An update of the trend report (for the period 1990-2017) has confirmed this very slow,

insignificant rate of increase in trophic level. This also confirmed that the lake would be classified as mesotrophic in terms of its biological condition.

2.1.3.7 Effects on trout

The monitoring of trout downstream of the dam was completed in the 2012-2013 period. The results indicate that trout spawning in the lower Patea River is not sufficiently successful to mitigate for the barrier to juvenile trout passage posed by the Patea Dam and Lake Rotorangi. Therefore, the report recommends stocking of the Patea River downstream of the dam. The expert panel review of the report supported this recommendation. Consequently the Company prepared a trout restocking programme and released 1,000 tagged yearling brown trout and 500 tagged yearling rainbow trout in spring 2017, with this release to be repeated annually. This release was repeated again in October 2018.

The Company is required to develop and implement a monitoring programme to assess the success and effects of the restocking programme. The methodology for this has already been developed, and is detailed in section 9 of the Aquatic Monitoring Plan (Ryder, 2011). This component is to be reviewed after five years of monitoring. It is understood that monitoring completed by Fish and Game to date has been unsuccessful in terms of capturing tagged fish, there has also been no public reports of captured tagged fish to date.

2.1.3.8 Dissolved oxygen monitoring

Consent 0489-2.3 requires the Company to undertake an investigation into the extent, frequency, causes and effects of de-oxygenated water being discharged into the river below the Patea Dam. An interim report was to have been presented to Council within 18 months of this consent being granted, while a full report was due within 36 months of this consent being granted. This investigation has encountered numerous issues, primarily related to inadequate maintenance of the dissolved oxygen meters, but culminating in the loss of the McColl's Quarry meter in the June 2015 flood. There have also been delays caused by staff changes within the Company. Overall, compliance with this requirement has been poor.

In July 2014, the Company presented an interim report to stakeholders and the Council for comment. The Council expressed significant concerns about the quality of the data presented. This report was subsequently presented to the expert panel in June 2016, who provided their response shortly thereafter. In short, the expert panel found that the data collected was of limited use, and they "strongly recommended that future deployment and recording of DO at the two Patea River sites follow protocols described in the National Environmental Monitoring Standard (NEMS) for continuous measurement of dissolved oxygen".

Following a number of reviews of the DO data using internal and external resources, the Company determined that the DO data for the McColl's Quarry site was not of a sufficient standard to be used as intended by resource consent 0489-2.3. The Company committed to installing new sensors by the end of September 2016, and improving the maintenance regime for these sensors. It was expected that an interim dissolved oxygen and temperature report, as required by condition 36 of resource consent 0489-2.3, would be submitted to stakeholders for comment by November 2017. Unfortunately, more issues arose with this monitoring, resulting in the loss of tailrace data for the period of November 2016 to March 2017. The Company was advised that any further such failures would be assessed with a view to undertaking enforcement action.

Since the March 2017 issues, the dissolved oxygen monitoring appears to have progressed relatively well. An interim report was presented to stakeholders for review in October 2018 with the final draft of this report submitted in May 2019 after stakeholder and expert panel review and commenting. The complete interim report is available on request. The conclusions from the report are as follows:

A dissolved oxygen concentration of less than 3 ppm occurring for more than 24 hours at McColl's Quarry is identified in the Patea HEPS monitoring plan (Ryder Consulting 2011) as a trigger for further investigations into river ecology (Appendix One). Dissolved oxygen and water temperature data for two monitoring sites in

the Patea River was analysed along with other relevant monitoring data for the Patea HEPS and Lake Rotorangi (for the period 1st of June 2017 to the 1st of July 2018). There were no trigger events during the monitoring period. There were however two events when the dissolved oxygen concentration at McColls Quarry dropped below 3 ppm for 1.3 hours (28th of January) and 18.25 hours (13th of February). These coincided with two periods of higher than normal (for the time) generation at low lake levels. It is likely that leading up to the low dissolved oxygen events stratification would have been apparent in Lake Rotorangi (this will be able to be confirmed once the Lake Rotorangi monitoring data becomes available), and the breakdown of stratification in combination with sustained generation appears to be the most likely reason for the low dissolved oxygen concentrations observed in the river. In addition to the regular Lake Rotorangi monitoring (in October, February, March and June), it is recommended that lake monitoring also be undertaken in December 2019 and January 2020. This data should then be examined together with other available monitoring information (e.g., river dissolved oxygen levels, lake level, weather conditions) to determine if targeted monitoring (as detailed in Appendix One Section 6.1.2 C. and D.) during the 2019 late summer/autumn period would assist with understanding the cause of low dissolved oxygen concentrations in the river.

During the 2018-2019 monitoring period there were no instances where a dissolved oxygen concentration of less than 3 ppm was observed at the McColl's Quarry site, with the lowest recorded value being 5.22 ppm.

The final dissolved oxygen report after taking in to account stakeholder and expert panel feedback is due in October 2020.

2.1.3.9 Lake Rotorangi sedimentation

Condition 38 of resource consent 0489-2.3 requires that the consent holder shall monitor sedimentation within Lake Rotorangi. That monitoring is to include an annual visual lakeshore inspection of Lake Rotorangi, an annual photographic survey of the 15 permanent cross section locations, and at least once every two years a bathymetric channel cross-section survey of the 15 permanent cross section sites.

As was outlined in the 2017-2018 monitoring compliance report no draft information on the annual lake shore survey for the 2017-2018 compliance period was received prior to the report being compiled. An investigation was undertaken regarding the reasons for non-submission and enforcement action was being considered at the time of writing that compliance report. It was found through the investigation that the survey work required for September/October 2017 was not undertaken which resulted in an infringement notice being served to the Company. Reasons for the non-delivery of the work were summarised by the Company:

"When investigating the non-delivery against condition 38(b) we identified a number of contributing factors. During the 2017/2018 period we were transitioning into a new survey frequency and from undertaking this work internally to consulting it out. The person who was responsible for carrying out the work internally went on extended leave during this period but subsequently did not return to work at Trustpower. Over that period the Generation Department also went through a restructure which resulted in various roles being moved into different work streams. It is now apparent this resulted in a breakdown in communications about responsibilities for ensuring this survey was completed and subsequently the work was not carried out. How our compliance actions are managed internally has changed and a system which automatically informs employees of compliance tasks has been implemented. This will ensure that full compliance will be achieved with our resource consents for our hydro schemes, as demonstrated through the ongoing engagement with Council undertaking downstream ecological sampling"

With the Council's agreement, the Company will continue to delay when in the year the biennial bathymetry and annual lakeshore surveys will be undertaken. Previously surveys have been undertaken around February/March but experienced sampling difficulty due to weed build-up and exposed debris. The biennial bathymetry sampling are therefore now delayed until around September/October for improved sampling conditions, and the annual photographic survey is also delayed to align with the bathymetry surveys. For

historical context the Council received the reports for the 2016 bathymetry and lakeshore survey in February 2017. These surveys, conducted in December 2016, found that at the lower lake transects there was little change from the previous surveys, especially in terms of lower bottom depths. Differences between years are possibly a result of slight inconsistencies in transects path at each location, or the result of submerged weed beds or objects such as branches and trees. Most sites further up the lake indicated an increase in bed level from to previous surveys. The visual inspection of the lake shore noted that the recent erosion features as documented in the April 2016 photographic survey were still obvious. Some features showed some very minor but continued erosion, but there were 10 new features identified (some on pre-existing erosion zones). As the annual lake shore survey was not undertaken for the 2017-2018 period no details can be presented here.

The Council received the 2018 - 2019 reports for the 2018 bathymetry and lakeshore survey in January 2020. These surveys, were conducted in February 2019, with the delayed survey time likely a result of similar organisational issues outlined earlier for the non-submission of the 2017-2018 lakeshore report. Nonetheless, the survey timing again matches up with previous monitoring, with no major surveying issues noted in the reports. The survey again found that at the lower lake transects there was little change from the previous surveys. Some of the observed differences between years are again possibly a result of slight inconsistencies in transects path at each location, or the result of submerged weed beds or objects such as branches and trees. Some sites further up the lake indicated an increase in bed level from the previous surveys. Only one site showed a significant change (site 10, the second most upper site) with sediment building up on the true right-hand bank and a deepening channel towards the left-hand bank.

The visual inspection of the lakeshore noted that there was a number of new sites when compared to the previous surveys, although, many of these may have only been detected due to much lower lake levels when compared to the previous survey. The majority of the new erosion features were minor with limited vegetation loss, slumping, or erosion at the lake side margin. Many of the previously identified features had remained unchanged or had minor changes, with revegetation at many of the sites evident. Twelve new sites showed evidence of minor sedimentation at the lake margin. Only two sites showed significant change, one being a significant slip above a previously documented slip and the other a significant slump at the lake edge.

The schedule for the next survey work required is:

- Biennial bathymetry survey to be undertaken in September/October 2020 (alongside the annual lakeshore survey).
- Annual lakeshore survey to be undertaken in September/October 2019.

2.1.3.10 Lower river erosion monitoring

Consents 7190-1.1 and 7191-1 require that the lower Patea River be inspected annually and that this inspection is to be accompanied by a photographic survey, in order to document any erosion. The report for the 2017-2018 compliance period was reviewed during this monitoring period.

In addition, a biennial channel cross-section survey of 13 sites is required, although the frequency of this survey would change to every five years if two consecutive surveys found no significant change in cross section shape. The work completed in February 2015 found no significant change in cross section shape. As a result the survey frequency has now changed to every five years. It is possible that the flood of June 2015 has affected the lower river cross sections, and as such it is likely that the next survey, scheduled for completion in 2019-2020, will record a change in cross section shape. This may see the survey frequency return to being biennial.

The results of the visual inspection and photographic survey completed in October 2016 found some minor erosion and/or subsidence at most cross section locations. There was significant erosion noted near two of the cross sections, with one cross section location subject to substantial erosion and subsidence of the true

right bank. In general, observations made found significant erosion of the river banks in many places, although some areas of erosion or subsidence had stabilised since the previous survey.

