

**MOKIHINUI HYDRO PROPOSAL
CONSENT APPLICATIONS
REVIEW OF ASSESSMENT OF EFFECTS ON AVIFAUNA**

JULY 2008

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1.0 Introduction

1.1 Background

This report provides a review of the assessment of environmental effects (AEE) provided by Meridian Energy Ltd (Meridian) in support of resource consent applications associated with the Mokihinui Hydro Proposal (MHP).

The Mokihinui Hydro Proposal 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.

This report will provide the decision-maker with information and advice related to the effects of the proposed activities on the avifauna in the Mokihinui gorge and proposed transmission line.

1.2 Qualifications

My name is Katrina Hale and I have been employed by Jolly Consultants Ltd as an Ornithologist since October 2007 on a sub-consultant contractual basis. My qualifications are: New Zealand Certificate in Science, majoring in biology/biochemistry at the Waikato Institute of Technology; Bachelor of Science and Doctor of Philosophy in Science, both majoring in Zoology and both obtained from the University of Canterbury. Since completing my PhD I have published five scientific papers in international journals. I have seven years professional experience as an ornithologist in New Zealand although my general experience with New Zealand birdlife is more than fifteen years. I specialise in New Zealand avifauna, with a focus on small population issues including immune function, disease, population translocation and population bottleneck issues, especially within New Zealand's native/endemic passerine populations.

The report has been reviewed by James Norman Jolly, the Director of Jolly Consulting Ltd. Mr Jolly has an M.Sc (Hons equiv.) in Zoology from the University of Canterbury and some 35 years of experience as a scientist in the Forest Research Institute, the NZ Wildlife Service/ DOC, and as an independent researcher, consultant, and writer. He has extensive experience working with New Zealand and overseas avifauna.

1.3 Scope of Report

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

To carry out this review of the consent application I have considered the relevant sections of the AEE submitted as part of the application, and the following technical appendices:

- Mokihinui Hydro Proposal Baseline Terrestrial Ecology Surveys
- The avifauna section of the Mokihinui Hydro Proposal Terrestrial Ecology Assessment for Concession Application
- S92 Review of Terrestrial Ecology Technical Reports and subsequent response by Meridian.

I have also taken into account issues raised by submitters in relation to the effects on avifauna.

In addition I carried out a site visit on the Wednesday 11th June 2008. This involved an overnight stay at the forks hut and walking out along the Mokihinui track the following day. It should be emphasised that June is not the ideal time of year to observe bird activity/abundance and that it is also difficult to assess presence/absence/abundance of birds in the area in a single day and within a restricted area (i.e. along the track) of the proposed site to be affected by the dam.

I have discussed the MHP with Miss Kate Steffens who has experience carrying out blue duck surveys and also Mr Paul Gasson who is involved with the Rotoiti Nature Recovery Project, both who are from the Department of Conservation, Nelson Lakes Area Office.

Mr Jolly has also discussed aspects of the MHP with Dr Murray Williams, a leading expert on blue duck.

2.0 Submissions

The following issues were raised by submitters in relation to the possible effects to avifauna by the proposed inundation of the Mokihinui Gorge and loss of habitat within that area, in particular:

- There is significant concern regarding the loss of habitat to birdlife including kereru, weka, kakariki, falcon, black shag, rifleman but particularly blue duck and great spotted kiwi;
- A number of submitters point out that the activities involved in the proposal are inconsistent with section 6(c) of the RMA;
- The scientific merit of the terrestrial ecology assessment has been questioned and the adequacy of the assessment of the effects on biodiversity.

- The loss of habitat is considered by many to outweigh any mitigation benefits from predator control.

3.0 Assessment of Effects

3.1 Introduction

I have reviewed the fauna sections of the material provided by the applicant noted in section 1.3, and have taken into account the mitigation proposed. Comments and discussion are set out below, with a focus on the following key issues:

- Loss of bird habitat, particularly blue duck (*Hymenolaimus malacorhynchos*) habitat and Great Spotted Kiwi (*Apteryx haastii*) habitat;
- The data used to assess blue duck numbers in the gorge;
- The Mokihinui Gorge as a dispersal pathway, particularly for blue duck;
- Lack of scientific evidence provided to substantiate suggestion on pages 35, 53 and 64 of the terrestrial ecology assessment, that the Mokihinui Gorge is “probably less than optimal physical habitat” for the blue duck and the implication made on page 102 of the AEE is that this therefore fulfils the requirement of section 6(c) of the RMA;
- Predator control as a means of mitigation;
- Translocation of blue duck as a means of mitigation;
- Possibility of disturbance on avifauna in general, but particularly on blue duck and kiwi, due to increased human activity in the area.

