LEE RIVER DAM VEGETATION UPDATE

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1. Background

Uruwhenua Botanicals undertook an initial assessment of vegetation of the Lee Dam footprint area in May 2006. This study was followed by more detailed observations in May 2008, including downstream from the proposed dam site. A third study, of the upper reach of the potential reservoir, was undertaken in May 2009 in response to a change in dam site. Each of these assessments extended the range of observations and recorded the discovery of further botanical values.

The present study was undertaken to update the detailed assessment of the indigenous vegetation of the reservoir and construction footprints given that there has been a small change to the construction and reservoir footprint (based on maximum probable flood level of RL 202m - Relative Level or altitude), and the elapsed time since the most recent survey in 2009. Specifically it was considered that there was the potential for changes to have occurred to boundaries of vegetation types and areas of ecological significance, as well as changes to vegetation condition.

This report needs to be considered in relation to the previous three reports.

I wish to acknowledge the assistance of Matt Stuart, a land owner in the footprint area, who organized safe passage with the logging company operating on the day, who accompanied me on part of the survey and who facilitated access to certain places along the river.

2. Methodology

The site was visited on October 30, 2013. Using the most up to date plans of the dam footprint, previously identified sites were revisited, notably those that will be impacted the most. Sites 1,,2 and most of 3 were examined in detail. Site 4 was viewed from adjacent forestry roads. Site 5 was not visited. Site 6, on Waterfall Creek, was added. Parts of each site were traversed and botanical observations recorded, particularly new records of species or any changes in condition in comparison with previous surveys.

3. New observations

The following paragraphs note changes to, or new information on, the vegetation in each of the Sites of Significance determined in the previous assessments.

Site 1. With the relocation of the dam upstream Site 1 will not be inundated, but may well be modified by construction activity if such activity extends that far downstream. This is a unique part of the footprint because the river follows an S-shaped course caused by a reef of hard rock, and this means that there is a set of uncommon habitats. The very important kanuka strip with regenerating podocarps and some *Scutellaria* recorded previously is still present. An additional species was found protected by a rock outcrop, namely *Pimelea longifolia*, NZ Daphne, which has not been seen before in the footprint area or downstream. It is growing with turf species including the liverwort (hornwort) *Anthoceros* as well as *Thelymitra* ground orchids, neither of which has been recorded from previous surveys. Site 1 is confirmed as a place of ecological significance. There was more pig rooting observed than previously, but no apparent loss of ecological values.

Site 2. This is at the dam site and is likely to be largely destroyed by disturbance and inundation as it lies within the dam and reservoir footprint. A montane species, *Pseudopanax colensoi* (3-finger), was recorded during the current survey, adding to the list of combined lowland and montane biodiversity. The previous assessments recorded the presence of both lowland and Hall's totara. Further information on the significance of this population indicates it is a pattern characteristic of the Nelson region in which lowland totara extends up the valleys from the plains and coast. This population is special in that Halls totara extends down-slope to such a low altitude. This area of the Lee catchment is important as remnant podocarps including Halls totara, lowland totara, rimu, matai, miro, tanekaha and kahikatea (seven species) are all present in the same habitat. Another distinctive feature is that all of these are regenerating, matai in particular. Based on my previous notes, the map prepared by Tonkin & Taylor records the presence of kahikatea in Site 2. In fact, rimu is much more important to this site. Most of the beech forest within Site 2 is even aged but there are a few much older individuals. Elsewhere in the catchment evidence of historic catastrophic loss of beech forest, through wind probably, can be seen. This instability is also apparent in the matai forest of Site 4 and is probably the reason why matai occurs in pure stands - the beech has been uprooted. Periodic instability caused by natural events, may result in periods of high sedimentation/gravel deposition.

Site 3. The mature kahikatea forest (10-3-1, in 2008 report) on the left bank was not visited but was observed from across the river, and the upstream boundary was located, indicating that it is a defined river flat, separate from the pole kahikatea forest (10-3-3) upstream. The kanuka forest on Waterfall Flat (10-3-2) was visited and confirmed as a future, very dense matai forest of

ecological significance. There are fewer areas of pig rooting apparent now in comparison with previous surveys. Site 10-3-3 still has a large population of the ground herb *Australina*, despite a high presence of pigs. The variety of pole podocarps as well as the good population of *Neomyrtus pedunculata* not seen previously confirms the ecological significance of this site (assessed as High in combination with other parts of Site 3, in the May 2008 report). It is unusual in being dominated by podocarps of the 50-100 year age, indicating one of the key features of podocarp regeneration - in patches related to river flat renewal relating to periodic flooding.

Site 4. I did not visit this complex site, but did observe the kanuka island and the matai forest from high on the right bank forestry roads. An interesting feature is that the pines have been milled from adjacent to the matai. This gives a clearer picture of the boundary and of the level of disturbance that has occurred due to logging of pines adjoining the matai area. The lack of a buffer between the matai block and pine plantation may contribute to incidental damage of native trees along the edge of the matai block. Natural slope instability is a feature of the site.

