

**MOKIHINUI HYDRO PROPOSAL
RESOURCE CONSENT APPLICATIONS
REVIEW OF TERRESTRIAL ECOLOGY ASSESSMENT**

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Prepared by:
Simon Beale, MWH New Zealand Limited

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1.0 Introduction

1.1 Background

This report documents the results of a review of the terrestrial ecology assessment undertaken by Meridian Energy Ltd (the applicant) supporting resource consent applications for the Mokihinui Hydro Proposal (MHP).

The purpose of this review is to provide the decision-makers with independent advice as to the effects of the MHP on terrestrial ecosystems.

The MHP includes a dam located on the Mokihinui River approximately 3 km upstream from the township of Seddonville and 11 km upstream from the river mouth, a new lake upstream of the dam extending to just below the Mokihinui Forks Ecological Area, a new transmission line to carry electricity from the power station to the existing Inangahua-Waimangaroa transmission line at Cedar Creek, and a new substation at Cedar Creek.

1.2 Qualifications

My name is Simon Beale. I have been employed by MWH New Zealand Limited (MWH) as a Senior Environmental Scientist since 1994. My qualifications are Bachelor of Science, majoring in Zoology and a Bachelor of Forestry Science. I have over twenty years professional experience working in New Zealand, Australia and the UK.

1.3 Scope of Report

This report is prepared under the provisions of Section 42A of the Resource Management Act 1991 (RMA).

In carrying out this review of the terrestrial ecology aspects of the MHP I have reviewed the following reports:

- Terrestrial Ecology Assessment
- Baseline Terrestrial Ecology Surveys
- 110 kV Transmission Line Constructability Report

I have also reviewed the draft consent conditions proposed by the applicant and taken into account issues raised by submitters in relation to the effects of the MHP on terrestrial ecosystems within the Mokihinui Gorge and along the transmission line route.

I flew over the Mokihinui Gorge and along the route of the transmission line on Tuesday 20 May 2008. I also inspected the dam site and surrounding riparian margins on foot the same day.

2.0 Submissions

Key issues raised by submitters in relation to the effects of the MHP on terrestrial ecology values of the Mokihinui Gorge and along the route of the transmission line are as follows:

- The creation of the reservoir will result in the loss of areas of significant ecological importance, including old growth forest
- Significant habitats for indigenous flora and fauna will be lost or altered, including habitat of at least 16 threatened species
- Ecological effects would be significant. No habitat offsets as proposed will compensate for habitat loss in the gorge.
- The reservoir will permanently alter the biodiversity within the immediate and surrounding areas
- The ecological effects cannot be mitigated. They will lead to irreversible damage
- The project presents uncertain consequences in the long term
- The gorge is an avian flight corridor; losing it would have a considerable detrimental impact on lowland birds
- The removal of trees from 92-102 metres a.s.l. will involve logging operations on very steep and often inaccessible slopes
- The transmission line traverses areas of very high ecological value, including important vegetation sequences and plant associations throughout its length
- The creation of the reservoir and transmission line will lead to a proliferation of weeds

3.0 Assessment of Effects

3.1 Introduction

The following discussion is a short commentary on the adequacy or otherwise of the assessment of the key ecological effects provided by Meridian. These effects relate to the loss of riparian and river terrace vegetation and wildlife habitat within the Mokihinui Gorge, the type of vegetation that can be expected to develop around a future reservoir and the effects of the proposed transmission line on forest vegetation and associated habitats along the route.

In terms of the assessment criteria set out under Policy 4.8.7.4 of the Buller District Plan for the purposes of Section 6 (c) of the Resource Management Act 1991, the MHP would in my opinion affect significant indigenous vegetation and significant habitats of indigenous fauna within the Mokihinui Gorge.

The MHP would affect vegetation that is highly natural, as noted by the applicant. In my opinion the vegetation of the gorge contributes significantly to the natural character of the Mokihinui River and its margins.

3.2 Reservoir Effects

3.2.1 Effects on Riparian Vegetation

The applicant notes that the floristically rich riparian vegetation associations would be reduced in area within the gorge, including tall trees and shrubland vegetation. It is acknowledged that some shrub species may die off due to periodic rises and falls in the reservoir level while some may survive (depending on slope and species tolerance).

The ecological assessment notes that various plant communities that are typically adapted to frequent and quite prolonged periods of submersion such as lacustrine wetland (turf) communities in addition to flood zone shrub vegetation which exists at present near the river would establish, with forest vegetation being retained above the flood zone.

I consider this to be a fair assessment with respect to the more moderately sloping areas that would adjoin the new reservoir.