3.2 Review of Assessment of Effects

I have reviewed the avifaunal section of the assessment of effects on terrestrial ecology; the Assessment of Affects on the Environment; the concerns and issues raised by submissions; the ecological impacts of the proposed power scheme on the avifauna within the Mokihinui gorge and transmission line in particular impacts on the rare endemic blue duck, and have taken into account the mitigation proposed by Meridian. This is discussed below with a focus on the key issues.

3.2.1 Effect of Loss of bird habitat, particular reference to blue duck/whio and great spotted kiwi/roa.

3.2.1.1 The Mokihinui Hydro Proposal Terrestrial Ecology Assessment provides an analysis of the terrestrial ecology and ecological values of the Mokihinui Gorge and the transmission line route and provides an assessment of the ecological effects of the proposal. Specifically regarding birdlife the assessment focuses on the likely effects to birdlife from the loss of 301.4 ha of forest within the Mokihinui Gorge area and approximately 15 ha of forest along the proposed transmission line, and the inundation of a 14km stretch of the Mokihinui River. Particular reference is made to the critically endangered endemic blue duck.

- 3.2.1.2 The report identifies eleven threatened species of bird within the project footprint. These species include South Island fernbird, Western weka, tomtit, kereru, New Zealand falcon, kaka, kea, rifleman, kakariki, black shag, blue duck and great spotted kiwi. Two main issues are highlighted: first, reduction in habitat available for kereru, kaka and kakariki due to a reduction in the area of lowland forest in the gorge; second, the possible loss of five to seven blue ducks due to the effective loss of habitat.
- 3.2.1.3 The authors of the assessment undertaken for the applicant predict the effects of the Mokihinui Hydro Proposal will be minor for most bird species since the surrounding area of unaffected habitat will be large. The loss of 301.4 ha of habitat out of 68,000 ha of available similar habitat is described as less than minor in the Assessment of Ecological Effects. From my visit to the area it seems reasonable to suggest that outside of the breeding season highly mobile birdlife are unlikely to be, in the short-term, detrimentally affected by the proposed hydro scheme. However, a loss of lowland forest habitat in the area affected by the scheme should not be considered “minor” if not adequately mitigated or compensated for considering habitat loss continues to be one of the leading causes of bird decline in New Zealand.
- 3.2.1.4 The terrestrial ecology assessment report states that 5-7 blue duck are present within the project footprint and this was determined by three sources of visual sightings: a single-pass survey in April 2007 using trained dogs and casual observations from Marion Boatwright and rafting guide Joshua Marcotte. There are some inconsistencies and some confusion based around how the authors arrived to the final figure of seven. In the Baseline Terrestrial Ecology Surveys which supply a full account of the methodology used for the Terrestrial Ecology Assessment, it is stated on page 51 that the two birds Marion Boatwright observed at Johnny Cake Creek and the one further downstream are the same birds Joshua Marcotte observed 2.5 km further up the river “at or near” Rough and Tumble Creek. Blue duck, which are highly territorial birds, have a territory size of approximately 1 km of river (Williams, 1991). Therefore it seems unreasonable to assume the birds Marion Boatwright observed at Johnny Cake Creek are the same birds that Joshua Marcotte observed at Rough and Tumble Creek. Taking these facts into account would bring the minimum number of blue duck in the gorge to nine. It is recommended that at least one more thorough survey be carried out to provide more certainty as to how many blue duck are residing in the project footprint area. Miss Steffens (pers. comm. July 2008) commented that while surveys for blue duck can be carried out at any time of the year the best time for surveying blue duck is generally mid November to late December when surveyors are most likely to see evidence of successful breeding, i.e. ducklings. Ideally further blue duck surveys should be carried out prior to the hearing.