The results of the visual inspection and photographic survey completed on 30 November 2017 and 1 December 2017 found similar results to that of 2016, with minor erosion and/or subsidence at most cross section locations as well as some stabilisation due to plant growth. Two sites on alternating banks had experienced significant erosion. This had narrowed the river bed profile at one site as well as lowered the river bed level by approximately 0.5 m at places for both sites. In general, observations made found significant and minor erosion of the river banks in many places, although some areas of erosion or subsidence had stabilised since the previous survey as was also found in 2016. There was also several locations where sedimentation build up had occurred, which were mostly associated with where streams entered the river.

The report for the 2018-2019 compliance monitoring period visual inspection and photographic survey completed on 17 December 2018 was received in January 2020. The results were similar to that of the 2017 survey, showing minor erosion and/or subsidence at most cross section locations as well as some stabilisation due to plant growth. In general, observations made again found significant and minor erosion of the river banks in many places, with some areas of erosion or subsidence having stabilised since the previous survey in 2017. There were also 12 locations where sedimentation build up had occurred.

The schedule for the next survey work required is:

- Lower Patea River visual inspection and photographic survey in late 2019/early 2020.
- Lower Patea River biennial (currently once every 5 years) cross section survey in late 2019/early 2020.

2.1.3.11 Mangamingi Bridge

Condition 40 of resource consent 0489-2.3 outlines that *'The consent holder shall, in consultation with South Taranaki District Council prepare a report on the risk to the Mangamingi Bridge from increased flooding as a result of sedimentation in Lake Rotorangi, and shall install safety devices that, to the reasonable satisfaction of the Chief Executive of Taranaki Regional Council, adequately minimises the risk to the public.'*

Initial consultation was undertaken with South Taranaki District Council (STDC) in 2015/2016 to come to a position on an acceptable safety device but due to a change in staff at STDC this project lost momentum. The condition does not have a completion date but it is acknowledged that progress should be undertaken to satisfy its requirements. During this monitoring period it was reiterated to the Company that although there is no set time limit to meet this condition, it has been considered by the Council that the time period since the granting of the consent has been sufficient enough that the requirement for the completion of this work is now becoming pressing particularly due to the safety element of the condition. The Company has reinitiated conversations with the STDC and at the time of writing this report had already undertaken a meeting to firm up a position on getting the work done. Both parties estimated together that the project to meet this condition may be able to be completed by June 2020.

2.2 Riparian planting

As per special condition 14 of consent 7190-1.1, the Company 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, one landholder in the lower Patea catchment had applied to be subsidised 50% of the cost of plants planted within the catchment for riparian protection in the 2018-2019 period, with just over \$22,000 available to them at the start of the period. It is expected that there will be approximately \$26,000 available for the 2019-2020 period following the next contribution by the Company.

2.3 Stakeholders meetings

The resource consents for the scheme require the Company to convene a stakeholder meeting every year. Stakeholders who usually attend or are invited to such a meeting include representatives from Ngāti Ruanui, Nga Rauru Kaitahi, Fish and Game, the Department of Conservation, and the Council. This meeting intends 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 give the stakeholders the opportunity to ask questions, and to discuss the monitoring requirements in depth.

The meeting in the 2018-2019 period was held on 1 February 2019² and was attended by three of the Company's representatives, Fish and Game (Taranaki), the Department of Conservation, and the Council. Discussions were held relating to the compliance monitoring of the scheme and the monitoring undertaken in accordance with the Aquatic Monitoring Plan. In particular, there was discussion around the pheromone monitoring of lamprey above the Dam, the downstream eel bypass effectiveness methodology, the upstream and downstream fish transfer work, trout restocking, and the interim dissolved oxygen report. The Company also outlined they would like to trial an Archimedes screw upstream fish transfer system in 2020. The Company held separate meetings with various Iwi groups on their request where they discussed similar aspects of the scheme.

2.4 Incidents, investigations, and interventions

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

For all significant compliance issues, as well as complaints from the public, the Council maintains a database record. The record includes events where the individual/organisation concerned has itself notified the Council. Details of any investigation and corrective action taken are recorded for non-compliant events.

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 individual/organisation is indeed the source of the incident (or that the allegation cannot be proven).

Table 6 below sets out details of any incidents recorded, additional investigations, or interventions required by the Council in relation to the Company's activities during the 2018-2019 period. This table presents details of all events that required further investigation or intervention regardless of whether these were found to be compliant or not.

² Meeting minutes can be found in document number 2378049.

Table 6 Incidents, investigations, and interventions summary table

Date	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
20/12/18	Non-submission of Lake Rotorangi lakeshore report for 2017-2018 monitoring year	N	Infringement notice	No further outcome- Time dependent annual survey-the next survey was already being undertaken for the next compliance monitoring period as required
11/12/19	Release of fish to unapproved sites as part of the upstream fish trap and transfer programme	N	14 day letter and Abatement Notice	Cessation of transfer at non-approved sites. Will likely result in the modification of the Aquatic Monitoring Plan in 2020

3 Discussion

3.1 Discussion of site performance

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. Numerous investigations have been undertaken and reported on to date relating to the ecological monitoring components, with most of these summarised in previous monitoring reports. Several draft reports received during the 2016-2017 and 2017-2018 monitoring periods that were still undergoing finalisation in the 2017-2018 monitoring period have now been finalised. In terms of reporting, there have been issues with the performance by the Company with regard to the timeliness of meeting annual reporting requirements which resulted in several reports being unable to be reviewed before the completion of the last annual compliance report. These reports were then reviewed in this monitoring period and during the time of writing this report. Some reports for this monitoring period have not yet been finalised. In some instances this has been allowed by the Council to ensure that relevant stakeholders are given a better opportunity to review submissions. There has at times been a low level of engagement with some stakeholders when it has come to report revisions for various reasons including reviewer availability. The Company has provided the review periods as outlined by their various consents as well as sought review period extensions with the Council to allow some stakeholders to comment, this has been seen as both proactive and positive in terms of stakeholder engagement.

During this monitoring period it was found through enforcement investigations that the 2017-2018 field work required to form an annual lake shore survey report (part of the Lake Rotorangi sedimentation report), which was due in the 2017-2018 monitoring period, was not undertaken. The non-submission of this report resulted in an infringement notice being issued to the Company. In general, the Company's long term track record for reporting has been well managed, however, over the last few years their performance appears to have slumped. This is likely a result of a mixture of issues, which may be the result of the significant and complex reporting requirements related to the schemes consents, internal staff and process changes over the past years, and a lengthy and complex stakeholder review and engagement process. An improvement in the Company's future performance in this area is expected.

With regards to the monitoring of water flows and levels, the Company provided records of the level of Lake Rotorangi, discharge rates from the Patea Powerhouse and spillway, and volumes of water taken from groundwater for domestic use. These records were all provided when required, and to the accuracy required. The compliance point for the residual flow was changed in October 2017, to McColl's Bridge. Flow data recorded at this site found that adequate residual flow had been provided at all times. The Company were fully compliant with lake level restrictions. The rise and recession rates during floods were controlled as required.

The primary Company representatives based in Tauranga have maintained good channels of communication with Council, with frequent open discussions regarding consent condition requirements and potential consent non-compliance. They have frequently consulted with stakeholders, holding a stakeholders meeting in February 2019.

The Company 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, the team have demonstrated that they are proactive in achieving consent compliance. For example, signs have been erected and maintained as required at numerous locations, the floating pontoon has been installed, maintained and upgraded at Pukekino Landing and a significant amount of work has gone into implementing both the upstream and downstream fish passage systems.

A relatively small proportion of the elvers and the majority of whitebait species caught were released directly above the dam site during the 2018-2019 period. This raised concerns with respect to compliance with approved transfer protocols and the appropriateness of the dam as a release site due to predation issues. At the time of writing this report a 14 day letter and an abatement notice had been issued to the Company to address the matter surrounding the release of fish to non-approved release locations, namely at the Patea Dam. It is likely that one outcome of the abatement notice will be the modification of the Aquatic Monitoring Plan in 2020 to address emergency fish release situations.

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. Some improvements to this process are being made to ensure that receipt and review of the document by the relative parties is confirmed.

Overall, the scheme has been operated well during the period under review. Over this period however, two non-compliant incidents were recorded against the scheme. As outlined in Section 2.4, this is related to the non-submission of the 2017-2018 Lake Rotorangi sedimentation report and the release of fish at unapproved locations during the 2018-2019 trap and transfer programme.

3.2 Environmental effects of exercise of consents

Environmental monitoring undertaken by the Council, including observations made during inspections, coupled with monitoring undertaken by the Company provided a valuable insight into the environmental effects of the scheme.

The lower river ecological monitoring undertaken in both the 2016-2017 and 2018-2019 monitoring periods found that the lower Patea River supports a significant native fishery and moderate macrophyte communities. The macroinvertebrate component of the monitoring programme recorded a relatively low quality macroinvertebrate community. This is relatively typical for rivers that are subject to flow regulation from a hydroelectric dam. There was no apparent pattern in index scores both between sites and years.

Previous monitoring has determined that 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.

Monitoring has determined that trout spawning in the lower Patea River is limited, and insufficient to mitigate for the loss of downstream recruitment of trout from the headwaters. As a result, the Company embarked on a trout restocking programme, which began in spring 2017 and is undertaken on an annual basis. To date no tagged fish have been caught through monitoring efforts below the dam.

The Company has operated a trap and transfer system for many years now, which has resulted in thousands of galaxiids and eels being transferred in to the Patea River headwaters. Follow-up monitoring of the upstream fish communities, completed in 2017, found that the transfer of fish has resulted in improved longfin eel, shortfin eel and koaro populations in the headwaters.

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 are still occasional observations made of dead eels in the Patea River downstream of the dam as well as at the intake screens. The Company has installed an adult eel bypass system which was commissioned in early winter 2015. At the conclusion of the 2019 eel migration period, a total of 170 eels had used the bypass. In addition to using the by-pass, it is thought that many eels take advantage of a number of naturally caused spill events to navigate the dam, during which monitoring is not possible.

The scheme provides a significant recreational resource to the public, with of Lake Rotorangi being a popular water skiing, jet skiing, swimming and kayaking location. In 2011 the Company completed 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.

The scheme impacts on the recreational value of the lower Patea River. A condition of consent requires the Company to provide water for an annual jet boat race event when requested to do so. The lower river also provides an important fishery, with whitebaiting popular in certain locations. The lower river contains brown trout, with the occasional rainbow trout also recorded. These fish can grow to a large size. However it is apparent the numbers of brown trout in the lower river are low. This may change should the restocking programme be successful.

