

From: [Annabelle Coates](#)
To: [Natasha Pritchard](#)
Subject: RE: EXPERT AUDIT/ REVIEW - Change to drawdown rate of Lake Onslow - Pioneer Energy Limited – DUE 17 August 2021
Date: Wednesday, 18 August 2021 2:23:51 p.m.
Attachments: [image001.png](#)
[image002.png](#)
[#BFE19 Pioneer Energy updated 18 08 21.pdf](#)

Hi,

Please find the updated review attached. I haven't deleted anything, but I have added in a bit more clarification for the Teviot River. None of the conclusions have changed and your understanding of the key conclusions a few emails below is correct.

Many thanks,

Annabelle

Annabelle Coates MSc (Environmental Science) BSc (Biology)
Ecologist

Babbage Consultants Limited

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From: Annabelle Coates
Sent: Wednesday, 18 August 2021 12:50 PM
To: Natasha Pritchard <natasha.pritchard@orc.govt.nz>
Subject: RE: EXPERT AUDIT/ REVIEW - Change to drawdown rate of Lake Onslow - Pioneer Energy Limited – DUE 17 August 2021

Sweet thanks. That's what I thought based on what you sent though in the email, but just want to double check so I'm not recommending something that has already been done.

Annabelle Coates MSc (Environmental Science) BSc (Biology)
Ecologist

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From: Natasha Pritchard [<mailto:natasha.pritchard@orc.govt.nz>]
Sent: Wednesday, 18 August 2021 12:31 PM
To: Annabelle Coates <annabelle.coates@babbage.co.nz>
Subject: RE: EXPERT AUDIT/ REVIEW - Change to drawdown rate of Lake Onslow - Pioneer Energy Limited – DUE 17 August 2021

Hi Annabelle,

That is a pain. Hopefully you can access the attached. There were all the amendment documents.

There is nothing specific proposed for the river in terms of monitoring from my understanding.

Thanks,
Natasha

From: Annabelle Coates <annabelle.coates@babbage.co.nz>
Sent: Wednesday, 18 August 2021 12:03 p.m.
To: Natasha Pritchard <natasha.pritchard@orc.govt.nz>

Subject: RE: EXPERT AUDIT/ REVIEW - Change to drawdown rate of Lake Onslow - Pioneer Energy Limited – DUE
17 August 2021

Hi, I can't seem to access the dropbox link to look at the monitoring plan. I have issues sometimes getting on as I am not part of ORC. Are you able to send me a PDF of it? I just want to check what is proposed for the river.

Cheers

Annabelle Coates MSc (Environmental Science) BSc (Biology)
Ecologist

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From: Natasha Pritchard [<mailto:natasha.pritchard@orc.govt.nz>]

Sent: Wednesday, 18 August 2021 10:57 AM

To: Annabelle Coates <annabelle.coates@babbage.co.nz>

Subject: RE: EXPERT AUDIT/ REVIEW - Change to drawdown rate of Lake Onslow - Pioneer Energy Limited – DUE
17 August 2021

Hi Annabelle,

Yes, I can certainly do that. Apologies for that not being so clear. I appreciate there was a large amount of documentation to review and the majority focus of that was the lake.

Take care,
Natasha

From: Annabelle Coates <annabelle.coates@babbage.co.nz>

Sent: Wednesday, 18 August 2021 9:20 a.m.

To: Natasha Pritchard <natasha.pritchard@orc.govt.nz>

Subject: RE: EXPERT AUDIT/ REVIEW - Change to drawdown rate of Lake Onslow - Pioneer Energy Limited – DUE
17 August 2021

Hi Natasha, thanks for this. Let me have another look later on this morning and I'll send it back to you after that. If future consent review only require part of the habitat to be reviewed, perhaps just emphasise this in the first request. I see that effects on the Teviot River are in the email, but it was the volume of info in the documents specific to the lake that directed our focus.

Cheers

Annabelle Coates MSc (Environmental Science) BSc (Biology)
Ecologist

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From: Natasha Pritchard [<mailto:natasha.pritchard@orc.govt.nz>]

Sent: Wednesday, 18 August 2021 8:54 AM

To: Annabelle Coates <annabelle.coates@babbage.co.nz>

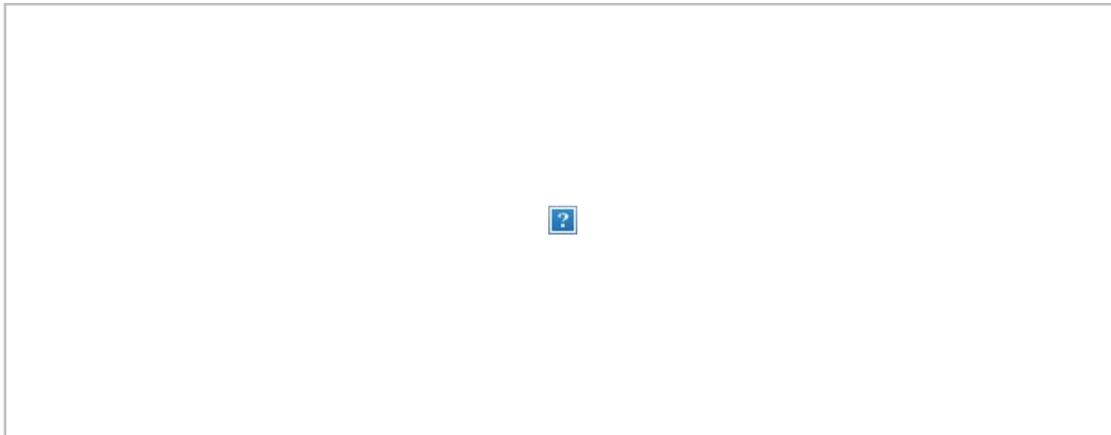
Subject: RE: EXPERT AUDIT/ REVIEW - Change to drawdown rate of Lake Onslow - Pioneer Energy Limited – DUE
17 August 2021

Hi Annabelle,

Thank you for providing this comprehensive response within the deadline. Much appreciated.

A few minor comments that you may wish to consider before the audit report is finalised.