3.2.1.5 The report in a number of instances implies that the loss of blue duck in the gorge will be of little or no consequence as the duck population is likely to be in decline and is not sustainable due to predation and thus will probably disappear from the area anyway. While it is reasonable to assume the population is likely to be under considerable pressure from mammalian predators given the impact of predators on other blue duck populations within close proximity (e.g. Oparara River) (Gerizlehner, 2006), there is no data from the terrestrial ecology assessment that enables this conclusion to be drawn for the blue duck population in the Mokihinui Gorge. Without monitoring the breeding success and survival of blue duck in the gorge it can only be speculative whether or not the population is declining, stable or increasing. Further research on this population would be required in order to be able to make such judgements. However, Dr Williams (pers. comm. July 2008), commented that one way to check the status of the blue duck population would be to assess sex ratio. Predation tends to be more severe on females as they are vulnerable on the nest. Thus lingering solo males would be a very good indicator of decline.

The report specifically states on page 35 and 53 it *[The Mokihinui Gorge] is probably less than optimal physical habitat because of flooding risk and mobile sediments from landslides that affect roosting sites and the aquatic larval food supply. It seems likely that blue ducks are adapted to the habitat characteristics of the gorge through switching their habitat use to tributaries when the main river is carrying elevated flows and sediment levels*". There is no data in the terrestrial ecology assessment or any published research on the Mokihinui Gorge that I am aware of to support the statement that the Mokihinui Gorge habitat is less than optimal for blue duck. Floods and temporarily elevated sediment flows are typical of blue duck habitat in general. Dr Murray Williams (pers. comm. July 2008) commented that blue duck are well adapted to those conditions and move to small tributaries and return to their territory in the main river when it clears.

The estimated seven ducks in the gorge (but possibly nine or more) does not suggest "less than optimal habitat". The Department of Conservation Blue Duck Recovery report states "Blue ducks are river specialists confined to headwater catchments of rivers over parts of the North and South Islands, its presence in these sites should not be regarded as an indication of habitat preference. Rather it should be viewed as the result of a restriction to generally unmodified environments whose relative quality as blue duck habitat is yet to be determined" (Adams *et al.*, 1997). In other words, there is currently a lack of knowledge as to what optimal blue duck habitat is, or if any such habitat remains. Furthermore, studies have shown that aquatic food supply may not be as critical to survival as initially thought and that the birds are capable of taking advantage of other temporally abundant food resources such as fruits from riparian vegetation (Collier *et al.* 1993; Harding, 1990). The fact that at least seven blue duck are present on this section of the river suggests the habitat is able to support blue duck. I consider that the applicant has not provided sufficient evidence to be able to suggest with any certainty that the Mokihinui Gorge is any less suitable for blue duck than other wilderness rivers. Further studies are required to more fully understand habitat selection by blue duck. Until then the statement that the habitat is less than optimal, when blue duck in fact exist in that habitat, remains speculative.

- 3.2.1.6 The MHP AEE reports on page 66 that the great spotted kiwi is considered to be in gradual decline in the Department of Conservation review of the status of threatened species. This is correct, although in Mr Jolly's expert opinion (pers.comm. July 2008) the (threatened) status should be serious decline status. It should be remembered that the Buller District along with North-West Nelson, the Paparoa Range and a small area surrounding Arthurs Pass are all that remains of a much wider historic distribution of great spotted kiwi throughout the West Coast. Such an iconic threatened species should have been given priority attention in the AEE along with blue duck and *Powelliphanta* snails.

The results of the terrestrial ecology report do not however, indicate a significant population within the area of the Meridian Hydro Proposal (one bird recorded). The survey itself appears to be adequate with nine listening points and one transect, although the assessment did not specify how much time was spent listening at each of those listening stations or whether the listening stations were established well away from river noise which is essential for adequate coverage of the surrounding area. In addition, great spotted kiwi probe holes were apparently not found on any of the snail transect lines. These probe holes can also give an indication of kiwi abundance provided they are correctly identified and recorded.

Low numbers of great spotted kiwi in the lower reaches of rivers, as reported by the applicant in the Mokihinui, but high numbers in the headwaters is typical of the current distribution of this species (J. Jolly, pers. comm. July, 2008). If the numbers are as low as the terrestrial assessment suggests, then I would consider that there would be a less than minor adverse affect on great spotted kiwi from the Mokihinui Hydro Proposal itself. However, I would recommend further kiwi surveys in the upper reaches of the Mokihinui and its branches. The best time for surveys, as pointed out on page 20 of the terrestrial ecology assessment, is between November and March. Ideally, further surveys should be carried out prior to the hearing taking place.

