



Document Id:

MEMORANDUM

To: Natasha Pritchard

From: Jason Augspurger

Date: 11/1/2017

Re: RSU Information assessment of RM18.004

Description of Proposed Activity

The applicant is proposing to alter the lake allowed drawdown rate of lake Onslow from the currently consented 0.2 m/week to 0.5 m/week.

Ecological Values and Significance

Lake Onslow represents regionally important brown trout fishery with over 3,000 angling hours a year (Unwin, 2015). The wider Teviot catchments contains the nationally critical Teviot flathead galaxias as well as common bully.

Assessment of Effects

As currently proposed, the effects of the proposed change cannot be assessed. The applicant seeks to change the consent as the 0.2 m/week drawdown is limiting their power generation. If changed, more water is likely to be passed downstream and the status quo of lake level is likely to change.

"Hydroelectricity generation requires water to be released from the dam and both of these permits restrict the rate at which the water level in the lake can be drawn down (Condition 2 of Water Permit 2001.475 and Condition 3 of Water Permit 2001.476.V1):

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

This application seeks to amend this condition to increase the authorised rate of drawn down to 0.5 m over seven days. No amendments to the rate of take, the minimum operating level of the lake or the residual flows are proposed.”

Downstream effects

No information is currently provided about downstream effects or water management. As a result, the effects of this increased flow on hydrograph, mainstem aquatic communities, and potential inundation of surrounding areas/tributaries can be made. Further information about downstream water management, flows, ramping rates (and potential alterations to), and a downstream environment impact assessment must be provided.

Lake effects

The information provided to assess potential effects on lake Onslow is also insufficient. We acknowledge that the applicant is currently unable to provide experimental type results to demonstrate the effects of lowering the lake level at a rate of .5 m/week as they are not consented to do so. However, at a minimum, models of lake surface area changes in relation to various lake levels and proposed management regimes under the .5 m/week allowance must be provided.

The applicant’s assessment shows lake bathymetry results in a large range of disproportionate losses (Figure 2). As a result of this variable loss, the relationship between lake level decrease and surface area decrease is unlikely to be linear. Variable bathymetry will result in more surface area loss when the overall gradient is shallow and less loss when the gradient is steep. However, the applicant’s water-level and area measurements suggest a linear relationship (see Table 5 in the applicant’s assessment or Figure 3 in this memo). A better estimate of surface area loss at various lake levels must be provided to assess effects on the lake. This could be done using either aerial imagery and historical records of lake level and then calculating the area or by using more intensive bathymetric mapping and modelling.

The applicant suggests that the increase in lake level alteration may provide higher productivity. This is entirely possible, but to fully assess this the applicant must also provide information about the recharge rate of the reservoir and potential durations of low vs. high lake levels. Factors such as vegetation of previously submerged areas and the inundation of these vegetated areas plays a role in nutrient and productivity changes. Without proposed temporal lake level regimes it’s difficult to assess the role that these factors may play.

Overall Opinion

If more detailed water management plans and proposed regimes for both the lake and downstream catchment are not provided a suitable environmental impact assessment cannot be made. As there is potential for negative effects on both downstream and lake ecology, effects cannot currently be considered as less than minor. If this information can be provided, an assessment can be made and, with conditions, it may be possible to achieve the potential positive effects proposed by the applicant.