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 7-16.

Table 7 Summary of performance for consent 0489-2.3

Purpose: To 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 2.2 cumecs in the Patea River	Review of data provided to Council	Yes
5. Limits how often flow can be less than 2.2 cumecs during occasions of abnormally low rainfall	Review of data provided to Council	N/A
6. Requires an explanation should condition 5 be engaged	Receipt of explanation	N/A
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

Purpose: To dam the Patea River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
10. Requires notification and explanation of lake level being lowered beyond normal seasonal operating range	Notification received	N/A
11. Set out lake level restrictions until hazards have been adequately managed	Review of data provided to Council	Yes
12. Provide a real time estimate of lake level on internet	Liaison with Council	Yes
13. Install and maintain staff gauges in lake	Inspections	Yes
14. Complete and report on hazard survey of Lake Rotorangi	Receive report-provided in 2011	Yes
15. Requires publication of maps detailing the identified hazards	Inspections, liaison with Company- provided in 2011	Yes
16. Construct and maintain a floating pontoon at Pukekino Landing	Inspections	Yes
17. Measure and record lake level, and provide records to Council	Review of data provided to Council	Yes
18. Take all reasonable steps to avoid scheme presenting a migration barrier for target fish species	Inspections and liaison with Company	Yes
19-21. Present report detailing how condition 18 will be achieved	Receipt of report	Yes
22. Implement the fish passage systems detailed in report within 12 months	Inspections-note delay allowed for downstream passage system	Yes
23-26. Prepare a monitoring plan following prescribed process	Receipt of monitoring plan	Yes
27. Allows a review of monitoring plan, and prescribes required process	Receipt of revised monitoring plan-not revised in period	N/A
28. Reports annually on the success of the fish transfer programme	Receipt of annual report	Yes- draft report with allowed delays
29. Surveys and reports on the estimated densities of the target species upstream of the dam	One report to be received within nine months of consent commencing, another in the sixth year after commencement	Yes

Purpose: To dam the Patea River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
30. Review report of the fish transfer system, including recommendations	Receipt of report within six years of consent commencing	Yes
31. Monitor and report on the downstream ecology of the Patea River	Receipt of one report in monitoring period	Yes - draft report with allowed delays
32. Investigate and report on the effects of the dam on trout in the lower Patea River	Receipt of reports	Yes
33. Undertake a trout restocking programme if required	Inspections, liaison with Company	Yes
34. If trout restocking undertaken, develop and implement monitoring programme	Receipt of monitoring programme, liaison with Company	Yes
35 and 36. Monitor and report on dissolved oxygen investigation	Receipt of report, liaison with Company	Yes, with delays
37. Monitor and report on the potential for fish stranding	Receipt of report-see 2011-2014 report	Yes
38 and 39. Monitor and report on the sedimentation of Lake Rotorangi	Receipt of report	2017 - 2018 report not produced resulting in infringement notice 2018 -2019 report received with delays in January 2020
40. Report on the flooding risk to the Mangamingi Bridge and install safety devices	Receipt of report, liaison with Company	Not yet received- liaison with Company ongoing
41. Ecological and water quality survey of Lake Rotorangi every three years	Receipt of report, liaison with Company	Yes - draft report with allowed delays
42-51. Sets out how the expert panel will be established and coordinated	Liaison with Company	Yes
52. Requires certain reports to be circulated to stakeholders for consultation	Liaison with Company	Yes

Purpose: To dam the Patea River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
53. Requires that stakeholder comments are provided to Council	Receipt of comments, liaison with Company	Yes
54. Annual meeting of stakeholders	Attend meeting	Yes
55. Maintain boat ramps	Inspections	Yes
56. Allows temporary restriction of access at boat ramps, notification required	Notification received, inspections	Not implemented during reported period
57. Erect signs at various locations warning of flow and lake level fluctuations and log debris at	Inspections	Yes
58. Maintain floating booms at the dam	Inspection	Yes
59-61. Provide water for an annual jet boat race event	Liaison with Company	Yes
62. Install signs should access to boat ramps be restricted due to low lake level	Inspection, liaison with Company	Not required during year
63. Notify barge operator of potential restriction to Tangahoe Valley boat ramp	Liaison with company & barge operator	Not required during the year
64. Review condition	No review sought	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		Good Improvement required

N/A = not applicable

Table 8 Summary of performance for consent 0488-2

Purpose: To 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

Purpose: To use the Patea Dam and associated infrastructure.		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
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

N/A = not applicable

Table 9 Summary of performance for consent 0489-2.1

Purpose: To 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 2.2 cumecs in the Patea River	Review of data provided to Council	Yes
5. Limits how often flow can be less than 2.2 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 and 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	Report received in 2011	Yes

Purpose: To take and use water from Lake Rotorangi		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
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	Yes
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		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 10 Summary of performance for consent 7188-1

Purpose: To 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

N/A = not applicable

Table 11 Summary of performance for consent 7190-1.1

Purpose: To 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	2018 -2019 report received with delays in January 2020
2. Alter frequency of surveys if criteria met	Procedural	N/A
3. Provide survey results	Receipt of report	2018 -2019 report received with delays in January 2020
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	Yes
9. Requires a flow of 2.2 cumecs in the Patea River	Review of data provided to Council	Yes
10. Limits how often flow can be less than 2.2 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 and 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

Purpose: To discharge water from the Patea HEPS		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
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		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 12 Summary of performance for consent 7191-1

Purpose: To 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	2018 -2019 report received with delays in January 2020
2. Alter frequency of surveys is criteria met	Procedural	N/A
3. Provide survey results	Receipt of report	2018 -2019 report received with delays in January 2020
4. Rise rate limit and recession rate limit during high flows	Review of data provided to Council	Yes
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

N/A = not applicable

Table 13 Summary of performance for consent 7192-1

Purpose: To 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

N/A = not applicable

Table 14 Summary of performance for consent 7193-1

Purpose: To 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 100 m of water	Notification received, liaison with Company	N/A
9. Limits on suspended particulate matter and dust deposition	Inspections	N/A

Purpose: To 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?
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

N/A = not applicable

Table 15 Summary of performance for consent 7194-1

Purpose: To 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

N/A = not applicable

Table 16 Summary of performance for consent 7773-1

Purpose: To 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

N/A = not applicable

Table 17 Evaluation of overall environmental performance over time

Year	High	Good	Improvement req	Poor
2011-2014 (joint report)	-	-	1	-
2015	-	1	-	-
2016	1	-	-	-
2017	-	1	-	-
2018	-	1	-	-
2019	-	1	-	-
Totals	1	4	1	0

During the monitoring period, the Company demonstrated a good level of environmental and administrative performance with the resource consents as defined in Section 1.1.4. All components of the Patea HEPS were operated well for the majority of the reported period. There were two non-compliance incidents recorded in respect of this scheme during the period under review. These resulted in the issuing of one infringement notice (for non-submission of lake sedimentation report) and the issuing of a 14 day letter and an abatement notice and 14 day letter (for releasing fish at non-approved locations).

3.4 Recommendations from the 2017-2018 Annual Report

In the 2017-2018 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at the Patea HEP in the 2018-2019 year remain unchanged from that undertaken in 2017-2018, with one exception, being the incorporation of the lower river ecological surveys and lake eutrophication surveys into the compliance monitoring programme.
2. THAT should there be issues with environmental or administrative performance in 2018-2019, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the option for a review of resource consent 0489-2.3, as set out in the conditions of this consent not be exercised, on the grounds that there are no recommendations from the expert panel that call for a change to conditions, and that the conditions are currently adequate to deal with any adverse effects.

Recommendations 2 and 3 were implemented in the 2018-2019 monitoring period. Recommendation 1 was not implemented, with the work being undertaken separate to the compliance monitoring programme as has been done in the past. The Company has been informed that this is the likely direction in which the management of this monitoring will proceed, although this monitoring is not required in the 2019-2020 period.

3.5 Alterations to monitoring programmes for 2019-2020

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account:

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;
- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- 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 exercising resource consents.

It is proposed that for 2019-2020:

1. Monitoring of the Patea HEPS remain unchanged from that undertaken in the 2018-2019 period, with the exception being the inclusion of the ecological monitoring components in future monitoring years for when they are required.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site(s) in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2019-2020.

3.6 Exercise of optional review of consent.

Resource consent 0489-2.3 provides for an optional review within two months following the consent holder providing a written response declining to accept a recommendation(s) from the expert panel. There is no need to invoke this review at present, as the consent holder has accepted all expert panel recommendations to date.

4 Recommendations

1. THAT in the first instance, monitoring of consented activities at the Patea HEP in the 2019-2020 year remain unchanged from that undertaken in 2018-2019, with one exception, being the incorporation of the lower river ecological surveys and lake eutrophication surveys into the compliance monitoring programme when they are required.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the option for a review of resource consent 0489-2.3, as set out in the conditions of this consent not be exercised, on the grounds that there are no recommendations from the expert panel that call for a change to conditions, and that the conditions are currently adequate to deal with any adverse effects.

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.
BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
BODF	Biochemical oxygen demand of a filtered sample.
Bund	A wall around a tank to contain its contents in the case of a leak.
CBOD	Carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate.
Cumec	A volumetric measure of flow- 1 cubic metre per second (1 m ³ s ⁻¹).
DO	Dissolved oxygen.
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.
Incident Register	The 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.
L/s	Litres per second.
m ²	Square Metres.
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.
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.
QMCI	Quantitative macroinvertebrate community index.

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.

For further information on analytical methods, contact a Science Services Manager.