3.2.2 Mitigation of loss of habitat and blue duck, great spotted kiwi and other indigenous bird species

Possible mitigation measures to minimise or offset the impact resulting from the loss of habitat and the habitat-dependent blue duck and other endangered and indigenous bird species include:

- initiating a predator control programme in adjoining waterways with blue duck populations and adjacent areas known to contain significant populations of other threatened species;
- financial support for blue duck recovery in the wider area;
- carrying out construction activities (catchment clearance, lake inundation, transmission line clearance) outside the breeding season of bird species;
- translocation of blue duck from the proposed reservoir to a suitable new habitat (Mokihinui South Branch suggested).

3.2.2.1 As stated in the report, predator control would be of significant benefit to all bird populations in the larger Mokihinui area, including blue duck and great spotted kiwi **if** it is carried out correctly. Predator control has been shown to successfully enhance avian bird populations both on offshore islands and on the mainland. For example, four years of monitoring in the Rotoiti Nature Recovery Project suggests that a high proportion of great spotted kiwi chicks can be expected to reach sub-adult weights without being predated when stoat control is effective in suppressing stoats to below a 5% tracking tunnel index (P. Gasson, pers. Comm. July, 2008) However, the design and implementation of the predator control programme is paramount for it to be successful and beneficial to indigenous fauna. A detailed predator control plan has not been adequately outlined by the applicant. The AEE merely states that “an integrated predator control programme for blue duck and snail (*P. I. unicolorata*) habitat at the Mokihinui South Branch will be undertaken by Meridian to mitigate the effect of habitat loss in the project foot print”. I suggest that a detailed predator control plan be supplied to the Hearings Panel for their consideration and a plan, approved by the Consenting Authority should be a condition of the consent.

3.2.2.2 Following on from 3.2.2.1, in reviewing the Schedule. A draft consent conditions, provision should be made for the Department of Conservation to review any Habitat Enhancement Programme prior to submission to the Consent Authority.

- 3.2.2.3 The Applicant suggests financial support for blue duck in the “wider area”. “Wider area” needs to be described in more detail.
- 3.2.2.4 Financial support towards blue duck recovery by the Applicant could be extended also by setting up a grant specifically for blue duck research. Such research is required to help identify the factors critical to blue duck survival and reproduction.
- 3.2.2.5 It is reasonable to suggest that carrying out construction activities outside the breeding season of all 11 endangered bird species will help minimise impacts on (at least in terms of breeding behaviour) of these bird species.
- 3.2.2.6 Dr. Williams commented (pers. comm. July 2008) that translocation of adult blue duck has only been tried once (Manganui A_Te Ao R. to Mt Egmont) and was a failure with some birds returning to home territory over 100 kilometers away and others presumably perishing. Translocations have only been successful with captive reared juvenile birds into known suitable habitat (as to Mt Egmont and into Pearce and Rolling Rivers in Kahurangi Park). There is no experience with island transfers as an alternative option because there are no suitable island habitats presently available, although a restored Resolution Island has been touted as a possibility for a very few birds. Dr. Williams also stated that the site tenacity of adult birds means translocation is unlikely to be successful.. A further option of removal to captivity is of doubtful benefit as the reproductive success of adults brought into captivity has been very poor. Removal of birds from the Gorge also risks a fragmentation effect on the remaining population through reduced number of breeding pairs and reduced potential recruitment and/or social cohesion. In other words, translocation as a means of mitigation is unlikely to be effective.

3.2.3 Effect of Increased human activity in the area

The applicant suggests that with the creation of a hydro lake, the existing track will be upgraded and there will be increased access to the gorge and back country. This new access will enable more people to use the area and enable more activities in the area. While the area has a potential to be an educational tool, an influx of people and activities in the area may also pose a further serious threat to the birdlife if not properly managed. Indeed, human disturbance is identified as a third major contributor (alongside habitat loss and introduced predators) to the decline in bird populations. Such an effect has not been considered in the terrestrial ecology assessment. There are five main areas of concern related to an increased usage of the area:

- The increased risk of introduction of Didymo to the surrounding rivers (particularly the North and South branches of the Mokihinui);
- Increased number of boats and people on the lake and around the lake may hinder blue duck dispersal;
- Potential increased activity due to track upgrades and new tracks such as the proposed “Old Ghost Road” along the south branch;
- Easier access to the North and South branches of the Mokihinui;
- More dogs in the area as a result of increased access and activity.