- The amendment to the application lodged on Monday 21 June 2021 changed the rate of drawdown proposed to 0.4 m/7 days. This is the change that we are currently assessing when considering the application. You may wish to note that/update the sections of the report that refer to the drawdown rate.
- At the bottom of page 2 there is reference to invertebrate sampling in the Teviot River and 2013 is stated twice. This may be a typo?
- We received an assessment/audit of the application from Mark James at Aquatic Sciences of the ecological effects of the proposed change on the lake ecology (Review of Pioneer Application final v2 in the OneDrive). His review was limited to effects on the lake ecology. In light of that, the focus of this audit was to be the ecological effects to the Teviot River and the upgradient wetlands. It is helpful that your conclusions in respect of potential lake ecology effects align with those of the previous audit but it may be useful to note that you have reviewed his audit and confirm any areas of agreement/disagreement under the first question so there is clarity on what the focus of this audit was.
- The Amendment to the application included a monitoring proposal. I have just checked the OneDrive and I suspect you may not have been able to access that? I have added it in now. This monitoring proposal includes invertebrate sampling of the lake. I note that you have also recommended invertebrate sampling of the lake. The following is a snip from the LOMP and the conditions below are what are currently proposed to be added to the consents. Can you advise whether you have any comments on this current proposal (feel free to modify the relevant section of your report to comment on this). The current monitoring proposal has been developed by the applicant with consultation with Fish and Game and Mark James.



Definitions

In these conditions,

- **Year**, or any reference to a specific year, means a calendar year (unless otherwise stated).
- A **trigger year** is a year in which:
 - the minimum lake level over the year is 682.5 metres above mean sea level or lower, and
 - the rate of drawdown of the lake level exceeds 200 mm/week for 4 or more calendar weeks.
- A **monitoring year** is a year in which monitoring in accordance with the Lake Onslow Monitoring Proposal (LOMP) is required under condition A1.
- A **monitoring round** is two consecutive **monitoring years**, following a **trigger year**.

Draft condition A1

The consent holder must monitor Lake Onslow in accordance with the Lake Onslow Monitoring Proposal (LOMP) dated May 2021 and prepared by Ross Dungey. Monitoring must be carried out by a suitably qualified aquatic ecologist (except for Condition (c) below). Monitoring must include, but is not necessarily limited to:

- a) One baseline monitoring event in 2022 (unless 2021 is a **trigger year**, in which case 2022 would form part of the first post-baseline **monitoring round**);*
- b) A minimum of two **monitoring rounds**, one following each of the first two **trigger years**, with the provisos that:*
 - i. If a second **trigger year** occurs in the first **monitoring year** of a **monitoring round**, this will not trigger a new **monitoring round** (with the next **trigger year** after this then triggering the second **monitoring round**).*

- ii. If a **trigger year** occurs in the second **monitoring year** of the first **monitoring round**, this would trigger the second **monitoring round** to begin in the following year (in this case there would be four consecutive years of monitoring).
- iii. In each **monitoring year**, the fieldwork shall be carried out once only between January and March (inclusive), and preferably in February.
- c) Facilitating monitoring of the Lake Onslow trout population as described in the LOMP using anglers to collect samples. This shall take place annually from 2021 until the completion of the second post-baseline **monitoring round**.

Within two months from the completion of the baseline monitoring event and each **monitoring round**, a report prepared by a suitably qualified ecologist detailing the results must be prepared and submitted to the Consent Authority, the Otago Fish and Game Council, DOC and Aukaha.

Draft condition A2

After the second **monitoring round** required under condition A1 is completed, the consent holder must engage a suitably qualified aquatic ecologist to review the monitoring data collected under Condition A1 and any other relevant data available and prepare an Ecological Review Report (ERR). The ERR shall be submitted to the Consent Authority for certification that it adequately addresses the matters required under Condition A1 and achieves the key objective of the ERR, which is to evaluate the extent of any ecological effects associated with the increased drawdown provided for by Condition B1. The consent holder must meet the costs of certification of the ERR by the Consent Authority. The ERR must include, but is not limited to, the following matters:

- a) Describes, discusses and evaluates the monitoring results (baseline and post-baseline) in accordance with the LOMP;
- b) Describes, discusses and evaluates the degree to which the lake has been drawn down at greater than 0.2 m/week between 2021 and the date when the ERR is prepared and compares this with typical drawdown rates in the previous years when drawdown was limited to no more than 0.2 m/week;
- c) Based on (a) and (b), provides and justifies a professional opinion regarding whether any more than minor adverse ecological effects have occurred since the baseline monitoring;
- d) If there have been any more than minor adverse ecological effects, provides and justifies a professional opinion as to whether the effect(s) is/are likely to be occurring as a result of the increased rate of drawdown.

The ERR must be provided to the Consent Authority, the Otago Fish and Game Council, DOC and Aukaha within 60 working days after the second **monitoring round** required under condition A1 is completed.

Draft condition A3

Should the Otago Fish and Game Council, DOC or Aukaha choose to provide comments on the ERR, the consent holder and/or their ecologist must respond to these comments, provided that such comments are received within 20 working days of the ERR being provided to those parties. The consent holder must respond to all such comments within a further 20 working days (i.e. within 40 working days from the ERR being released), and must provide a copy of both the comments received and the response given to the Consent Authority.

Note: The consent authority may consider any comments offered by Fish and Game, DOC or Aukaha, as well as the consent holder's response to any such comments, when making a decision regarding certification of the ERR under condition A2.

Draft condition B1^[2]

The rate at which the lake shall be drawn down over any period of seven days must not exceed 0.4 metres.

Draft condition B2

For the period commencing 1 October in the **year** in which the second **monitoring round** required under condition A1 is completed and ending with the expiry of the consent, the rate at which the lake shall be drawn down over any period of seven days must not exceed 0.2 metres unless:

- a) the ERR prepared under condition A2 is certified in accordance with that condition; and
- b) the report concludes that no more than minor adverse ecological effects have occurred, or

c) if there is such an effect, the report concludes that this effect is not caused by the increased drawdown rate.

Notes: 1 October was chosen as this allows 3 months for preparation of the ERR under condition A2, one month for affected parties to consider it and comment if they wish, one month for the consent holder to respond to any comments, plus one month for peer review/certification of that report by the Consent Authority and any discussion following on from that.

Draft condition C

The consent holder shall maintain and operate a lake level monitoring site at or near the dam, with lake levels recorded at least hourly to a minimum accuracy of 0.025 metres.

- I did not explicitly ask you to comment on the assessment made by the applicant in terms of effects on upstream waterbodies and probably should have. The applicant did provide some further information on this when they lodged the amendment application (Lake Onslow tributary fish passage – I am not sure if you were able to access this but it is in the OneDrive now?). You may wish to add comment under 'Does the application appropriately identify sensitive areas including any other affected waterbodies' on this?
- Perhaps for certainty on what you have reviewed and considered you could list at the start the documents you reviewed?

Based on the above, let me know if you would like to make any amendments to the audit report. Once finalised, I will send the report to the Applicant.

My understanding of the key conclusions from your report are as follows. Please correct me if I am wrong.