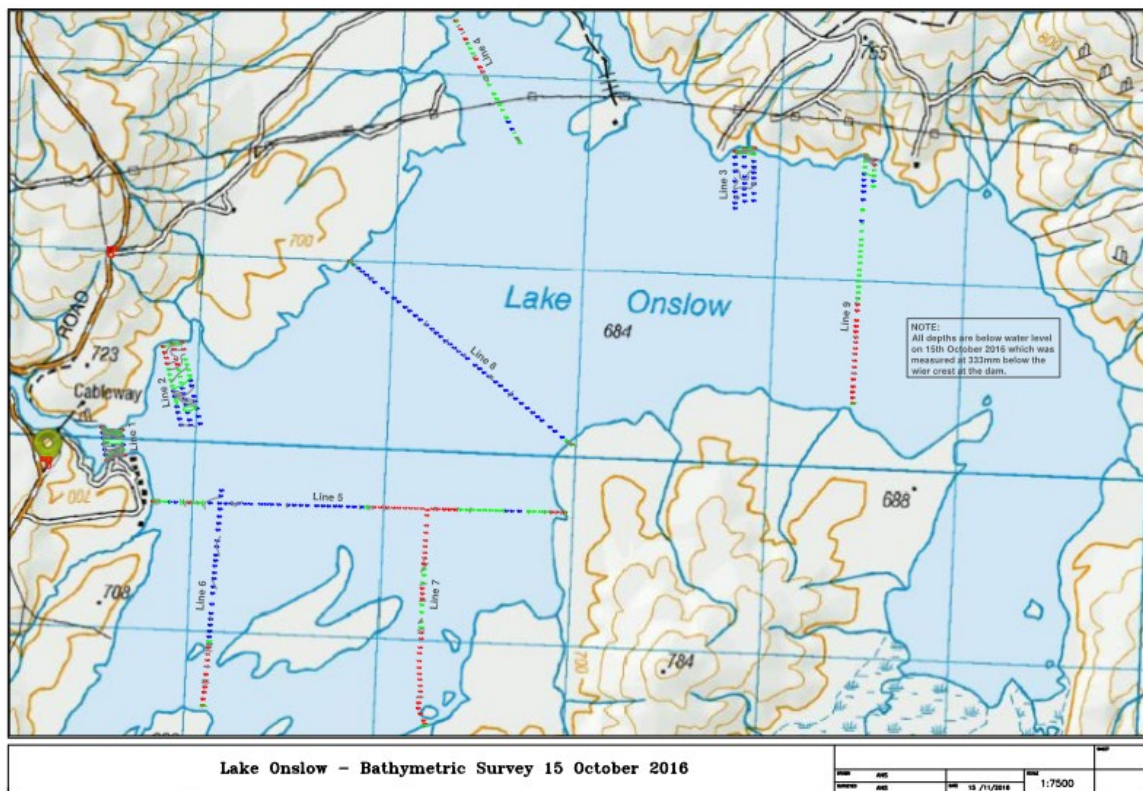


Figure 1, lines 1, 2, and 3 are invertebrate survey sites, others lines are water depths only, see appendix 1 for large scale map.

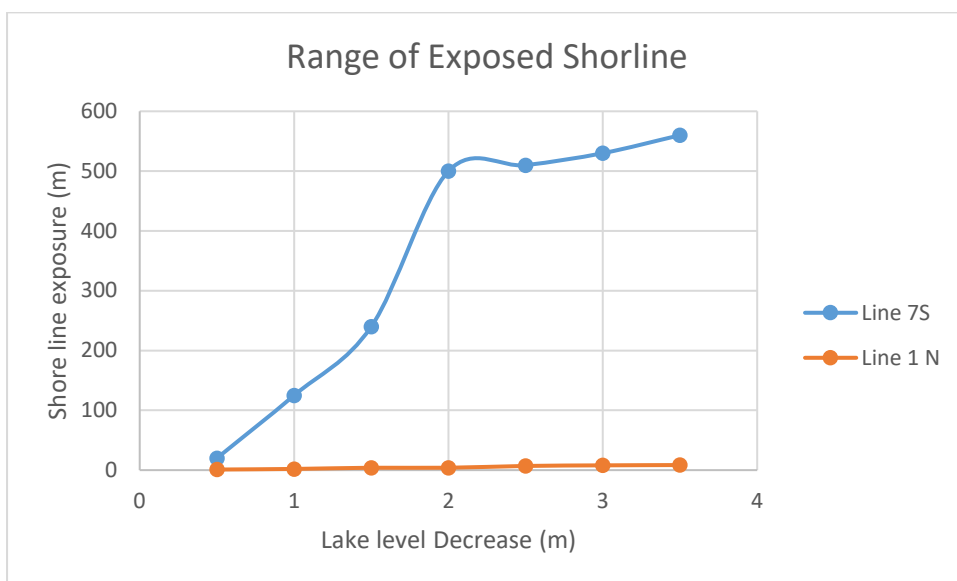


Figure 2: Range of losses supplied by the applicant.

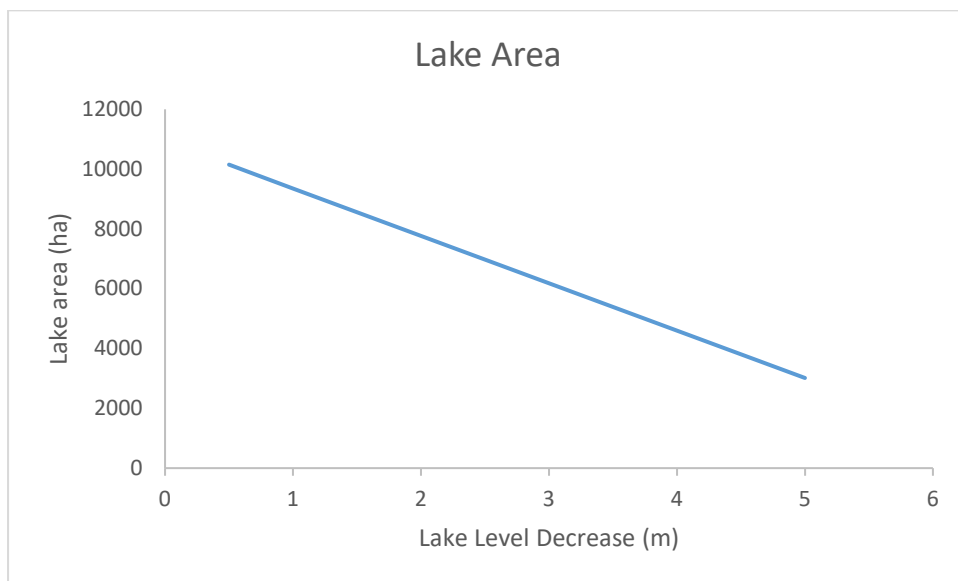


Figure 3: The applicants proposed decrease in lake area in relation to lake level decrease.



Figure 4: Sentinel-2 satellite imagery of Lake Onslow in January 2016 and May 2016 showing the area exposed by water level decreases.