Bibliography and references

- Ryder Consulting Ltd (2011): Patea Hydro Electric Power Scheme-Aquatic Monitoring Programme. Prepared for TrustPower, August 2011. Doc#1461930.
- Ministry for the Environment. 2018. Best Practice Guidelines for Compliance, Monitoring and Enforcement under the Resource Management Act 1991. Wellington: Ministry for the Environment.
- Taranaki Catchment Board (1989): 'Water right compliance monitoring programme Egmont Electric Power Board Patea Dam'. Taranaki Catchment Board, Stratford.
- Taranaki Regional Council (1990): 'Egmont Electricity Lake Rotorangi 1989/90 Monitoring Report'. Taranaki Regional Council Technical Report 90-30.
- Taranaki Regional Council (1991a): 'Egmont Electricity Lake Rotorangi 1990/91 Monitoring Annual Report. Water Quality and Biological Programmes'. Taranaki Regional Council Technical Report 91-21.
- Taranaki Regional Council (1991b): 'Egmont Electricity Patea Hydro Riverbed Monitoring Annual Report 1990/91.' Taranaki Regional Council Technical Report 91-39.
- Taranaki Regional Council (1992a): 'Egmont Electricity Ltd Lake Rotorangi 1991/92 Monitoring Annual Report. Water Quality and Biological Programmes'. Taranaki Technical Report 92-30.
- Taranaki Regional Council (1992b): 'Egmont Electricity Patea Riverbed Monitoring Annual Report 1991/92'. Taranaki Regional Council Technical Report 92-39.
- Taranaki Regional Council (1993): 'Egmont Electricity Ltd Lake Rotorangi 1992/93 Monitoring Annual Report Water Quality and Biological Programmes'. Taranaki Regional Council Technical Report 93-37.
- Taranaki Regional Council (1994): 'Patea River Catchment Water Management Plan'. Taranaki Regional Council, Stratford.
- Taranaki Regional Council (1994): 'Egmont Electricity Ltd Lake Rotorangi 1993/94 Monitoring Annual Report Water Quality and Biological Programmes'. Taranaki Regional Council Technical Report 94-41.
- Taranaki Regional Council (1995): 'Egmont Electricity Ltd Lake Rotorangi 1994/95 Monitoring Annual Report Water Quality and Biological Programmes'. Taranaki Regional Council Technical Report 95-18.
- Taranaki Regional Council (1996): 'Egmont Electricity Ltd Lake Rotorangi 1995/96 Monitoring Annual Report Water Quality and Biological Programmes'. Taranaki Regional Council Technical Report 96-57.
- Taranaki Regional Council (1997): 'Egmont Electricity Ltd Lake Rotorangi 1996/97 Monitoring Annual Report Water Quality and Biological Programmes'. Taranaki Regional Council Technical Report 97-78.
- Taranaki Regional Council (1998): 'Powerco Ltd Lake Rotorangi 1997/98 Monitoring Annual Report Water Quality and Biological Programmes'. Taranaki Regional Council Technical Report 98-78.
- Taranaki Regional Council, (1999): Powerco Ltd and Taranaki Generation Ltd Lake Rotorangi 1998-1999 Monitoring Programme. Water Quality and Biological Programmes. Taranaki Regional Council Technical Report 99-89.
- Taranaki Regional Council, (2000): Taranaki Generation Ltd Lake Rotorangi 1999-2000 Monitoring Programme. Water quality and biological programmes. Taranaki Regional Council Technical Report 2000-90.
- Taranaki Regional Council, (2001): Taranaki Generation Ltd Lake Rotorangi 2000-2001 Monitoring Programme. Water quality and biological programmes. Taranaki Regional Council Technical Report 2001-78.

- Taranaki Regional Council, (2002): Taranaki Generation Ltd Lake Rotorangi 2001-2002 Monitoring Programme. Water quality and biological programmes. Taranaki Regional Council Technical Report 2002-36.
- Taranaki Regional Council, (2003): Taranaki Generation Ltd Lake Rotorangi 2002-2003 Monitoring Programme. Water quality and biological programmes. Taranaki Regional Council Technical Report 2003-24.
- Taranaki Regional Council, (2004): Taranaki Generation Ltd Lake Rotorangi 2003-2004 Monitoring Programme. Water quality and biological programmes. Taranaki Regional Council Technical Report 2004-69.
- Taranaki Regional Council, (2004): TrustPower Taranaki Generation Ltd, Patea hydroelectric scheme lower river monitoring programme Annual Report 2004-2005. Technical report 2004-87.
- Taranaki Regional Council, (2005): Taranaki Generation Ltd Lake Rotorangi 2004-2005 Monitoring Programme. Water quality and biological programmes. Taranaki Regional Council Technical Report 2005-76.
- Taranaki Regional Council, (2005): TrustPower Taranaki Generation Ltd, Patea hydroelectric scheme lower river monitoring programme Annual Report 2004-2005. Technical report 2005-81.
- Taranaki Regional Council, (2006): Taranaki Generation Ltd Lake Rotorangi 2005-2006 Monitoring Programme. Water quality and biological programmes. Taranaki Regional Council Technical Report 2006-76.
- Taranaki Regional Council, (2006): TrustPower Ltd-Taranaki Generation, Patea hydroelectric scheme, below dam lower river monitoring programme Annual Report 2005-2006. Technical Report 2006-89.
- Taranaki Regional Council, (2007): TrustPower Ltd Lake Rotorangi 2006-2007 Monitoring Programme. Water quality and biological programmes. Taranaki Regional Council Technical Report 2007-91.
- Taranaki Regional Council, (2008): TrustPower Ltd Lake Rotorangi 2007-2008 Monitoring Programme. Water quality and biological programmes. Taranaki Regional Council Technical Report 2008-45.
- Taranaki Regional Council, (2009): TrustPower Ltd-Patea hydroelectric scheme, below dam lower river monitoring programme Biennial Report 2006-2008. Technical Report 2008-99.
- Taranaki Regional Council, (2009): TrustPower Ltd Lake Rotorangi 2008-2009. Monitoring Programme Water quality and biological programmes. Taranaki Regional Council Technical Report 2009-50.
- Taranaki Regional Council, (2009): Officers report for consents 0488-2, 7188-1, 0491-2, 0489-2, 7190-1 & 7191-1. Document#611614.
- Taranaki Regional Council, (2009): Hearing Committee Report and Decision on applications by Trustpower Ltd to re-consent the Patea Hydro-electric Power Scheme. Doc#616614v3.
- Taranaki Regional Council, (2010): TrustPower Ltd-Patea hydroelectric scheme, below dam lower river monitoring programme Annual Report 2008-2009. Technical Report 2009-91.
- Taranaki Regional Council, (2010): TrustPower Ltd Lake Rotorangi 2009-2010 Monitoring Programme. Water quality and biological programmes. Taranaki Regional Council Technical Report 2010-50.
- Taranaki Regional Council, (2011): TrustPower Ltd-Patea hydroelectric scheme, below dam lower river monitoring programme Annual Report 2009-10. Technical Report 2010-87.
- Taranaki Regional Council, (2015): Trustpower Ltd Patea Hydroelectric Power Scheme Monitoring Programme Report 2011-2014. Technical Report 2014-88.

Taranaki Regional Council, (2016): Trustpower Ltd Patea Hydroelectric Power Scheme Monitoring Programme Report 2014-2015. Technical Report 2015-50.

Taranaki Regional Council, (2016): Trustpower Ltd Patea Hydroelectric Power Scheme Monitoring Programme Report 2015-2016. Technical Report 2016-9.

Taranaki Regional Council, (2017): Trustpower Ltd Patea Hydroelectric Power Scheme Monitoring Programme Report 2016-2017. Technical Report 2017-91.

Taranaki Regional Council, (2019): Trustpower Ltd Patea Hydroelectric Power Scheme Monitoring Programme Report 2017-2018. Technical Report 2018-100.

Appendix I

Resource consents held by Trustpower Limited

(For a copy of the signed resource consent
please contact the TRC Consents department)

Consent number	Purpose	Granted	Review	Expires
0488-2	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	17 December 2010	2022	1 June 2040
0489-2.3	To dam the Patea River (forming Lake Rotorangi) and divert water from Lake Rotorangi through the Scheme's intake structure, the service spillway, auxiliary spillway and emergency spillway, for hydro-electric power generation purposes	17 December 2010 Varied 29 September 2017	2022 or within two months of expert panel recommendation	1 June 2040
0491-2.1	To take and use water from Lake Rotorangi for hydro-electric power generation purposes	17 December 2010 Varied 29 September 2017	2022 or within two months of expert panel recommendation	1 June 2040
7188-1	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	17 December 2017	2022	1 June 2040
7190-1.1	To discharge water from the Patea power house and the main service spillway to the Patea River for hydro-electric power generation purposes	17 December 2010 Varied 29 September 2017	2022	1 June 2040
7191-1	To discharge water from the Patea Hydro-electric scheme's auxiliary spillway and emergency spillway to the Patea River via spillway creek	17 December 2010	2022	1 June 2040
7192-1	To take groundwater to provide a domestic water supply to facilities at the Patea Dam, including the powerhouse, dwellings and a camping ground	17 December 2010	2022	1 June 2040
7193-1	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	30 June 2009	No reviews remaining	1 June 2020
7194-1	To discharge contaminants [combustion products] into the air during the burning of driftwood captured by the Patea Hydroelectric Power Scheme log boom	30 June 2009	June 2022	1 June 2028
7773-1	To place and use a floating pontoon in Lake Rotorangi, including associated excavation and disturbance of the lake bed, for recreational purposes	26 January 2011	June 2022	1 June 2028

Water abstraction permits

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. Permits authorising the abstraction of water are issued by the Council under Section 87(d) of the RMA.

Water discharge permits

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. Permits authorising discharges to water are issued by the Council under Section 87(e) of the RMA.

Air discharge permits

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. Permits authorising discharges to air are issued by the Council under Section 87(e) of the RMA.

Discharges of wastes to land

Sections 15(1)(b) and (d) of the RMA stipulate that no person may discharge any contaminant onto land if it may then enter water, or from any industrial or trade premises onto land under any circumstances, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Permits authorising the discharge of wastes to land are issued by the Council under Section 87(e) of the RMA.

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. Land use permits are issued by the Council under Section 87(a) of the RMA.

Coastal permits

Section 12(1)(b) of the RMA stipulates that no person may erect, reconstruct, place, alter, extend, remove, or demolish any structure that is fixed in, on, under, or over any foreshore or seabed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Coastal permits are issued by the Council under Section 87(c) of the RMA.

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

Expiry Date: 1 June 2040

Review Date(s): As per special condition 5

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

Grid Reference (NZTM) 1734751E-5621514N

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.
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.

Consent 0488-2

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.