- The effects associated with the change have been adequately assessed and the supporting information is appropriately detailed, given the nature of the activity. Further existing environment details about the Teviot River could have been provided but are not necessary to inform/assess environmental effects for this proposal.
- If the variation were to be granted you recommend additional monitoring from that currently proposed that includes invertebrate monitoring of the Teviot River and Lake Onslow

Depending on the outcome of the notification recommendation, if the application requires a hearing we will look to engage you to provide evidence on the above and attend the hearing. I will let you know as soon as possible if we are likely to require this and likely timeframes etc and we will set up a further purchase order for that work.

Please let me know if you have any questions.

Kā mhi,
Natasha



Natasha Pritchard
PRINCIPAL CONSENTS PLANNER

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From: Annabelle Coates <annabelle.coates@babbage.co.nz>
Sent: Tuesday, 17 August 2021 4:51 p.m.
To: Natasha Pritchard <natasha.pritchard@orc.govt.nz>

Subject: RE: EXPERT AUDIT/ REVIEW - Change to drawdown rate of Lake Onslow - Pioneer Energy Limited – DUE 17 August 2021

Hi Natasha,

Please find attached our review for Pioneer Energy. Lots of info to go through so if you have any questions, let me know.

Many thanks,

Annabelle

Annabelle Coates MSc (Environmental Science) BSc (Biology)
Ecologist

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From: Natasha Pritchard [<mailto:natasha.pritchard@orc.govt.nz>]

Sent: Tuesday, 10 August 2021 2:01 PM

To: Annabelle Coates <annabelle.coates@babbage.co.nz>

Subject: RE: EXPERT AUDIT/ REVIEW - Change to drawdown rate of Lake Onslow - Pioneer Energy Limited – DUE 17 August 2021

Thanks Annabelle,

I have requested a purchase order so hopefully this is with you later today/early tomorrow so you can commence work.

Let me know if you have any contextual questions.

Much appreciated,
Natasha

From: Annabelle Coates <annabelle.coates@babbage.co.nz>

Sent: Tuesday, 10 August 2021 10:51 a.m.

To: Natasha Pritchard <natasha.pritchard@orc.govt.nz>

Subject: RE: EXPERT AUDIT/ REVIEW - Change to drawdown rate of Lake Onslow - Pioneer Energy Limited – DUE 17 August 2021

Hi, that's fine, just let me know when the decision has been made.

I don't know anyone personally sorry that could complete the amenity questions. A Landscape Architect, possibly one nearby in Alexandra, or Dunedin, would be your best bet.

Annabelle Coates MSc (Environmental Science) BSc (Biology)
Ecologist

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From: Natasha Pritchard [<mailto:natasha.pritchard@orc.govt.nz>]

Sent: Tuesday, 10 August 2021 9:50 AM

To: Annabelle Coates <annabelle.coates@babbage.co.nz>

Subject: RE: EXPERT AUDIT/ REVIEW - Change to drawdown rate of Lake Onslow - Pioneer Energy Limited – DUE 17 August 2021

Hi Annabelle,

Thank you very much for that prompt response.

In light of transparency, we are waiting on a quote from another of our suppliers and I will wait to receive that this morning before letting you know whether we will proceed with a purchase order.

I appreciate you outlining that you do not have the technical expertise for the amenity questions and your recommendations on those with suitable expertise. Do you know of anyone outside of your organisation that I could approach about this?

Much appreciated,
Natasha

From: Annabelle Coates <annabelle.coates@babbage.co.nz>

Sent: Tuesday, 10 August 2021 8:46 a.m.

To: Natasha Pritchard <natasha.pritchard@orc.govt.nz>

Subject: RE: EXPERT AUDIT/ REVIEW - Change to drawdown rate of Lake Onslow - Pioneer Energy Limited – DUE 17 August 2021

Hi Natasha,

Thanks for sending through the different link, I was able to access that one. I can confirm we can undertake the review for the ecological components of the questions you have listed below. We can also comment on wetlands and the ecological components of recreation (i.e. sport fishing). The amenity questions however, are outside our scope of expertise, and therefore it would not be appropriate for us to comment on them. You're probably best to get a landscape architect with visual effects experience, and/or a recreation planner for these.

I can confirm we have no conflicts of interest for this, and that the review can be completed by the 17th.

We can complete the review of the ecological components for \$1170, as per the table below. The slightly higher number of hours are due to the ecological report being reasonably substantial and it will take some time to go through that in detail.

	<i>Annabelle Coates \$165 Ecologist</i>	<i>Mark Delaney \$180 Internal Review</i>
Application audit (hrs) ¹	3	
Technical report (hrs) ²	3	1
Further information request report (hrs) ³		
Further information review report (hrs) ⁴		
Site visit (hrs) ⁵		
Hearing (hrs) ⁶		
Correspondence meetings (hrs) ⁷		

Happy to discuss.

Many thanks,

Annabelle

Annabelle Coates MSc (Environmental Science) BSc (Biology)

Ecologist

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From: Natasha Pritchard [<mailto:natasha.pritchard@orc.govt.nz>]

Sent: Monday, 9 August 2021 12:03 PM

To: Annabelle Coates <annabelle.coates@babbage.co.nz>

Subject: EXPERT AUDIT/ REVIEW - Change to drawdown rate of Lake Onslow - Pioneer Energy Limited – DUE 17 August 2021

Good morning Annabelle,

Council has received an application from Pioneer Energy Limited for an application to vary their current water permits for damming and taking and using water from Lake Onslow. Provided there are no conflicts of interest, please let me know if you can undertake this work by **tomorrow morning (10 August)**. The deadline for the review/comments is Tuesday **17 August 2021**

Details are provided below.

DETAILS	
Application number	RM18.004
Current consent number [where relevant]	2001.475 2001.476.V1
Applicant's name	Pioneer Energy Limited
Consent (activity) type	S127 variation
Brief description of Proposal	To change the rate of drawdown from 0.2 m/7 days to 0.4 m/7 days
Location [general, i.e. Low Burn]	Lake Onslow, Central Otago
Review due by	17 August 2021
Field of expertise required [include where relevant]	Ecological effects (Teviot River) Amenity effects (effects on recreation, collecting mahika kai, angling amenity, aesthetics) Wetlands

Objective link [internal only] sharepoint link [external] to Application	https://otagorc-my.sharepoint.com/:f/r/personal/natasha_pritchard_orc_govt_nz/Documents/RM18.004%20-%20Pioneer%20Energy%20Limited%20-%20Application%20and%20associated%20documents?csf=1&web=1&e=1EVD8p
Charge Code and sub-codes	Charge code is: RM18.004 Guidance for using sub-codes: <ol style="list-style-type: none"> 1. Correspondence if emailing/talking/calling about a consent job 2. Application audit for reading the application 3. Completeness assessment to be used if you have been asked to help determine if the application is complete from a tech POV. 4. Timeframe extensions and memos for writing a report/email/memo on the application.
Other information	The proposal is a variation under s127. The application was lodged in 2018. A technical audit on lake ecology effects was undertaken in 2018 (included in sharepoint). The application has been on hold for the proposal to be discussed with potentially affected parties since lodgement. Key outstanding concerns relate to angling amenity effects. The applicant has sought limited notification to any parties identified as affected. - A brief summary of the application is below.