However I am of the opinion that shrub or wetland (turf) communities would be unable to colonise the steeper slopes that would surround much of the reservoir. Following creation of the reservoir, I would expect that most of the vegetation and soils covering steep littoral and riparian margins lying between the minimum and maximum operating levels and immediately above the maximum operating level would be lost in a relatively short period of time due to the loss of slope stability coupled with the washing and erosive effects of wave action. These processes would create a steep surface dominated by rock and gravel substrates. Such surfaces would provide minimal protection to terrestrial plant life and I would expect a plant community that could adapt to these substrates and hydrological regime to be one dominated by bryophytes and adventive exotic species. It is quite possible though that turf communities along with some weed species and hardy indigenous woody species such as manuka and southern rata may establish in crevices towards the maximum operating level where organic material may remain or accumulate and where the effects of desiccation would be less pronounced.

3.2.2 Effects on River Terrace Vegetation and Wildlife Habitat

A large proportion of the low altitude mixed beech-podocarp forest that occupies the river terraces within the gorge would be lost. These forests contain large old podocarp and rata trees that provide seeds for forest regeneration and roost sites and seasonal food sources for threatened species of birds such as kereru, kaka and kakariki as well as provide suitable habitat for long-tailed bats and a diverse invertebrate community including threatened *Powelliphanta* spp. The applicant states that the loss of this forest habitat would result in more competition for remaining resources in the gorge and may cause displacement of some individuals while reducing breeding success. While the applicant notes that similar vegetation types occur throughout much of the northern part of the Buller District and upstream of the gorge such as across the river terraces in the Mokihinui basin, the effect of inundation of this forest and hence habitat loss at a local level would in my opinion be significant.

3.2.3 Management of the Reservoir Bed and Margins

I consider the retention of tree stumps and shrub vegetation around the reservoir margins to be an appropriate management measure as promoted by the applicant. However, the retention of the stumps and shrubs would in my opinion be effective only on the flat to gently sloping shorelines where the effects of erosion would be less pronounced and where the extent of soil loss is reduced. While I would expect die back of many of the shrub species around the shoreline margins, the retention of soil along these sections of shoreline would assist in the early development of a shrubland - wetland shoreline plant community exhibiting zonation patterns that reflect species tolerance to varying periods of submergence and emergence.

The retention of the stumps and shrub vegetation would also reduce the degree of weed infestation which is supported.

The proposed monitoring of the shoreline on an annual basis and subsequent control measures to reduce the extent of any exotic weed infestations is considered essential and supported.

3.3 Transmission Lines Effects

Construction of the transmission line could potentially involve the clearance of large areas of vegetation for pole construction, access roads and conductor clearance requirements resulting in loss of a variety of habitat for a number of threatened species as well as cause sediment generation, erosion and animal and plant pest (weed) invasion. A large proportion of the land the transmission line would cross has high ecological values such as the Radcliffe and Ngakawau Ecological Areas and the upper Waimangaroa - Mt William RAP (RAP1).

While the applicant provides an estimated area of indigenous vegetation to be selectively felled (Table 3.2 of the Terrestrial Ecology Assessment), it is difficult to understand how these estimations can be calculated to within 0.01 hectare when the exact position of the towers are unknown. Tower positions have a bearing on conductor sag and alignment of access roads which are important factors in determining extent of vegetation clearance. I note that no estimations are provided by the span between poles 23-28 where considerable clearances are envisaged.

The applicant provides only a cursory mention of the potential collision hazards the transmission lines poses to various bird species and in particular nocturnal species such as long-tailed cuckoo. While the route does not cross any known migratory routes, anecdotal evidence suggest that kereru are the most susceptible due to their lack of manoeuvrability compared to other birds. NZ Falcon are also an at risk species, particularly in situations where prey is being pursued in the vicinity of the line.

Overseas research indicates that the risk of collision is greatest where transmission lines pass through forested areas. However this risk reduces over time through acquired familiarity of the transmission line.

4.0 Assessment of Proposed Mitigation and Compensation Measures

4.1 Loss of Riparian and River Terrace Vegetation

It is acknowledged that the scope to mitigate against the loss of the riparian and river terrace vegetation and associated habitat is limited to measures that reduce the loss and/or disruptions to resident indigenous fauna. The applicant proposes to undertake construction related activities and flooding of the reservoir footprint to avoid breeding seasons (particularly those of the threatened species). I support this.

The provision of predator control measures in forested areas upstream of the gorge, as proposed, is considered to be a compensatory rather than a mitigation measure. These measures are in my opinion, the most effective means of compensating for the loss of high quality habitat within the Mokihinui Gorge, if consents are granted.

4.2 Transmission Line Effects

I support the mitigation measures proposed by the applicant (Section 3.7 of the Terrestrial Ecology Assessment) such as the use of taller poles in the Ngakawau Ecological Area.