Transferred at Stratford on 31 October 2016

For and on behalf of
Taranaki Regional Council

A D McLay
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
(Change): 29 September 2017

Commencement Date
(Change): 29 September 2017 (Granted Date: 17 December 2010)

Conditions of Consent

Consent Granted: To dam the Patea River (forming Lake Rotorangi) and divert water from Lake Rotorangi through the Scheme's intake structure, the service spillway, auxiliary spillway and emergency spillway, for hydro-electric power generation purposes

Expiry Date: 1 June 2040

Review Date(s): In accordance with special condition 64

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

Grid Reference (NZTM) 1734750E-5621510N

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 all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

Water Abstraction Restrictions

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 divert 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; and 1,400 cubic metres per second for flood flows.
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.

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.
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 'McColl's Bridge' measuring site (site no. 34305), to be less than 2.2 cubic metres per second (as an hourly average)(the 'minimum flow').

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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 Bridge' measuring site (site no. 34305) is not less than 2.2 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 Bridge' measuring site (site no. 34305), 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 by that consent.

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.

Lake Level Management

9. The consent holder shall manage the water level of Lake Rotorangi immediately behind the dam so that:
 - (a) the level does not exceed RL 79 m unless the service spillway gates are fully open;
 - (b) the level is no lower than RL 74 m;
 - (c) the level only exceeds RL 78 m during and immediately following a flood, and the consent holder shall use best endeavours to ensure the level returns to less than RL 78 m as soon as is reasonably achievable;
 - (d) subject to condition 11, during the period beginning on 15 December and ending on 15 April the following year the level is no lower than RL 76 m, except for a total of up to 264 hours when it may be lower than RL 76 m but no lower than RL 75 m, provided that the level is below RL 76 m only:
 - (i) for the purpose of providing generation for a short term shortage in electricity supply; and
 - (ii) for the minimum period necessary to provide the generation and to return the level to RL 76 m; and
 - (e) subject to condition 11, during the period beginning on 16 April and ending on 14 December the level is lower than RL 76 m on no more than 125 days and lower than RL 75 m on no more than 40 days.
10. On each occasion that the water level in Lake Rotorangi is below RL 76 m during a period beginning on 15 December and ending on 15 April the following year, the consent holder shall:
 - (a) advise the Chief Executive, Taranaki Regional Council within 24 hours of the decision to take the level below RL 76 m being made, by sending an email to worknotification@trc.govt.nz, or by another method that the Chief Executive may advise, with an explanation of the need for the low lake level; and
 - (b) within 30 days of the level first being below RL 76 m, provide the Chief Executive, Taranaki Regional Council, with a report demonstrating that the low lake level was necessary to provide for a short term electricity shortage and that the period when the level was below RL 76 m was the minimum necessary.
11. From the commencement of this consent until the hazards to water skiers and boaters have been avoided, remedied or mitigated, in accordance with condition 15 of this consent, the water level in Lake Rotorangi shall be:
 - (a) no lower than RL 76 m for the period beginning on 1 November and ending on 30 April the following year; and
 - (b) during the period beginning 1 May and ending on 31 October:
 - (i) lower than RL 76 m on no more than 128 days; and
 - (ii) lower than RL 75 m on no more than 36 days.

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12. The consent holder shall provide a real time estimate of the level of Lake Rotorangi at Glen Nui Boat Ramp and Pukekino Landing to the nearest ± 0.25 m via a readily available remote electronic means (e.g. the internet) so that recreational users and the public can easily determine whether the lake is suitable for their proposed activity.

Advice Note: TrustPower will consult with the Hawera Water Ski Club on the form of the presentation of the estimate of lake levels. For the avoidance of doubt TrustPower is not required to present the estimates or levels under this condition in a form that displays commercially sensitive information.

13. Subject to the consent holder obtaining any necessary resource consents and access agreements, the consent holder shall install and maintain staff gauges at Glen Nui Boat Ramp and Pukekino Landing that indicate the lake level over the full operating range.
14. The consent holder shall undertake and report on a hazard survey in those areas of Lake Rotorangi that are used for water skiing. In undertaking and reporting on this survey the consent holder shall:
- (a) following consultation with the Hawera Water Ski Club and Mangamingi Residents, being submitters to this application, identify:
 - (i) the type of survey to be undertaken,
 - (ii) those areas of Lake Rotorangi to be surveyed, and
 - (iii) the known hazards in those areas that do not require surveying;
 - (b) within the areas required to be surveyed, identify the lake bed features between RL 73.5 m and RL 76 m greater than 2 metres from the lake edge at RL 76 m;
 - (c) recommend the measures needed to avoid, remedy or mitigate any hazard which presents a greater threat to water skiers and boaters than existed under the lake level regime existing prior to the commencement of this consent (i.e. as required by condition 14 of consent 0488-1 and the associated Lake Level Management Plan); and
 - (d) in preparing the recommendations to avoid, remedy or mitigate hazards (required by condition 14 (c)) the consent holder shall carry out reasonable consultation with Hawera Water Ski Club and Mangamingi Residents (being submitters to this application) that includes submitting the report to those parties for comment and allowing at least one month for a response.
15. The consent holder shall implement the following measures to avoid, remedy or mitigate hazards identified from the fulfilment of condition 14, having taken into account the consultation undertaken with, and the response of interested submitters:
- a) Provide a full set of A3 colour hazard maps at the following locations:
 - Hawera Water Ski Clubrooms;
 - Trust Power internet website (www.trustpower.co.nz);
 - Public boat ramps at Mangamingi, Tangahoe and Patea Dam.
 - b) Provide a colour copy of the Hazard Report identified in Condition 15 at the following locations/to the following parties:
 - Taranaki Regional Council;
 - Hawera Water Ski Clubrooms;
 - Trust Power internet website (www.trustpower.co.nz);
 - Mangamingi Residents.

16. Subject to the consent holder obtaining any necessary resource consents and access agreements, within 12 months of the commencement of this consent the consent holder shall construct, and subsequently maintain, a structure at Pukekino Landing that is operational at all lake levels between RL 74 m and RL 76 m. The consent holder shall consult with the South Taranaki District Council and Hawera Water Ski Club about the structure's location and design but it shall, as a minimum, be:
 - (a) able to provide safe access to the shoreline and boats for users;
 - (b) capable of having at least two boats tied to it at once;
 - (c) located to minimise any navigational hazard; and
 - (d) designed to minimise floating debris collected on its upstream side.
17. The consent holder shall measure and electronically record the water level in Lake Rotorangi immediately behind the dam to an accuracy of ± 0.01 metres 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.

Fish Passage

18. The consent holder shall take all reasonable steps to ensure that the Patea Dam and Lake Rotorangi do not prevent the establishment and maintenance of populations of longfin eels, shortfin eels, lamprey, koaro, banded kokopu, giant kokopu and shortjaw kokopu (the 'target species') in the major areas of suitable habitat upstream of Lake Rotorangi. The objective shall be to establish and maintain populations of the target species that are comparable with those in similar barrier-free habitats. The steps to be taken shall include:
 - (a) operating and maintaining a trap and transfer programme to facilitate passage of the target species upstream;
 - (b) undertaking one re-seeding of juvenile lamprey to the upper catchment to facilitate transfer of that species upstream; and
 - (c) operating and maintaining a system to facilitate the non-lethal downstream passage of adult eels from upstream of the Patea Dam to below the tailrace.

Advice Note: *In carrying out re-seeding of juvenile lamprey under condition 19(b) the consent holder shall be aware that it will require approvals under the Conservation Act 1987.*

19. Within six months of the commencement of this consent, the consent holder shall have prepared and submitted a comprehensive report to the Chief Executive Taranaki Regional Council that describes the up and downstream fish passage systems that the consent holder will adopt to achieve compliance with condition 18.

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20. The report required by condition 19 must as a minimum:
- (a) For upstream passage:
 - (i) specify the design and location of the fish trap;
 - (ii) specify the period over which the fish trap and transfer programme will be operated (this period will align with the peak migration period(s) for each of the target species);
 - (iii) detail the methodology to be used in the transfer of the fish, including a requirement for the target species to be transferred to suitable areas upstream of Lake Rotorangi (ranging from the mouths of upstream tributaries to above Stratford depending on species);
 - (iv) specify the proposed locations of the releases of each species and the reasons for those locations being chosen;
 - (v) specify the measures to be undertaken to enhance fish survival during the transfer and post release periods;
 - (vi) specify the measures to be undertaken to avoid the transfer of smelt;
 - (vii) within the first year of commencement of consent, detail a proposed means of transferring juvenile lamprey from other catchments to upstream tributaries of Lake Rotorangi on one occasion for the purposes of facilitating the passage of lamprey upstream.
 - (b) For downstream passage:
 - (i) set an objective for the effectiveness of the downstream fish passage system; and
 - (ii) describe the proposed non-lethal fish passage system for adult eels, and detail the alternative options considered/assessed, the costs and benefits of each alternative and set out the reasons for recommending the proposed fish passage system.
21. In preparing any report referred to in conditions 19 and 20, the consent holder shall carry out reasonable consultation with the Department of Conservation, Nga Rauru Kiiitahi and Ngati Ruanui that includes submitting the report to those parties for comment and allowing one month for a response. The consent holder shall provide any comments received from Department of Conservation, Nga Rauru Kiiitahi or Ngati Ruanui to the Chief Executive, Taranaki Regional Council.
22. Within 12 months of receiving certification from the Chief Executive, Taranaki Regional Council that the report addresses the matters set out in conditions 19 and 20, the consent holder shall implement the fish passage systems detailed in the report prepared in accordance with conditions 19 and 20.