Financial Information

At the same time as advising you can undertake the work, please outline the expected cost and hours by completing the table below so that I can arrange a purchase order. Please note charge out rates on purchase orders will be issued based on agreed contractual rates.

Please be aware that we may contact several companies to ensure timely and cost-effective processing of the application.

Please do not start any work on this job until you have confirmation from me that we accept the quote and we have sent you a purchase order. We will not accept any invoices for work that has been completed prior to a PO being created. The PO only covers the scope of work agreed to and any additional work beyond this scope will require an additional cost estimate and PO.

	<i>Consultant Name Hourly Charge out rate (ex GST)</i> Role in audit, e.g. area of expertise (e.g. hydrology) or internal peer reviewer	<i>Consultant Name Hourly Charge out rate (ex GST)</i> Role in audit, e.g. area of expertise (e.g. hydrology) or internal peer reviewer	<i>Consultant Name Hourly Charge out rate (ex GST)</i> Role in audit, e.g. area of expertise (e.g. hydrology) or internal peer reviewer
Application audit (hrs) ¹			
Technical report (hrs) ²			
Further information request report (hrs) ³			
Further information review report (hrs) ⁴			
Site visit (hrs) ⁵			
Hearing (hrs) ⁶			
Correspondence meetings (hrs) ⁷			

2 Writing technical report (if there is no further information is required or after further information is received)

3 Writing further information request report

4 Reviewing further information response

- 5 Site visits
- 6 Time spent at hearing and writing evidence
- 7 Meetings and phone calls

If the job requires additional work above the quoted and agreed amount of hours/ charges, please obtain a new PO (or a PO extension) prior to carrying out of that work.

Scope of work

Please provide an audit of what has been provided as part of the application and further information received and a response to the questions in the below template. I do not require a new or full assessment of effects or recommendations to make system changes. Please provide a response in the below table, or an attached report that uses the same structure.

Confirmation that you can complete this work in the agreed timeframe and the provision of the quote are considered to be the confirmation of engagement for the works as supported by our underlying contract.

I require an audit considering the following questions:

<i>For all three fields of expertise</i>	
Q:	Is the technical information provided in support of the application robust, including being clear about uncertainties and any assumptions? Yes, or no. If not, what are the flaws?
R:	
Q:	Are there any other matters that appear relevant to you that have not been included? Or is additional information needed? Please specify what additional info you require and why [please explain]
R:	
Q:	If granted, are there any specific additional conditions that you recommend should be included in the consent or recommended changes to the conditions to be varied and the proposed conditions including in the amendment document?
R:	
Q	Have the cumulative effects of the activity been appropriately assessed? Yes/no
R	
Ecological effects	
Q:	Does the application appropriately identify sensitive areas including values within the Teviot River, wetlands and any other affected water bodies? Yes/no
R:	

Q:	Is the description of the sensitive areas attributes potentially affected by the activity accurate?
R:	
Q:	Has the instream ecology of the Teviot River been appropriately assessed including both native and sport fish values? Please include details on the appropriateness of the method of assessment
R:	
Q:	Have the changes to the hydrology of the Teviot River been appropriately assessed?
R:	
Q	Have the effects to the ecology from the changes to the hydrology of the Teviot River been appropriately assessed including effects on fish, plants, algal build-up and sedimentation?
R	
Q	Have the potential for increased erosion and sedimentation and the effects associated with this been appropriately assessed?
R	
Q	Have the water quality effects of the proposal been adequately assessed? Is the monitoring proposed adequate?
R	
Wetlands	
Q	Have the effects from the proposed change on the wetlands been appropriately assessed? Are the hydrological conclusions accurate?
R	
Q	Is the assessment conclusions that the location of wetlands and tributaries being above the lake means that the proposal will have no effects on them accurate?
R	
Amenity	
Q	Have the aesthetic values associated with Lake Onslow and the Teviot River been appropriately identified and appropriately assessed?
R	
Q	Have the recreational values and effects on them associated with Lake Onslow and the Teviot River been appropriately identified and appropriately assessed including effects on public access?
R	
Q	Have the overall amenity effects of the activity been appropriately assessed? Do you concur with the assessment?
R	
Q	Is there a need to consider the effects on amenity from the potential creation of more mud flats and potential dust generation?
R	

If you have any questions, please let me know.

Kind regards,

Natasha



Natasha Pritchard
PRINCIPAL CONSENTS PLANNER

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1. Description of Proposed Variation

Pioneer Energy Limited (“**the Applicant**”) currently holds various consents for the operation of the Lake Onslow hydroelectric power generation scheme on the Teviot River in Central Otago. The Applicant is seeking to vary the conditions on two of these consents:

- Water Permit 2001.475 to dam the Teviot River with a 17-metre-high gravity dam (Lake Onslow Dam) for the purpose of creating Lake Onslow for hydroelectric power generation and for irrigation for a term expiring on 1 April 2041.
- Water Permit 2001.476.V1 to take and use surface water non-consumptively from Lake Onslow at a maximum rate of 6 cubic metres per second for the purpose of hydroelectric power generation and flow augmentation for a term expiring on 1 April 2041.

Both of these consents have the following condition imposed (Condition 2 of Water Permit 2001.475 and Condition 3 on Water Permit 2001.476.V1). This condition restricts the rate at which the water level in the lake can be drawn down:

The rate at which the lake shall be drawn down shall not exceed 0.2 metres over any period of seven days.

The Applicant states that the current rate of draw down restricts the amount of electricity that can be generated from Lake Onslow (“**the Lake**”), especially at periods of high demand. The minimum operating level of the lake is 679.9 metres above sea level (masl), which allows for an operating range of 5 metres (m) below the crest of the dam. The Applicant states that the lake level is normally operated within a 2.5 m range below the crest, with lows experienced about once a decade. The Applicant is seeking the following changes to the above condition:

*The rate at which the lake shall be drawn down shall not exceed ~~0.2~~ **0.4** ^[1] metres over any period of seven days.*

The Applicant is not proposing to make any other changes to the existing consent conditions including the rate of take, the minimum operating level of the lake or the existing residual flows.