However I consider that the applicant does not go far enough to avoid or minimise the effects of the transmission line on all areas of significant ecological value along the route. I therefore consider that it is appropriate that taller poles be constructed in the Ngakawau Gorge area to avoid the loss of an estimated 4.35 hectares of forest and within the Solid Energy Deed Area (RAP 1) between Stockton Plateau and the Cedar Creek substation. Taller poles should also be used where the route passes through forest vegetation (hill slope beech-podocarp forest) in the Charming Creek Block. Part of this section of line (spans 26-28) lies within the Radcliffe Ecological Area.

Installing taller poles where the route passes over taller vegetation avoids clearance of the forest vegetation and habitat of forest bird species and long tailed bats (beyond the pole platforms), avoids future vegetation maintenance activities to maintain the growth limit zone and reduces the risk of bird collision. Adverse effects arising from edge effects and potential weed invasion would be avoided as well.

The terrestrial ecology assessment does not address transmission line wiring operations and whether these operations would require clearance of forest and scrub vegetation along the route.

I support the installation of poles by helicopters in areas of significant ecological value, as proposed. Use of helicopters during construction avoids the need to establish access tracks across areas that have been previously unaffected by development activities. This includes that part of the Stockton Plateau that possesses significant ecological values and would be susceptible to erosion and weed invasion as a result of tracking activities.

5.0 Assessment of Proposed Draft Conditions

5.1 Pre-Construction

The *Powelliphanta* snail monitoring and investigation plan, Habitat Enhancement Programme, Kiwi listening survey and Terrestrial Ecology Management Plan (TEMP) are considered to be appropriate in light of the potential effects of the MHP and supported.

While I appreciate the matters to be included in the TEMP are by no means exhaustive, an important facet of the management plan will be the timing of the works, particularly to avoid disruptions to breeding seasons of threatened species as part of the adaptive approach to construction. In terms of the applicant's draft Condition 40(b)(iv) of the TEMP, I question the ability of the appointed contractors to be able to prevent the establishment of invasive exotic species around the reservoir considering the substantial area involved.

In terms of the re-construction studies concerning the transmission line I seek clarification from the applicant that the applicant's draft Condition 42(a) relates to those areas of high ecological significance that lie outside of the designated Radcliffe and Ngakawau Ecological Areas and the upper Waimangaroa - Mt William RAP.

5.2 Construction

I consider that the words "*where practicable*" in the applicant's draft Condition 53 need to be defined in an advice note to this condition to make the requirement of this condition concise and enforceable. This advice note should be a definitive statement specifying exactly which poles are to be instated by helicopter since this information is lacking in the application. A lack of certainty here implies that some access tracks may need to be constructed resulting in vegetation clearance not already accounted for.

A further condition should be included under Transmission that specifies where the taller poles are to be installed along the route.

I support draft conditions 82 and 84 concerning monitoring of the *Powelliphanta* snail species and the terrestrial ecology management plan.

5.3 Operational

By way of further comment to the discussion in Section 3.2.1, it is my opinion the minimum operating level of RL 97.0 metres as sought in draft Condition 100 will result in an extensive and steep sided riparian zone that will be relatively devoid of indigenous vascular plants. The affected zone would encompass a 3 metre operating range plus an area above the full supply level that would be affected by wave action.

I support draft conditions 114 and 115 concerning Predator Management and Habitat Enhancement and the Terrestrial Ecology Management Plan.

6.0 Conclusions

The terrestrial ecology assessment and supporting baseline survey reports are comprehensive and accurately document the terrestrial ecology and ecological values of the Mokihinui Gorge and land along the route of the proposed transmission line.

However the assessment is considered to be optimistic in terms of the riparian vegetation community that is predicted to re-establish around the reservoir shoreline. It is considered that the steepness of the terrain surrounding much of the shoreline and the effects of the operating regime proposed will create rocky and gravely substrates that will tend to be colonised by bryophyte dominated communities and adventive exotic species.

The retention of tree stumps and shrub vegetation along the shoreline is supported as a means of retaining as much soil as possible around the shoreline following inundation.

The assessment is light on detail in terms of the effects of the transmission line on the vegetation cover given that the position of the poles has yet to be finalised.

Use of taller poles and their installation by helicopters within all the areas of high ecological value along the route of the transmission line is advocated.

The mitigation and compensation measures, to the extent that they can be effective, are supported.

7.0 References

Bevanger, K. 1994: Bird Interactions with Utility Structures: Collision and Electrocution Causes and Mitigating Measures. IBIS 136: 412 - 425.

Bevanger, K. 1998: Biological and Conservation Aspects of Bird Mortality Caused by Electricity Power Lines: A Review. Biological Conservation 86: 67 - 76.

Johnson, P.N. 1991. Lake Monowai Shore Vegetation. Botanical Report. DSIR Land Resources, Dunedin.