Monitoring Plan

23. All requirements for monitoring and investigations set out under conditions 24 to 41 below shall be undertaken in accordance with a 'Monitoring Plan', certified by the Chief Executive, Taranaki Regional Council that details techniques, methodologies and procedures that will be employed to ensure compliance with:
 - condition 30 (native fish populations);
 - condition 31 (downstream ecology);
 - condition 32 (investigations about effects on trout);
 - conditions 33 & 34 (trout restocking and monitoring of effects);
 - condition 35 (investigations about dissolved oxygen); and
 - condition 37 (flow fluctuations).
24. In preparing the Monitoring Plan, the consent holder shall carry out reasonable consultation with the Department of Conservation, Fish and Game New Zealand, Nga Rauru Kiiitahi, and Ngati Ruanui, allowing one month for a response on the draft monitoring plan. The consent holder shall provide any comments received from the Department of Conservation, Fish and Game New Zealand, Nga Rauru Kiiitahi, and Ngati Ruanui to the Chief Executive Taranaki Regional Council, at the time the final Monitoring Plan is submitted for certification under condition 26, including any responses from the consent holder to such comments.
25. In preparing the Monitoring Plan, the consent holder shall submit the final plan to the Expert Panel established for the purpose set out in condition 45. The consent holder shall provide any comments received from the Expert Panel to the Chief Executive Taranaki Regional Council, at the time the final Monitoring Plan is submitted for certification under condition 26, including any responses from the consent holder to such comments.
26. Within 6 months of the commencement of this consent the Monitoring Plan shall be submitted for approval by the Chief Executive, Taranaki Regional Council, acting in a certification capacity to ensure it meets the objectives of the respective monitoring conditions.
27. The Monitoring Plan can be revised by the consent holder as required to ensure the current monitoring methodologies or mitigation programmes are adequate to achieve the objective of the relevant condition(s), provided such changes are within the scope of these conditions, subject to the following process:
 - (a) Unless such changes are in response to the recommendations of the Expert Panel under condition 49, the consent holder shall submit any proposed changes to the Monitoring Plan to the Expert Panel;
 - (b) The consent holder shall carry out reasonable consultation about any proposed changes with the Department of Conservation, Fish and Game New Zealand, Nga Rauru Kiiitahi, and Ngati Ruanui, allowing one month for a response on the proposed changes;
 - (c) The proposed changes, along with any comments received from the consulted parties and Expert Panel, shall be submitted for approval to the Chief Executive Taranaki Regional Council, acting in a certification capacity to ensure it meets the objectives of the respective monitoring condition(s).

Monitoring Fish Passage and Transfers

28. The consent holder shall report annually to the Chief Executive, Taranaki Regional Council and to the Expert Panel details of the work undertaken to achieve compliance with condition 18 including:
 - (a) an estimate of the number of each species transferred upstream of the Patea Dam and the location of their release;
 - (b) an estimate of the success of each spillway opening event for the downstream passage of adult migrating eels using 'before' and 'after' counts.

29. The consent holder shall provide reports of monitoring that surveys and records the estimated densities of each of the target species upstream of Lake Rotorangi. The reports shall be provided to the Chief Executive, Taranaki Regional Council and to the Expert Panel:
 - (a) within 9 months of the commencement of this consent; and
 - (b) in the sixth year after commencement of this consent.

30. Within 6 years of the commencement of this consent, the consent holder shall prepare and submit to the Chief Executive, Taranaki Regional Council and to the Expert Panel a report that:
 - (a) details the work that has been undertaken to achieve compliance with conditions 18 to 20;
 - (b) reports the contribution made by the upstream and downstream fish passage systems to the achievement of the objective set out in condition 18;
 - (c) assesses the effects of the Patea Dam and Lake Rotorangi on fish populations and the benefits of the work that has been undertaken to maintain and enhance these populations; and
 - (d) makes recommendations about mitigating the effects of the Patea Dam and Lake Rotorangi on upstream fish populations, including:
 - (i) the value of continuing the facilitation of fish passage;
 - (ii) the species that should be targeted for any ongoing facilitation of passage;
 - (iii) any changes to the programme that would help achieve compliance with condition 18; and
 - (iv) alternative measures and/or programmes for avoiding, remedying or mitigating the effects of the Patea Dam blocking fish passage, in the event that the focus on facilitation of fish passage is shown to be unsuccessful in establishing and maintaining populations as required by condition 18.
 - (e) includes any comments received on the draft report by the Expert Panel in relation to matters under (a) to (d) above.

Monitoring downstream ecology

31. The consent holder shall undertake monitoring that identifies and quantifies the ecology of the Patea River downstream of the dam, including the varial zone, using surveys of macroinvertebrates, macrophytes and fish. In the first two years of the commencement of this consent, annual surveys shall be carried out to coincide with monitoring of dissolved oxygen and water temperature required under condition 35. Thereafter, the surveys shall be carried out every two years. The results of each downstream ecological survey shall be reported to the Chief Executive of the Taranaki Regional Council and to the Expert Panel within 4 months of completion.

Effects on Trout

32. The consent holder shall undertake an investigation into the effects of the Patea Dam and Hydro-electric Power Scheme (HEPS) on trout downstream of the dam. Interim reports on this investigation shall be provided to the Chief Executive, Taranaki Regional Council and the Expert Panel annually for the first two years of the commencement of this consent, and a final report including recommendations to be provided to the Chief Executive, Taranaki Regional Council and to the Expert Panel within three years of this consent commencing. The final report shall include conclusions specifically about the effects of flow fluctuations, temperature and low dissolved oxygen on trout recruitment, and recommendations as to whether restocking and/or undertaking further investigations are necessary as a way to mitigate the effects of the Patea Dam and HEPS.
33. If the final report under condition 32 recommends that a trout restocking programme commence and this is confirmed by the Expert Panel, the Consent Holder shall, after consultation with Fish and Game New Zealand (Taranaki Region) and the Department of Conservation, help to mitigate the adverse effects of the power scheme on trout recruitment by annually restocking up to 1,000 tagged yearling brown trout and up to 500 tagged yearling rainbow trout into the Patea River between McColl's Bridge and the Patea Dam. The numbers of trout to be released each year (if any) is subject to North Island availability and shall be decided in consultation with Fish and Game New Zealand (Taranaki Region) and the Department of Conservation and will be reviewed after 5 years of monitoring.
34. If a trout restocking programme is implemented under condition 33, the consent holder, in consultation with Fish and Game New Zealand (Taranaki Region) and the Department of Conservation, shall develop and implement a monitoring programme to assess the success and effects of the restocking programme required by condition 33 including whether modification of the restocking programme is necessary to:
 - (a) provide appropriate mitigation for adverse effects on trout populations; and/or
 - (b) address levels of trout predation on native fish species where levels of predation are inhibiting the achievement of the objective of condition 18.

The results of this monitoring shall be reported to the Chief Executive, Taranaki Regional Council and to the Expert Panel.

The monitoring programme referred to in this condition shall be submitted to the Chief Executive, Taranaki Regional Council for certification purposes and thereafter included in the Monitoring Plan.

Investigation of Dissolved Oxygen

35. Within six months of the commencement of this consent, the consent holder shall commence an investigation that, to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council, investigates the extent, frequency, causes and effects of discharges of de-oxygenated water into the river below the Patea Dam. The investigation shall include a determination of the dissolved oxygen concentration in the river by continuously monitoring dissolved oxygen and temperature at appropriate locations as specified in the Monitoring Plan.
36. The consent holder shall prepare reports on the investigation required by condition 35 and provide them to the Chief Executive, Taranaki Regional Council and the Expert Panel as follows:
 - (a) within 18 months of the commencement of the investigation, an interim report on the first year of the investigation; and
 - (b) within 36 months of the commencement of the investigation, a final report detailing the dissolved oxygen and temperature characteristics of the study reach and any likely adverse effects of low dissolved oxygen concentration.

The final report shall include an assessment of the environmental effects of discharges of water with low dissolved oxygen from the Patea dam and options and recommendations for mitigating any effects and/or undertaking further investigations.

Monitoring Flow Fluctuations

37. In addition to the monitoring undertaken in accordance with conditions 31 and 32, the consent holder shall undertake and report on a one-off investigation of the effects of the rapid reduction in water level in the Patea River downstream of the Patea Dam on the frequency and ecological significance of native fish becoming stranded. The report shall be provided to the Chief Executive, Taranaki Regional Council and the Expert Panel within two years of the commencement of this consent.

Monitoring Sedimentation within Lake Rotorangi

38. The consent holder shall monitor sedimentation within Lake Rotorangi. The monitoring shall include:
 - (a) an annual visual lakeshore inspection of Lake Rotorangi;
 - (b) an annual photographic survey of the 15 permanent cross section locations; and
 - (c) at least once every two years a bathymetric channel cross-section survey of the 15 permanent cross section sites. The cross section sites are as shown on Figure One, attached to and forming part of this consent.
39. The results, including a comparison with the previous survey, of the monitoring undertaken in accordance with condition 38 shall be forwarded to the Taranaki Regional Council by the consent holder within 60 days of the survey being completed.

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40. The consent holder shall, in consultation with South Taranaki District Council prepare a report on the risk to the Mangamingi Bridge from increased flooding as a result of sedimentation in Lake Rotorangi, and shall install safety devices that, to the reasonable satisfaction of the Chief Executive of Taranaki Regional Council, adequately minimises the risk to the public.
41. An ecological and water quality survey shall be carried out to determine the degree of eutrophication of Lake Rotorangi and the amount and species of aquatic weeds established in the lake, together with a plan showing the location and extent of weed beds. The survey shall follow the sampling locations and methods of existing surveys and the first survey shall be completed and reported to the Taranaki Regional Council within 12 months of the consent commencing. Subsequent surveys shall be conducted at least once every three years and reported to the Taranaki Regional Council within 3 months of the survey being completed.

Expert Panel

42. The consent holder shall engage a panel of three independent people who have not otherwise been involved in monitoring of this consent and between them can demonstrate proven expertise in the matters covered by the monitoring required by conditions 30 to 37 of this consent. The consent holder shall also ensure that the Panel contains the necessary level and scope of expertise to address each of the matters listed under condition 45(e). In the event that any member of the Expert Panel becomes unavailable to continue their role, the panel may temporarily consist of fewer than three people with the agreement of the consent holder and the Chief Executive, Taranaki Regional Council until such time as a new Panel member is engaged.
43. The members of the Expert Panel shall be nominated by the consent holder and, after consultation with the Department of Conservation and Fish and Game, shall only be appointed after having been approved by the Chief Executive, Taranaki Regional Council. If less than three acceptable nominations are made, the Chief Executive, Taranaki Regional Council may appoint one or more persons to act as a Panel Member until an acceptable nomination is made.
44. All reasonable costs incurred by the Expert Panel shall be met by the consent holder and it shall be the consent holder's responsibility to ensure that the Expert Panel carries out the tasks required of it within the timeframes specified in the conditions of consent.