After consultation with interested parties, the Applicant proposed the following amendment (“**Amendment**”) to their Application on 21 June 2021. The Amendment seeks to include the following conditions on both consents (2001.475 and 2001.476).

Definitions

In these conditions,

- **Year**, or any reference to a specific year, means a calendar year (unless otherwise stated).
- A **trigger year** is a year in which:
 - the minimum lake level over the year is 682.5 metres above mean sea level or lower, and
 - the rate of drawdown of the lake level exceeds 200 mm/week for 4 or more calendar weeks.
- A **monitoring year** is a year in which monitoring in accordance with the Lake Onslow Monitoring Proposal (LOMP) is required under condition A1.
- A **monitoring round** is two consecutive **monitoring years**, following a **trigger year**.

Draft condition A1

The consent holder must monitor Lake Onslow in accordance with the Lake Onslow Monitoring Proposal (**LOMP**) dated May 2021 and prepared by Ross Dungey. Monitoring must be carried out by a suitably qualified aquatic ecologist (except for Condition (c) below). Monitoring must include, but is not necessarily limited to:

- a) One baseline monitoring event in 2022 (unless 2021 is a **trigger year**, in which case 2022 would form part of the first post-baseline **monitoring round**);
- b) A minimum of two **monitoring rounds**, one following each of the first two **trigger years**, with the provisos that:
 - i. If a second **trigger year** occurs in the first **monitoring year** of a **monitoring round**, this will not trigger a new **monitoring round** (with the next **trigger year** after this then triggering the second **monitoring round**).
 - ii. If a **trigger year** occurs in the second **monitoring year** of the first **monitoring round**, this would trigger the second **monitoring round** to begin in the following year (in this case there would be four consecutive years of monitoring).
 - iii. In each **monitoring year**, the fieldwork shall be carried out once only between January and March (inclusive), and preferably in February.
- c) Facilitating monitoring of the Lake Onslow trout population as described in the LOMP using anglers to collect samples. This shall take place annually from 2021 until the completion of the second post-baseline **monitoring round**.

Within two months from the completion of the baseline monitoring event and each **monitoring round**, a report prepared by a suitably qualified ecologist detailing the results must be prepared and submitted to the Consent Authority, the Otago Fish and Game Council, DOC and Aukaha.

Draft condition A2

After the second **monitoring round** required under condition A1 is completed, the consent holder must engage a suitably qualified aquatic ecologist to review the monitoring data collected under Condition A1 and any other relevant data available and prepare an Ecological Review Report (ERR). The ERR shall be submitted to the Consent Authority for certification that it adequately addresses the matters required under Condition A1 and achieves the key objective of the ERR, which is to evaluate the extent of any ecological effects associated with the increased drawdown provided for by Condition B1. The consent holder must meet the costs of certification of the ERR by the Consent Authority. The ERR must include, but is not limited to, the following matters:

- a) Describes, discusses and evaluates the monitoring results (baseline and post-baseline) in accordance with the LOMP;
- b) Describes, discusses and evaluates the degree to which the lake has been drawn down at greater than 0.2 m/week between 2021 and the date when the ERR is prepared and compares this with typical drawdown rates in the previous years when drawdown was limited to no more than 0.2 m/week;
- c) Based on (a) and (b), provides and justifies a professional opinion regarding whether any more than minor adverse ecological effects have occurred since the baseline monitoring;
- d) If there have been any more than minor adverse ecological effects, provides and justifies a professional opinion as to whether the effect(s) is/are likely to be occurring as a result of the increased rate of drawdown.

The ERR must be provided to the Consent Authority, the Otago Fish and Game Council, DOC and Aukaha within 60 working days after the second **monitoring round** required under condition A1 is completed.

Draft condition A3

Should the Otago Fish and Game Council, DOC or Aukaha choose to provide comments on the ERR, the consent holder and/or their ecologist must respond to these comments, provided that such comments are received within 20 working days of the ERR being provided to those parties. The consent holder must respond to all such comments within a further 20 working days (i.e. within 40 working days from the ERR being released), and must provide a copy of both the comments received and the response given to the Consent Authority.

Note: The consent authority may consider any comments offered by Fish and Game, DOC or Aukaha, as well as the consent holder's response to any such comments, when making a decision regarding certification of the ERR under condition A2.

Draft condition B1^[2]

The rate at which the lake shall be drawn down over any period of seven days must not exceed 0.4 metres.

Draft condition B2

For the period commencing 1 October in the year in which the second monitoring round required under condition A1 is completed and ending with the expiry of the consent, the rate at which the lake shall be drawn down over any period of seven days must not exceed 0.2 metres unless:

- a) the ERR prepared under condition A2 is certified in accordance with that condition; and*
- b) the report concludes that no more than minor adverse ecological effects have occurred, or*
- c) if there is such an effect, the report concludes that this effect is not caused by the increased drawdown rate.*

Notes: 1 October was chosen as this allows 3 months for preparation of the ERR under condition A2, one month for affected parties to consider it and comment if they wish, one month for the consent holder to respond to any comments, plus one month for peer review/certification of that report by the Consent Authority and any discussion following on from that.

Draft condition C

The consent holder shall maintain and operate a lake level monitoring site at or near the dam, with lake levels recorded at least hourly to a minimum accuracy of 0.025 metres.

The conditions above have been proposed by the Applicant as an amendment to their Application for the following reasons:

- The Applicant considers that the environmental effects of their proposal are no more than minor and that the assessments that support the Application are still relevant (recognising that many of these assessments were lodged in 2018).
- The proposed Amendment introduces an adaptive management approach as a result of consultation with potentially affected parties (DoC, Fish and Game Otago and Aukaha). It establishes a monitoring regime to verify that the effects are as anticipated with a reversion to the current drawdown regime if there is evidence to suggest to the contrary.
- The amendment from 0.5 m/week to 0.4 m/week reflects a compromise to address concerns raised by Fish and Game Otago.
- Condition C has been proposed to ensure accurate lake level monitoring to ensure that the Consent Holder is complying with the consented maximum drawdown rate. This has been included as there is currently no requirement under the existing consents to monitor lake levels.

1.1 Further Information

The Application lodged included an AEE and was supported by a technical report prepared by Ross Dungey. Further information was provided on the following dates in respect of the general details summarised:

- 31 January 2018: storage graph for Lake Onslow in 1983, calculated natural inflow records from 1986-1996, storage data from 1995-2015, the calculated ramp rate for the average flow (assuming no inflows) and lake level since 1974.