Site 5. This upper reach of the footprint was not visited but from appearance remains unchanged from the previous survey. The *Coprosma acerosa* population (the only one located along the river upstream or downstream from the dam) is now within the proposed (revised) footprint of the reservoir.

Site 6. Waterfall Creek. This is a new site. I was able to visit two areas of bush at Waterfall Creek. The reservoir map indicates that the reservoir will extend to the 'forks'. This is where a tongue of beech forest extends down the true right branch from the highlands (Mt Starveall). This is a geologically complex place and is where the waterfall that names the creek is located. It appears that the reservoir may inundate this waterfall. The bush is dominated by black beech at this altitude but there is some red and silver beech, as well as rimu, matai, tanekaha and kahikatea. However, overall the bush here is more montane than lowland, with kamahi, lancewood and broadleaf prominent.

I would rank this site as having Medium ecological significance.

Just a little way downstream on the right bank of Waterfall Creek there is a steep gully (hidden by a ridge from view from the Lee River) with mature matai forest. I would rank this site as medium as it is only about 1ha in size. However, I did not have time for a detailed look.

4. General conclusions

The ecologically significant sites identified in previous surveys of the dam footprint appear to have remained essentially the same over the last four years. There has been a change in intensity in pig rooting in some areas – both increases and decreases.

However, I have added a new site in an area not previously visited (Site 6). The revised dam location means that the site will be impacted by the reservoir.

The vegetation of the Lee Catchment is significant in terms of its diversity and regeneration. The diversity comes from its location, geological setting, coastal, lowland and montane mix, and local inherent features of climate and soil. The particular feature of importance is the lowland altitude with good exposure to sun, plus the strong cold air drainage from the high hinterland. The previous assessments identify many species that are recorded from only one location or are otherwise rare species. Many species appear to be able to regenerate despite pressure from disturbance (former farming, current forestry, wild animal damage). Foremost in this respect are the podocarps. What this suggests is that remedial actions following the building of the dam and filling of the reservoir may succeed very well. On the other hand the loss of mature indigenous habitat, including rare species, from any cause, in this day and age, is problematic.

There is evidence of historical catastrophic change in the forest, including wind destruction,, slope instability and river flat flooding. These features were not fully appreciated in previous surveys but do explain some of the ecological patterns observed that contribute to overall diversity.

I do not observe any change to the boundaries or level of ecological significance of sites identified in my previous assessments but have noted some previously unrecorded species. Site 6 is added because it will be impacted by the reservoir.

Finally, I still support my various suggestions in former reports about mitigation. Removal of pigs is an urgent need in order to maintain the significant ground flora. I think plant rescue is a good mitigation method, including species like shovel mint and tanekaha, for trans-planting to new equivalent sites. Land purchase and reserve establishment may help in replacing lost river-flat podocarp forest.

Several images are appended.

APPENDIX: IMAGES

Site 1. A bed-rock induced curve in the river protects a turf habitat from flood damage, and the only *Pimelea longifolia* (NZ Daphne) known from the footprint area, a grove of several plants and seedlings, has survived.

Site 1. Two species growing in the bedrock flood-induced turf are *Anthoceros* sp. (one of 13 'hornworts' in New Zealand), showing as yellow-tipped spore capsules, and a ground orchid (dark grassy single leaves), possibly a *Thelymitre* sp: neither has been seen on previous surveys.

Site 3, pole kahikatea forest. The greenhood orchid *Pterostylus banksii*.

This species occurs in several forms in the Lee bush. Seeing it in flower illustrates the importance of undertaking surveys in different seasons of the year.

Site 3. Waterfall Flat kanuka forest. The fern *Blechnum vulcanicum*, which is well developed throughout the footprint area, shares an alluvial habitat with a vigorous young Hall's totara

(*Podocarpus cunninghamii*). Nationally this is an unusual alliance and reflects the montane component of the flora.

Site 3, Matai forest. Recent logging has defined the boundary to the remnant matai forest.

In future it may be possible to establish a buffer zone without pine trees and reduce subsequent disturbance around this important lowland forest remnant.

Site 4. Kanuka Island. Seen from above the precarious stability of this site is apparent. In this unusually cold, damp habitat, the young vegetation is dominated by grasses and sedges beneath the kanuka canopy.

Site 6, Waterfall Creek beech forest. This bush is linked by continuous beech forest to the hinterland (far left). This is where the waterfall that names the creek is located and is likely to be inundated by the Waterfall Creek arm of the reservoir.

Site 6. A gully dominated by matai on Waterfall Creek. This gully is linked along the top ridge to another gully remnant, and ultimately to the Waterfall Creek beech forest hinterland.