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45. The purpose of the Expert Panel shall be to peer review and, where appropriate, provide recommendations to the consent holder and the Chief Executive, Taranaki Regional Council, on the following:
- (a) the report on native fish passage systems required under condition 19;
 - (b) the report on the success of native fish passage systems required under condition 30;
 - (c) the reports on the effects of the Patea Dam and HEPS on downstream trout populations required under condition 32;
 - (d) the final Monitoring Plan required by condition 25 before it is submitted to the Chief Executive, Taranaki Regional Council for certification under condition 26;
 - (e) the reports or other outputs required by the following conditions:
 - condition 28 (native fish passage);
 - condition 29 (upstream native fish populations);
 - condition 31 (downstream river ecology);
 - condition 34 (trout restocking);
 - condition 36 (dissolved oxygen); and
 - condition 37 (fish strandings).
 - (f) For the avoidance of doubt, the Expert Panel may, as part of its function, review the Monitoring Plan and recommend further reviews of that Plan and the role of the Expert Panel in relation to these reviews.
46. The purpose of any recommendations of the Expert Panel shall be either:
- (a) To confirm that the current monitoring, methodologies, or mitigation programmes are adequate to achieve the objective of the relevant condition(s), or;
 - (b) Recommend changes or additions to any monitoring, methodology, or mitigation, in order to ensure that they are adequate to avoid, remedy or mitigate and adverse effect on the environment arising from the exercise of this resource consent.
- 46A Recommendations made in accordance with condition 46(b) may include but are not limited to:
- (a) recommendations to alter the upstream or downstream fish passage programme to help achieve compliance with condition 18, including:
 - (i) recommendations that the consent holder undertake further assessment of the efficiency of the fish trap (utilising dyes or by any other means) and/or that the consent holder alter the location or design of the fish trap;
 - (ii) if new technologies have become available, recommendations for improved monitoring of the success of downstream passage, or that the system to facilitate the non-lethal downstream passage of species is improved; and
 - (b) monitoring of upstream populations of the target species continuing beyond the date required by condition 29 of this consent.

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47. Of those matters specified under condition 45 above, the consent holder shall ensure that the full Expert Panel shall review and make recommendations on:
- (a) The final Monitoring Plan required by condition 25 and any review of that Plan; and
 - (b) The final results required in respect of downstream ecology (condition 31) and dissolved oxygen (condition 36).

Otherwise, of the balance of matters specified under condition 45, only the most appropriate expert(s) need review the relevant report or information and make recommendations, unless the expert(s) consider it necessary to seek the input from another member(s) of the Panel to assist them in their assessment.

48. Unless otherwise specified in these conditions, the expert(s) shall have two months to respond to the consent holder and the Chief Executive, Taranaki Regional Council on any report submitted to them, with any comments to be in writing.
49. The consent holder shall use its best endeavours to ensure that the Expert Panel shall review and provide recommendations to the consent holder and the Chief Executive, Taranaki Regional Council within two months of the receipt of each of the following reports:
- (a) the report required under condition 30 (success of fish passage measures);
 - (b) the final report required under condition 32 (effects on trout populations);
 - (c) if implemented, the report on the monitoring of the restocking required under condition 34;
 - (d) the final report on the investigation required under condition 36 (effects of low dissolved oxygen discharges);
 - (e) the report on the investigation required under condition 37 (effects of flow fluctuations on native fish strandings).
50. Should the consent holder choose to adopt the recommendations of the Expert Panel under condition 49, any proposed amendments to the monitoring programme, methodology, or mitigation requirements shall be implemented by the consent holder subject to the approval of the Chief Executive Taranaki Regional Council, acting in a technical certification capacity.
51. In the event that the consent holder declines to adopt any recommendation provided by the Expert Panel in accordance with condition 49, the consent holder shall within 8 weeks of the Expert Panel making its recommendation, provide to the Chief Executive, Taranaki Regional Council, its written reasons for declining to follow the recommendations of the Expert Panel.

Consultation with Stakeholders and Expert Panel

52. Before any report is submitted to the Expert Panel to be reviewed in accordance with condition 45, 47 and 49 of this consent, the consent holder shall carry out reasonable consultation with Fish and Game New Zealand (Taranaki Region), the Department of Conservation, Nga Rauru Kiiitahi and Ngati Ruanui, including submitting the Plan or Report in draft to those parties for comment and allowing one month for a response.
53. Where any comments are received from Fish and Game New Zealand (Taranaki Region), the Department of Conservation, Nga Rauru Kiiitahi, Ngati Ruanui or the Expert Panel in accordance with condition 52, the consent holder shall provide all such comments, in addition to providing the plan or report itself to the Chief Executive, Taranaki Regional Council. In conjunction with such comments, the consent holder shall as necessary provide to the Chief Executive, Taranaki Regional Council, its response to any of the comments made by any of the parties.

Consent Holder, Submitter and Council Engagement

54. At least once every year the consent holder shall convene a meeting of representatives of the Taranaki Regional Council, and interested submitters to application 4820, including Nga Rauru Kiiitahi, Ngati Ruanui and the Department of Conservation, to discuss any matter relating to the monitoring of this consent.

Recreation

55. The consent holder shall maintain the boat ramps at the locations listed below (and as shown in Figure Three, attached to, and forming part of this consent) so that they are usable at the lake levels stipulated below:
 - (a) The Glen Nui Ramp between lake levels RL 75.5 m to RL 78 m;
 - (b) The new Tangahoe Valley Barge Ramp between lake levels RL 74.5 m and RL 78 m; and
 - (c) The Boat Ramp located at the Patea Dam between lake levels RL 74.5 m and RL 78 m.

If maintenance of any boat ramp proves to be impracticable it shall be replaced.

56. The consent holder may temporarily restrict public access to the boat ramps highlighted in condition 55 due to reasonable health, safety and security requirements. Where such restrictions are imposed the consent holder shall notify the Taranaki Regional Council and the South Taranaki District Council. The notice shall explain the need for the restriction and estimate the duration that the restriction will apply for.

Consent 0489-2.3

57. The consent holder shall erect and maintain signs at the boat ramp located at the Patea Dam and the Glen Nui Ramp 1, and at McColl's Bridge and at the Patea Estuary boat ramp. The signs shall alert users of Lake Rotorangi and the Patea River to:
 - (a) fluctuations in flow downstream of the dam and of the extent of these fluctuations;
 - (b) fluctuations in lake levels and of the extent of these fluctuations; and
 - (c) the presence of floating log debris and lake bed features that may present a hazard for lake recreational users.
58. The consent holder shall maintain floating booms across the intake to the head race and across the full length of the spillway of the Patea Dam to safeguard persons using the lake for recreation and to prevent floating debris and logs from entering the penstocks. Log debris caught by the boom structure will be removed from the lake and appropriately disposed of in accordance with the special conditions in consent 7194-1.
59. The consent holder shall, in accordance with condition 61 provide jet boaters with water for an annual race event.
60. Water provided in accordance with condition 59 shall:
 - (a) be for the annual race event at a flow rate of not less than 40 cubic metres per second at McColl's Bridge, commencing at 2200 on a Friday or a Saturday and ending at 1800 hours on the following Saturday or the following Sunday, as the case may be (a period of 20 hours);
 - (b) occur within the period beginning on 20 May and ending on the following 20 September in any year; and
 - (c) only occur following the written request of a person delegated to make such requests by Jet Boating New Zealand, received by the consent holder no less than 60 days before.
61. All releases of water under condition 59 are subject to water being available from Lake Rotorangi. If the inflows to the lake over the 60 days prior to a release are low with a return period of greater than 15 years the consent holder need not provide the flow of water required by condition 59.
62. The consent holder shall install signs warning of restricted boat ramp access
 - i. On Rawhiti Road, between Anderson and Oru Roads, when the level of Lake Rotorangi drops below RL 75.5 m;
 - ii. on Ball Road, between Hursthouse and Joll Road intersections, when the level of Lake Rotorangi drops below RL 74.5 m.
63. The barge operator at the Tangahoe Valley boat ramp shall be notified of the potential restriction to access at least seven days prior to the level of Lake Rotorangi dropping below RL 74.5 m.

Consent 0489-2.3

64. 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:
- (a) within the sixth year of commencement of this consent, and every six years thereafter for the purposes of:
 - (i) ensuring that the conditions are adequate to deal with any adverse effect on the environment arising from the exercise of this resource consent; or
 - (ii) implementing the recommendations of the Expert Panel;
 - (b) within two months of the consent holder providing its written response under condition 51 to any recommendation of the Expert Panel provided in accordance with condition 49.

Signed at Stratford on 29 September 2017

For and on behalf of
Taranaki Regional Council

A D McLay
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
(Change): 29 September 2017

Commencement Date
(Change): 29 September 2017 (Granted Date: 17 December 2010)

Conditions of Consent

Consent Granted: To take and use water from Lake Rotorangi for hydro-electric power generation purposes

Expiry Date: 1 June 2040

Review Date(s): In accordance with special condition 14

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

Grid Reference (NZTM) 1734750E-5621510N

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 all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

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.
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 Bridge' measuring site (site no. 34305), to be less than 2.2 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 Bridge' measuring site (site no. 34305) is not less than 2.2 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.

Consent 0491-2.1

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 Bridge' measuring site (site no. 34305), 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:
 - (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.

Consent 0491-2.1

11. The consent holder shall ensure that the flow passing downstream of the Patea Dam, at the McColl's Bridge Site (site no. 34305), is measured and recorded to an accuracy of $\pm 5\%$ at intervals not exceeding 15 minutes. These records shall be transmitted to the Taranaki Regional Council's computer system within 2 hours of being recorded.

***Advice Note:** The McColl's Bridge Site and any associated telemetry, is owned and operated by the Taranaki Regional Council. It is therefore acknowledged that the consent holder has no control over the operation and maintenance of the equipment.*

12. The cost of maintaining the hydrographic station 'Patea River at McColl's Bridge' (site no. 34305) shall be shared equally between the consent holder and the Taranaki Regional Council.
13. All the water taken, except that taken for cooling purposes, shall be discharged back into the river immediately below the Patea Dam.
14. 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/or

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 29 September 2017

For and on behalf of
Taranaki Regional Council

A D McLay
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 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

Expiry Date: 1 June 2040

Review Date(s): As per special condition 7

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

Grid Reference (NZTM) 1734751E-5621514N

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.

Transferred at Stratford on 31 October 2016

For and on behalf of
Taranaki Regional Council

A D McLay
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
(Change): 29 September 2017

Commencement Date
(Change): 29 September 2017 (Granted 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

Expiry Date: 1 June 2040

Review Date(s): In accordance with special condition 18

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

Grid Reference (NZTM) 1734750E-5621510N

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 all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

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.