- 5 April 2018: supplementary information from Ross Dungey assessing the potential water quality effects from increased water level fluctuations, sediments and nutrients in Lake Onslow and the Teviot River; and water quantity effects downstream of Lake Onslow on the Teviot River.
- 17 August 2018: supplementary information from Ross Dungey on an assessment of the change on habitat critical to invertebrates and bullies, description of macrophyte communities and an assessment of effects of the change on macrophyte communities.
- 29 July 2021: supplementary information on land ownership of the bed of Lake Onslow, reasons for the Amendment; photographs of key locations at the site; an assessment of effects on cultural values, effects on Regionally Significant Wetlands, effects on aquatic plants, effects on fish and effects on koura; future management of the lake; and an assessment of the proposal against the NPS REG 2011, NPS-FW 2020, partially operative RPS, proposed RPS, KTKo NRMP and Te Rūnanga o Ngāi Tahu Freshwater Policy Statement 1999.

1.2 Description of the Teviot River Scheme

The Teviot River Scheme is a combined hydroelectric power generation and irrigation scheme located on the Teviot River, east of Roxburgh. Lake Onslow is a man-made lake located at the head of the river and was created in 1890 by damming an area of land called Dismal Swamp. The original purpose was to supply water for gold mining operations on the lower river.

The first irrigation and power scheme was built on the river in 1924. In 1982 a new dam was constructed at Lake Onslow downstream of the original structure (the damming authorised by Water Permit 2001.475). This increased the storage level of the lake by 5 metres and drowned the original dam (“old dam”). The reservoir area increased from 367 hectares (ha) to 830 ha.

The hydroelectric power scheme uses approximately 300 metres (m) of fall of the Teviot River and operates a total of five turbines. Lake Onslow operates as a storage dam with a regulated discharge that flows approximately 29 kilometres (km) down the Teviot River to the Clutha River/Mata-Au. The flow is diverted at the Marslin Dam and TIC Intake Weir on the lower section of the river where it is used for irrigation, electricity generation or both purposes.

1.3 Operation of the Teviot Power Scheme and Teviot Irrigation Scheme

The Pioneer hydroelectric and Teviot irrigation schemes rely on the storage of Lake Onslow to provide a supply of water throughout the year. Water demand for these purposes varies throughout the year and annually. The Application notes that the lake is generally operated so that the lake is full (70-90%) for the majority of the year with the storage being most valuable in late summer to supplement low flows in the Teviot River when irrigation demand and electricity demand is greatest. There is currently annual variability in use of the storage. This operating regime maximises the value of the water available from storage. The Applicant has stated that they have no intention on changing this operating regime.

The rate of drawdown is currently restricted to 0.2 m over any seven-day period. The speed of drawdown is variable and currently influenced by irrigation, electricity demand and rainfall. The Applicant has noted that the current drawdown rate limits use of the storage below 1 m below the crest as the rate of take is constrained. The increased drawdown rate sought is to provide the Applicant with more flexibility to react to relatively short periods of high demand. This is often when the lake is at lower levels, which tends to coincide with late summer and periods of high demand. The Application notes that sporadic increases in drawdown are often followed by steady periods where inflows may rise lake levels again.

The minimum operating level of Lake Onslow is 679.9 masl with a consented operating range of 5 m below the crest of the dam and a usual operative range of 2.5 m. The Applicant has indicated that low lake levels (i.e. close to 5 m below the crest) are experienced about once every decade.

The discharge from Lake Onslow into the Teviot River is regulated within the present storage range. The dam discharge varies from 1.4 cubic metres per second (m³/s) during the summer months up to 5.7 m³/s during the winter. As noted in their previous Application, factors that the Applicant considers when formulating the daily and seasonal operating regime for the existing scheme include irrigation demand, current generating plant status, electricity demand and market value, available daily storage,

and the lag time for flows to pass down the river from Lake Onslow to the intakes at Horseshoe Bend and Marslin Dam. Apart from the main discharge, a small flow passes through a turbine attached to the dam. The turbine provides power for charging the batteries that operate the discharge valves.

The Applicant supplies power to the local Aurora Energy Limited network. At times, available generation exceeds local demand and, in this situation, energy is fed into the national grid via the Transpower Clyde Grid Exit Point (GXP).

1.4 Compliance with Current Consent

The Council's Compliance Unit has audited the consents to be varied. The Compliance review notes that all performance monitoring requirements have been met for the supply of water meter data. Both consents were assigned Grade 3 (Non-compliant with no actual effects) due to the overdue supply of performance monitoring documents. These have now been provided.

Compliance have recommended that a consent condition is imposed that requires the lake levels to be monitored and reported on to enable the drawdown condition to be monitored. It is noted that the Applicant's Amendment includes Condition C which provides for lake level monitoring.

Compliance have also recommended that telemetry be installed and continuous records of the take for Water Permit 2001.476 provided.

Brief overview of proposal

The Applicant's proposal is seeking to increase the rate at which the lake is drawn down in Lake Onslow from 0.2 m over any 7-day period to 0.4 m. The Applicant has also proposed an adaptive management regime to monitor the ecological effects of this change during years when there are low lake levels. This will occur in the short to medium term. The results from this would establish a long term (until the consent expiry in 2041) draw down regime for the lake. It is noted that the monitoring, as proposed by the Draft Lake Onslow Monitoring Proposal ("LOMP"), is restricted to assessing ecological effects with a focus on weed bed monitoring, invertebrate sampling, electric fishing of bullies and trout angler records.

An increase in the rate that the lake is drawn down allows for lake levels to drop more quickly than they currently occur and for there to be more fluctuations in lake levels than what the current consent provides for. The draw down rate increase will enable water to be discharged from the dam more quickly resulting in changes in the flow regime in the Teviot River.