3.2.3.1 An as yet unquantified threat to blue duck, great spotted kiwi and possibly other birdlife in the area that could be brought about by the proposed hydro scheme is an increase in human disturbance above existing levels (Adams *et al.* 1997) and over a wider area. Direct impacts from humans include white water recreational activities (particularly an issue with blue duck), including jet-boating, rafting and kayaking; disturbance by dogs (particularly an issue with kiwi) and deliberate and accidental shooting. There is evidence to suggest that disturbance by these means during the breeding season can lead to fragmentation of broods of blue duck and loss of young (Adams *et al.* 1997). These impacts may be particularly an issue when the ducks are breeding or moulting through disturbance on the nest, disturbance of broods of ducklings, or disturbance during the adults' flightless moulting period. Thus while white-water rafting would cease to occur in the gorge and blue duck are unlikely to persist on the hydro lake, it is presumed that with increased access to the North and South branches of the Mokihinui River there will be both a greater amount and greater variety of activities around and within these rivers. Furthermore, proposed track upgrades and possible creation of a new track(s) along Mokihinui River and its branches, such as the "Old Ghost Road" along the South Branch (where it is proposed to build up blue duck numbers as a part of mitigating the loss of blue duck in the gorge), will enable trampers, mountain-bikers etc to access the area with greater ease. This could result in a further increase in traffic in these areas.

3.2.3.2 Dogs are a major threat to adult kiwi and are known to cause significant decline in kiwi populations (Tarbosky, 1988; Robertson, 2003). An increase in dog numbers in the Mokihinui area would pose a significant threat to any kiwi in the area.

3.2.3.3 With increased human traffic, particularly boats and fishing, comes an increased risk of introducing didymo to the Mokihinui River. Such an introduction would be of significant detriment to the blue duck populations in the area as it would lead to a rapid and marked reduction in water quality which appears to be a significant requirement of blue duck (Adams *et al.*, 1997; Collier *et al.* 1993).

3.2.4 Mitigation of increased human activity

It is anticipated that it would be impossible to apply year-round restrictions to the Mokihinui River area, thus it is suggested that access be restricted to some areas during the blue duck breeding season. Closing access onto the south branch of the Mokihinui River should be considered and would minimise disturbance to blue duck.. Restrictions should be placed on dogs entering the area. The risk of the introduction of Didymo may be very high with the increased human activity anticipated in the area. It will be very difficult to implement any form of strict screening system to manage this effectively. It will be necessary for the applicant to discuss with relevant land administrators or owners how to adequately reduce the potential effects of the issues raised with regards to increased human/dog activity in the area which, if the proposal is to go ahead, is foreseen to increase beyond existing levels.

3.3 Key Assumptions

My key assumptions are:

- That the area of predator control will be greater than 301.4 ha and that the applicant will develop an appropriate predator control plan that meets the requirements of the Consenting Authority.
- That the south branch of the Mokihinui River is suitable for sustaining larger numbers of blue duck;

4.0 Conclusion

The following conclusions and recommendations can be drawn from this report.

Translocation is not a feasible mitigation option for the blue duck. The loss of part of Mokihinui blue duck population through elimination of the birds in the gorge could produce unmeasured adverse effects due to a fragmentation effect on the remaining population and through reduced number of breeding pairs and reduced potential recruitment and/or social cohesion.

If successful, a predator control plan could improve the survival rate of remaining blue duck populations and be of benefit to great spotted kiwi and other indigenous bird species in the larger Mokihinui area. However, such a predator control program would need to be well planned and implemented, cover a large enough area and it would need to be permanent and would require staff for the ongoing maintenance and running of the program.

It is not possible at this stage to determine if a predator control program would achieve a net positive conservation result which over-rides the loss of habitat and the loss of the Mokihinui Gorge blue duck population, and the potential loss of great spotted kiwi and individuals/populations of other indigenous bird species. My recommendation is for the further work I have suggested, such as further bird surveys of the gorge (blue duck) and surrounding areas (great spotted kiwi) and preparation of a predator control plan which is reviewed and approved by the Department of Conservation. Whether or not the Mokihinui Gorge blue duck population is in decline remains an open question which, ideally should be satisfied by researching the breeding success and survival rate of the population over a longer period (three to five years) prior to the proposed hydro scheme taking place.

5.0 References

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