Consent 7190-1.1

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 Bridge' measuring site (site no. 34305), to be less than 2.2 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 Bridge' measuring site (site no. 34305) is not less than 2.2 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.

Consent 7190-1.1

13. At no time shall the exercise of this consent cause the flow in the Patea River, as measured at the 'McCull's Bridge' measuring site (site no. 34305), 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 proceeding 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.

Consent 7190-1.1

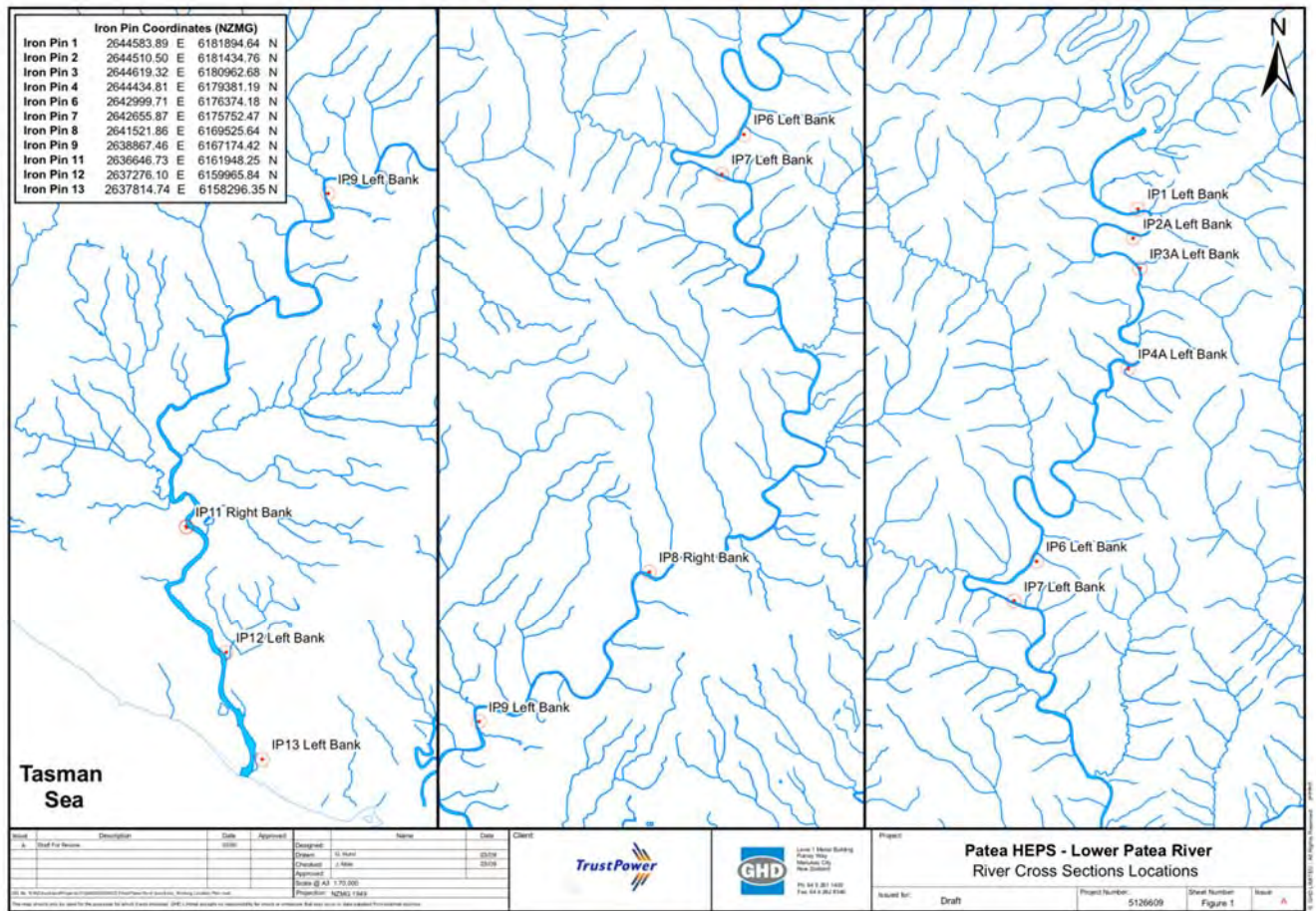
17. The cost of maintaining the hydrographic stations 'Patea River at Skinner Road' (site no. 34308) and 'Mangaehu Stream at Bridge' (site no. 34309) shall be shared equally between the consent holder and the Taranaki Regional Council.
18. In accordance with section 128 and section 129 of the Resource 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 29 September 2017

For and on behalf of
Taranaki Regional Council

A D McLay
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 Hydro-electric scheme's auxiliary spillway and emergency spillway to the Patea River via spillway creek

Expiry Date: 1 June 2040

Review Date(s): As per special condition 6

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

Grid Reference (NZTM) 1734751E-5621514N

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].

Consent 7191-1

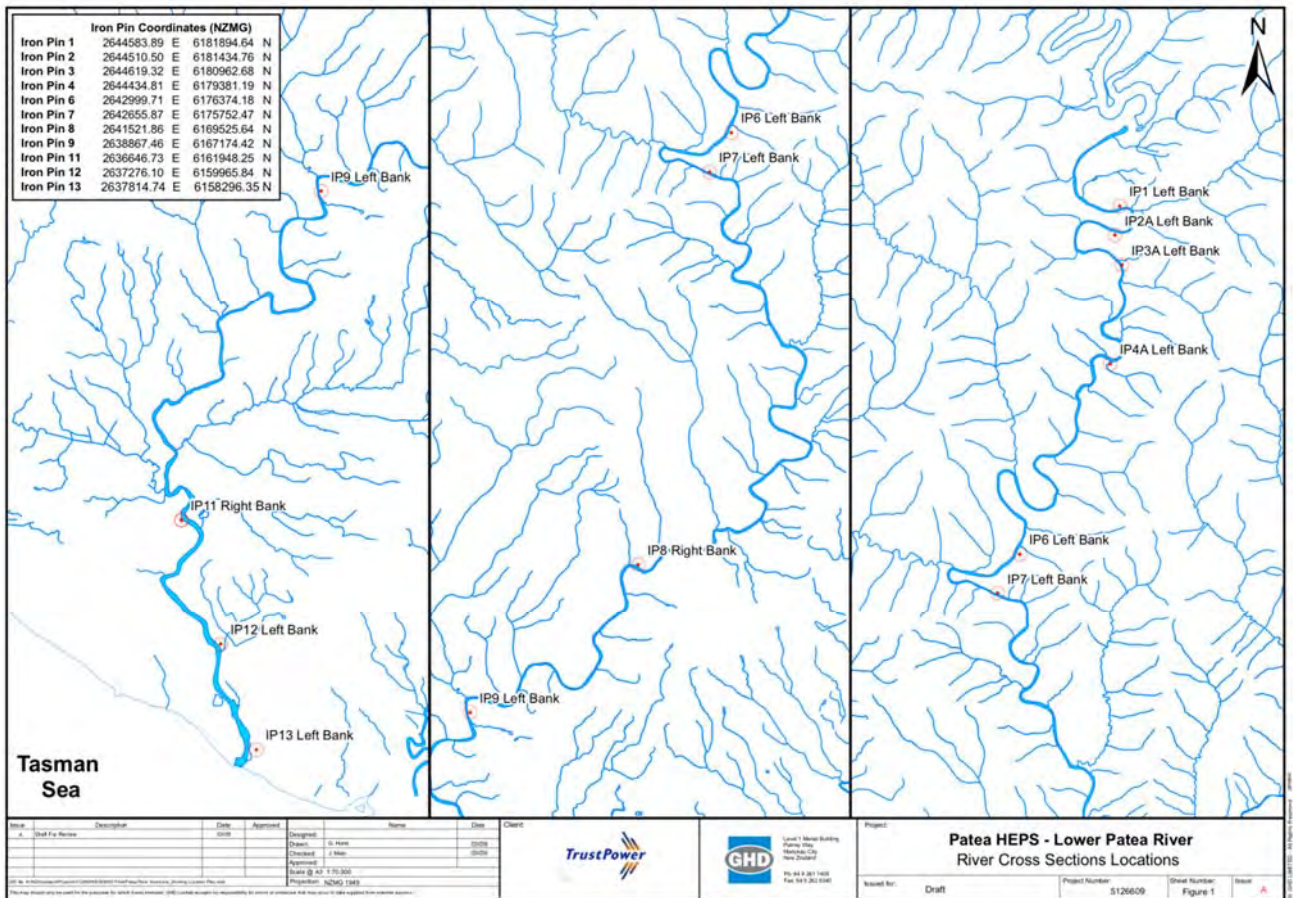
5. Whenever the spillway gate or spillway gates are re-opened during sustained recessions where the sum of the two mean hourly recession rates as determined in condition 4(b) is continuously negative, the discharge from the spillway shall, irrespective of the current lake level, conclude with a continuous 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.

Transferred at Stratford on 31 October 2016

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

FIGURE TWO – LOWER PATEA RIVER CROSS SECTIONS



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: 30 June 2009

Commencement 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

Expiry Date: 1 June 2040

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

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

Grid Reference (NZTM) 1734794E-5621358N

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 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.

Transferred at Stratford on 31 October 2016

For and on behalf of
Taranaki Regional Council

A D McLay
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: 30 June 2009

Commencement 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

Expiry Date: 1 June 2020

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

Grid Reference (NZTM) 1734677E-5621431N

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;
 - 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.

Consent 7193-1

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.

Transferred at Stratford on 31 October 2016

For and on behalf of
Taranaki Regional Council

A D McLay
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: 30 June 2009

Commencement 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

Expiry Date: 1 June 2028

Review Date(s): June 2022

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

Grid Reference (NZTM) 1735050E-5621586N

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. 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.

Transferred at Stratford on 31 October 2016

For and on behalf of
Taranaki Regional Council

A D McLay
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

Expiry Date: 1 June 2028

Review Date(s): June 2022

Site Location: Pukekino Road, Ohangai

Grid Reference (NZTM) 1729790E-5627396N

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 all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

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.

Transferred at Stratford on 31 October 2016

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