The changes proposed are considered in relation to the below and this is also the basis for the assessments made by the Applicant:

1. The proposed change is to increase the drawdown rate from 0.2 m per 7-days to 0.4 m per 7-days (1.2 mm/hr to 2.4 mm/hr on average).
2. No change is proposed to the maximum operating range (a maximum of 5 m below the crest of the dam^[3]). There are statements in the Application that the scheme normally operates between a 1.5-3 m range. At 2.5 m below the crest the lake is approximately 51% full.
3. The Applicant manages drawdown to provide for electricity demand/market demand with having a full lake to provide for irrigation.
4. The frequency of use of the proposed drawdown rate will be a factor of market demand and rainfall.
5. The maximum discharge from Lake Onslow is limited to 6 cumecs in winter^[4] and 3 cumecs in summer (cite consent condition). The current drawdown rate does not enable this take to be fully exercised.
6. The use of the increased rate of drawdown is likely to be in autumn (March to June) when rainfall inputs are low. The proposed variation will enable the Applicant to maintain higher flows in the Teviot River in dry years by reducing the restriction on the amount of water that can be discharged as the reservoir level lowers.
7. The frequency at which the drawdown rate will be applied is anticipated to be limited to late summer in a 2 out of 5 year period. However, the Applicant has not proposed any restrictions on the frequency of use. There is uncertainty on when the greater drawdown rate will be required (it is a function of low rainfall years). The extent of effects are considered to be a function of the frequency of use.
8. The lowest lake level will be reached more quickly than can currently occur as a result of the

TO: Natasha Pritchard
COPY TO:
FROM: Annabelle Coates

Date: 18 August 2021
Job No: 64189#BEE19

REVIEW OF RESOURCE CONSENT RM18.004 – CHANGE OF CONDITIONS, LAKE ONSLOW, PIONEER ENERGY

Pioneer Energy Limited (Pioneer) hold a number of resource consents allowing them to operate a hydroelectricity power generation scheme at Lake Onslow on the Teviot River. They have applied to ORC to change the conditions to allow them to draw down the level of Lake Onslow by 0.4m/7 days, compared to the 0.2m/7days currently allowed for. No amendments to the rate of take, the minimum operation level of the lake or the residual flows are proposed. It is noted the application was originally lodged in 2018, but has been on hold since lodgement.

ORC has asked Babbage Consultants Limited (Babbage) to review the ecological components of the resource consent application, responding to several questions posed by ORC. Our response to each question is outlined below. Our review has been limited to the resource consent application and associated documents, prepared by Landpro Limited, dated January 2018.

Is the technical information provided in support of the application robust, including being clear about uncertainties and any assumptions? Yes, or no. If not, what are the flaws?

Yes, mostly.

The application provides a good overview of the existing situation, as well as the proposed changes to the drawdown over the seven-day period. A description of Lake Onslow, including basic physical attributes is provided. The lake presents a significant number of natural values including trout spawning and trout fishery. Recent monitoring has shown fluctuations in levels of phosphorus and nitrogen which could indicate changes in land use in the catchment is affecting the lakes water quality.

A technical assessment of the effects of the increase in drawdown was completed by Ross Dungey Consulting in September 2017. The assessment used bathymetry, hydrology and invertebrate sampling to discuss potential effects of the increase in drawdown rates. It did not include commentary on phytoplankton or macrophytes, though macrophytes were addressed subsequently. It partly replicated a study undertaken by Cawthron in 1993 within Lake Onslow, that determined the productivity/reproduction/biomass of invertebrate communities increased in response to rising water levels which inundated the previously dry lakebed. Results from the bathymetric survey showed that in some parts of the lake, particularly the southern shore, a reduction in lake water level would result in significant areas of lake bed being exposed (e.g. at transect L7S: 0.5m drop = 20m horizontal distance is



exposed; 1m drop = 125m exposed; 1.5m drop = 240m exposed; 2m drop = 500m exposed). However, in other locations even after a drop in water level of 3.5m, only 8.5m of lakebed would be exposed.

Invertebrate assessments revealed the community was typical of a hydro lake, with species present that are adapted to/can tolerate changes in lake level. The fauna present were similar to that recorded in other lakes. It was concluded that the increase in drawdown from 0.2m/7 days to 0.5m/7 days would not likely have any detrimental effects on invertebrate fauna, and may actually be an advantage by 'creating' new habitat with reflooding on a rising lake. The lake is subject to natural variability in levels and has a 'dry' year approximately every 10 years. These dry years result in natural exposure of the lake bed and are often followed by significant increases in invertebrate production, and therefore fish production. The report concluded "a conservative approach may be to monitor the invertebrate fauna after a period where an increased draw-down has been in practice."

We generally agree with the Ross Dungey Consulting report. The increase in drawdown is considered unlikely to result in increased detrimental effects to ecology. The return period of seven days for the drawdown is very short compared to natural fluctuations. Macroinvertebrates have a rapid recolonisation and reproduction rate and recover quickly following habitat disturbance. Fish have remained present in the lake throughout naturally fluctuating years and the increase in lake bed exposure as a result of the increased drawdown rate is considered unlikely to have significant detrimental effects on fish habitat or population.

With regard to the effects on the Teviot River, the information is mostly provided in subsequent further information requests provided by the applicant. Information is predominantly sourced from existing studies undertaken downstream of the dam. Studies suggest a relatively stable, to increasing habitat quality. Limited information is provided about the waterways upstream of the dam. However, as they are upstream, changes to the dam regime will not affect the amount of water flowing into them. Controls in the wetland currently limit the flow of water entering the lake from the wetland and these will not alter. The other waterways that flow into the lake, with the exception of the Teviot River itself, are small, and relatively steep and are unlikely to be affected by changes in the drawdown rate. There is limited information regarding the fish population of the Teviot River, however this is easily extracted from the New Zealand Freshwater Fish Database.

Are there any other matters that appear relevant to you that have not been included? Or is additional information needed? Please specify what additional info you require and why [please explain]

No.

The application and supporting documentation provide sufficient information to assess potential effects.

If granted, are there any specific conditions that you recommend should be included in the consent? Please outline recommendations for changes to standard conditions and/all non-standard conditions that may be relevant.

Yes.

It is recommended monitoring is carried out to confirm expected effects. We agree with the requirement that monitoring occur as per the Lake Onslow Monitoring Proposal.

There is benefit in continuing to monitor macroinvertebrates downstream of the dam in the Teviot River. While this does not currently appear to be required as a condition, it is recommended the same methods are utilised as what occurred during surveys in 2012, 2013 and 2015, that are mentioned in the extra information provided in April 2018. Monitoring should occur in summer as this is when the changes in flow regime in the Teviot River are likely to be most noticeable. Data should be analysed as per draft condition A2 (Ecological Review Report).

Have the cumulative effects of the activity been appropriately assessed? Yes/no

Partly.

Cumulative effects have not been specifically addressed. However, the response to further information request provided by Ross Dungey in July 2018 states “The proposed change will allow the lowest lake level to be reached more quickly than can currently occur but the “draw-down to” level will remain unchanged and no additional lakebed will be exposed.” The maximum rate of discharge from the dam will also not change, however it is expected during years when the increased drawdown is utilised, there will be increased base flows in the Teviot River. These flows will not be anywhere near as large as normal flood flows, and will not be significantly variable over a short timeframe. As the application only concerns the increase in drawdown level, not the maximum amount taken, no cumulative effects are anticipated.

