

From: [Hilary Lennox](#)
To: [Natasha Pritchard](#)
Cc: [Tony Jack Pioneer \(tony.jack@pioneerenergy.co.nz\)](mailto:tony.jack@pioneerenergy.co.nz)
Subject: RE: Pioneer Energy Limited variation application - RM18.004 - Request for technical review
Date: Friday, 17 August 2018 9:24:51 a.m.
Attachments: [20180817_17367_Ross_Dungev_additional_s92_response.pdf](#)

Hi Natasha

Hope you are keeping well. Please find attached a response to the questions in your email below. Please don't hesitate to get in touch if you have any further questions

Many Thanks

Hilary

-----Original Message-----

From: Natasha Pritchard <natasha.pritchard@orc.govt.nz>
Sent: Thursday, 19 July 2018 4:42 PM
To: Hilary Lennox <Hilary@landpro.co.nz>
Subject: FW: Pioneer Energy Limited variation application - RM18.004 - Request for technical review

Hi Hilary,

We have received an initial technical review from Mark James at Aquatic Sciences regarding the variation application by Pioneer. He has asked that the following information be provided so that he can finalise his technical comments.

1. Please confirm that the change in drawdown will not result in significant changes to the extent and duration of low levels and that no habitat critical to invertebrates or bullies will be lost.
2. Please describe the distribution (general) of macrophytes and main species and whether there are any shallow turf communities.
3. Please confirm that the macrophyte community in the lake is at a depth that it would not be significantly impacted by changes in lake level as a result of the proposed drawdown rates.

Once we have the final technical comments, you will hopefully be able to proceed with your discussions with affected parties.

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Onslow Consent. Supplementary Questions; ORC.

Three questions from ORC were submitted for clarification;

1. Please confirm that the change in drawdown will not result in significant changes to the extent and duration of low levels and that no habitat critical to invertebrates or bullies will be lost.
2. Please describe the distribution (general) of macrophytes and main species and whether there are any shallow turf communities.
3. Please confirm that the macrophyte community in the lake is at a depth that it would not be significantly impacted by changes in lake level as a result of the proposed drawdown rates.

Pioneer Energy Ltd.

I have discussed the scheme with Mr A Jack of Pioneer and it is confirmed that the minimum level the lake is operated at will not change according to the proposal. The proposal relates to the rate of draw-down not the extent to which the lake is lowered and existing operating limits will remain. Consequently no substantial difference to the current operating regime other than a different rate of draw down is expected.

Consideration of issues relating to questions 1-3 above.

1. Extent and duration of low levels and effects on invertebrate and bully populations.

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**. Therefore no additional adverse effects are anticipated. The duration of “low level” is outside of the control of the scheme as it depends on rainfall for recharge over which the scheme has no control. As such there is no means for the proposed change to extend the duration of the low level period. The natural recharge (rain events) will continue to limit the frequency of draw-down events to those periods when water is available.

With regard to invertebrates and bully habitat no more than is currently exposed at low lake levels will occur under the proposed change and therefore no change to these populations is anticipated or expected as a consequence of the new proposal. Both populations have adapted to the lake level variations and support renowned fisheries under the existing regime. Other hydro lakes and reservoirs in Otago with a variety of draw down regimes, for example Hawea and Poolburn, have extensive bully populations that support high value angling resources at least in part supported by bully populations. Anglers specifically imitate bullies on fluctuating shorelines to target trout feeding on bullies at various life stages. The positive response to newly available habitat as shoreline becomes flooded as lake levels increase seems to compensate for the initial disruption.

Riss & Hawes 2002 note that “Community response to level variation appears to follow the pattern of intermediate disturbance maxima with niche and species diversity maximal at intermediate degrees of water level variation.” This community response has been described in the supporting information regarding invertebrate population studies commissioned by Pioneer Energy, Dungey 2017, and seems to be the main driver of productivity in many lakes and reservoirs supporting valued trout fisheries.

As has been previously described the usual operating range for Onslow is 1-3m, but generally within 1.5m, figure 5, Dungey 2017. This is a level that fits within an intermediate range for hydro lakes in New Zealand.

No significant adverse effect on invertebrate and bully communities is anticipated or expected.

2. Macrophyte distribution.

Observations on macrophytes have been made in the course of other surveys such as invertebrates, lake bed profiles, and lobster surveys. Angling excursions are also a source of information as weed beds are a favoured site to fish around. The invertebrates supported by weed beds are a significant component of trout diet. Macrophyte communities are dominated by *myriophyllum* sp. but include sparse populations of *potamogeton*. Macrophyte and shallow turf communities have not been specifically surveyed as no change is expected because the lowest lake level remains unchanged. They will not be exposed to any greater extent than currently occurs and again frequency is limited by natural recharge from rainfall in the catchment.

No changes to the distribution of macrophytes is anticipated or expected.

3. Macrophyte water depths and potential impacts.

Macrophytes are restricted to a narrow band on muddy lakebed limited largely by wave action as the upper limit and light penetration as the lower limit. They are sparse below 2m water depth and absent below 3m. Below the macrophyte zone the lake-bed is simply fine sediment (personal observation). The deepest depth to which they extend is controlled by the lowest lake level at which point the light penetration zone is at its maximum. As recharge occurs light penetration retreats as water depth increases. This process operates over a period of weeks or perhaps months in very dry years and is probably too short an exposure period to allow much in the way of macrophyte colonisation of lake in deeper water.

No significant adverse effect on macrophyte communities is anticipated or expected.

Summary.

Given that the current operating range for lake levels will remain and that recharge is controlled by climate/rainfall no change to existing aquatic communities is anticipated from an increase in drawdown rate.

References.

Dungey RG, 2017. Lake Onslow lake bed profile and invertebrate survey. Report prepared for Pioneer Energy Ltd.

Riss T, Hawes I, 2002. Relationships between water level fluctuations and vegetation diversity in shallow water of New Zealand lakes. *Aquatic Botany* 74, (2002) 133-148.

Ross Dungey
July 2018