Does the application appropriately identify sensitive areas including values within the Teviot River, wetlands and any other affected water bodies? Yes/no

Partly.

The assessment focuses on Lake Onslow. Lake Onslow is listed in Schedule 1A of the Regional Plan: Water, 2004, (RPW) as having the following natural values:

- Riparian vegetation of significance to aquatic habitats.
- Significant trout spawning areas and areas for the development of juvenile trout.
- Significant presence of trout.

The values in the Teviot River downstream of the dam have only been loosely discussed in the information provided. Effects are discussed including positive effects. These are discussed further in the response to the questions below. Limited fish information is provided, however species data is available from the NZFFD. We note the Nationally Critical Teviot galaxiid is present in the Teviot River downstream of the dam. NZFFD records indicate it is present in small, headwater tributaries of the Teviot River. These will not be affected by the flow regime.

There are two regionally significant wetlands within the vicinity of Lake Onslow – Fortification Creek Wetland Management Area, and Middle Swamp. These have been identified and discussed in requests for further information (dated 29 July 2021).

Is the description of the sensitive areas attributes potentially affected by the activity accurate?

Yes.

As discussed, the application is for a change in drawdown level only. No other aspects of the operation will change including minimum lake levels. Lake Onslow is discussed in detail and the adjacent wetlands are discussed in further information provided 29 July 2021. Photographs of the Teviot River downstream of the dam are provided. Standard practice would provide detailed descriptions of all areas, however, the effects are reasonably well discussed for both the Teviot River, and the adjacent wetlands. More detailed review of the effects on the Teviot River is provided below. Limited information is provided about the waterways that flow into the lake, however we do not consider it is needed as they will be unaffected by the drawdown change proposal.

Has the instream ecology of the Teviot River been appropriately assessed including both native and sport fish values? Please include details on the appropriateness of the method of assessment

Yes.

Assessments are largely based on existing data and literature. The photographs provided show a deep, swift river, and therefore it is not suited to easy sampling and survey of fish. A more in depth assessment of the river itself, including habitat features, riparian landuse and vegetation, and basic water quality parameters would have been useful to provide a better picture of the current state of the river, however they are not essential.

Invertebrate data collected from the Teviot River shows generally high quality habitat.

Increasing the drawdown level to 0.4m/7 days would result in increased summer flows in the Teviot River. Increased flows, during this period will have an overall positive effect as it can be expected that wetted area will increase and temperatures will not increase to the same level as currently experienced. There is the potential for a higher level of fluctuation in summer flows as a result of the increased drawdown, however this is not expected to be significantly detrimental to habitat, including fish habitat, in the Teviot River. As the Teviot River is largely 'U' shaped, fluctuating river levels are not expected to alter wetted areas significantly, rather the depth will fluctuate. As trout tend to prefer cooler water, they avoid the shallow benthic areas that will be affected by fluctuations. Bullies and galaxiids have not been specifically addressed. Bullies are more tolerant of warm waters and tend to prefer shallow benthic habitats. From review of the photos provides and aerial images, it appears their habitat is less prevalent in the reaches below the dam.

Have the changes to the hydrology of the Teviot River been appropriately assessed?

Yes.

There is a maximum discharge of 6 cumecs from Lake Onslow to the Teviot River. This maximum will not alter. An increased drawdown rate will result in increased flows in the Teviot River at times, up to the maximum discharge rate, and will be more noticeable during summer when flows are naturally lower.

Have the effects to the ecology from the changes to the hydrology of the Teviot River been appropriately assessed including effects on fish, plants, algal build-up and sedimentation?

Yes.

Effects on fish have been addressed in preceding questions.

There is the potential for increased sediment loads in the Teviot River as a result of higher levels of exposure of the lake bed, however this was considered to be unlikely as faster drawdown means the base level is reached sooner so the intervening sediments between top level and drawdown level spend less time in shallow water and potentially being worked by wind/wave action. We agree with this supposition. We also note, rivers are subject to natural periodic inputs of sediment and as such the biota within the rivers are adapted to periodic high sediment loads.

Macrophytes, or water plants, have not been discussed. They are highly unlikely to be present in the Teviot River due to flow regime and therefore we do not believe discussion is necessary.

Have the potential for increased erosion and sedimentation and the effects associated with this been appropriately assessed?

Yes.



Effects of sedimentation have been appropriately discussed, as per the response to the question above. Effects of erosion have not been discussed in detail. The photographs of the Teviot River provided show a channel largely bounded by bedrock. As such, erosion and the generation of fine sediment through erosion in the river is not likely. The further information provided stated “even these flows which left a debris line about 2m above the normal water level and washed out the water level recorder at Bridge Huts didn’t produce any river bed scouring that was noticeable on recent (summer 2017-18) visits”

Have the water quality effects of the proposal been adequately assessed? Is the monitoring proposed adequate?

Water quality has not been discussed beyond what is indicated by macroinvertebrates. Fluctuating, to increasing densities of macroinvertebrates, may be the result of increased agricultural use in the catchment and associated increased use of fertilisers. Altering the drawdown rate is not likely to result in changes to water quality, with the possible exception of sediment loads, however this has been discussed. Temperatures may also be affected if significant reductions in water level, however as the maximum take will not alter, no effects over and above what is already experiences are expected. No other aspects of the existing consent will be altered. Water quality is influenced by landuse in the wider catchment. It is also noted the consent requires flushing flows to flush out algal accumulation in the Teviot River.

Have the effects from the proposed change on the wetlands been appropriately assessed? Are the hydrological conclusions accurate?

Yes.

The regionally significant wetlands are upstream of Lake Onslow, and as such will be unaffected by the proposed increased drawdown rate. Further information provided states “The same hydraulic controls that controlled water flow from the wetlands originally are still in place and can be observed at a lake level of 2m below the weir crest. These controls limit the flow from the streams entering the lake and therefore also the rate at which the water leaves the wetlands. It is not draw down rate that controls inflow.” We note that the NPS-FM has rules regarding the damming of water within 100m of a wetland, however we are satisfied the wetlands will be unaffected by the proposal.

Is the assessment conclusions that the location of wetlands and tributaries being above the lake means that the proposal will have no effects on them accurate?

Yes.

We agree with the statements as per the response above. In addition, we note, water flows into the wetlands are controlled by rainfall events and streams flowing into the wetlands, not the lake level itself.



For these waterways to be affected, lake water levels would have to rise significantly, causing water in the streams to back up. This is not proposed under the consent application.