

**IN THE MATTER** of the Resource  
Management Act  
1991

AND

**IN THE MATTER** of the submissions  
by **GENESIS  
POWER LIMITED**  
on the Horizons  
Regional Plan:  
One Plan -  
Biodiversity

---

**STATEMENT OF EVIDENCE OF CAMPBELL SPEEDY**

**31 July 2008**

---

## 1. INTRODUCTION

### Qualifications and Experience

- 1.1 I hold the qualification of Bachelor of Science specialising in Ecology.
- 1.2 I am employed by Genesis Power Limited ("**Genesis Energy**") and hold the position of Environmental Coordinator – Renewable Energy. I am responsible for environmental monitoring, technical biological investigations and related stakeholder liaison across Genesis Energy's renewable energy assets, including: Tongariro, Waikaremoana and Kourarau hydro-power schemes and the Hau Nui Wind Farm. I have held this position since December 2006.
- 1.3 Previously, I held the position of Operations Manager for Epro Ltd, a private wildlife management company based in Taupo. This role included providing a range of specialised wildlife management and research services to clients such as the Animal Health Board, Regional Councils, Department of Conservation, Forestry Companies, Private land owners and various Maori and other private trusts in such areas as pest control, island pest eradications, game management, ecological restoration and biodiversity management. I held this position from October 2002 to November 2006.
- 1.4 Before working for Epro Ltd I held the position of Biodiversity Supervisor for the Department of Conservation ("**DoC**") at Turangi for approximately 15 years. During this time I managed up to seven technical staff coordinating biodiversity management on public conservation land within the Tongariro Taupo Conservancy including strategic planning and project management of extensive weed, pest and threatened species management programmes. The role also included being part of the multidisciplinary DoC team working with Genesis Energy on the consenting of the Tongariro Power Scheme ("**TPS**") between 1992 and 2002. I was a member of the National Blue Duck Recovery Group from 1988 to 2002; the National Kiwi Recovery Group from 1991 to 2002; and DoC's National Pesticide Advisory Group from 2001 to 2004.

- 1.5 I have published over 100 feature magazine articles and scientific papers on various wildlife management and hunting issues since 1994, including international papers on Pest Eradication and Restoration Ecology.

### **Scope**

- 1.6 The purpose of my statement of evidence is to inform the Hearing Committee on biodiversity issues associated with the TPS and the effects that the scheme has had on specific biodiversity values. Mr Matthews will outline specific biodiversity issues relating to the One Plan and proposed amendments supported by Genesis Energy.

- 1.7 In my evidence I will:

- Provide a general overview of how the development of the TPS has effected biodiversity values within the catchments of the scheme that fall within the Horizons Region, particularly in relation to lakes and wetlands, and rare and threatened species; and
- Describe how the development of the TPS, and implementation of new resource consents in 2004, together with associated third party agreements, have contributed to the maintenance or enhancement of specific, high value biodiversity assets within the TPS sections within the Horizons Region.

## **2. OVERVIEW OF BIODIVERSITY VALUES AND THE TPS**

- 2.1 Mr Bowler, Environmental Manager for Renewable Energy at Genesis Energy, has already described for you the layout and operation of the TPS in his earlier evidence to the Panel on the Overall One Plan. His evidence has provided an overview of what is a complex scheme, set within a valued landscape – a landscape that includes important biodiversity values, including lakes and wetlands, pristine river systems, and rare and threatened species.

- 2.2 The re-consenting process as described by Mr Bowler, identified bio-diversity values and issues associated with the ongoing operation of the TPS, in each case these issues were assessed and generally outcomes agreed as how impacts of the scheme could be avoided, remedied or mitigated. As described by Mr Bowler these outcomes were implemented by way of resource consent conditions (for example minimum flows, flushing flows and monitoring programmes) and/or third party agreements.
- 2.3 It is important that the One Plan provide for and enable flexibility as to how bio-diversity values are to be maintained and/or enhanced through its policies and rules. Genesis Energy submits that avoidance does not always provide for the best bio-diversity outcome, as I will describe below.
- 2.4 It is also important to acknowledge that developments by their very nature can create habitats that create and/or enhance bio-diversity values. It is however, very important to acknowledge that the primary reason for these developments should not become constrained because of these values, rather such developments should be supported or enabled through the One Plan.

### **3. DUTIES TO AVOID, REMEDY OR MITIGATE EFFECTS**

- 3.1 Biodiversity values are associated with the rivers and streams that form part of the TPS. Being in the upper, more pristine parts of their catchments, these water bodies generally have high water quality that provides habitat for a range of invertebrate, fish and bird species – some of which are classified as rare and threatened species. Diversion of water has had a variety of effects on rare and threatened habitats and species within the TPS and Genesis Energy has duties under the RMA to avoid, remedy, or mitigate these effects.
- 3.2 Horizons via the One Plan, have made a number of references through the One Plan to “avoidance” of adverse effects, as described by Mr Matthews at the Overall One Plan hearing. Through the process to renew resource consents for the ongoing operation of the TPS, Genesis Energy worked with a wide range of stakeholders to develop mitigation outcomes that would not have been possible if “avoidance” was the only option.

- 3.3 By way of an example one of the key biodiversity issues throughout the TPS, but particularly on Western Diversion Rivers, is the nationally endangered endemic blue duck or “whio”. Having an ecological niche at the upper end of the food-chain, blue duck are an important indicator species for the overall health of waterways. They require high water quality, rich stone dwelling invertebrate fauna and intact riparian habitat to thrive.
- 3.4 The blue duck population present within the Western Diversion catchments of the TPS is one of the most important populations in the country in that it is one of the few sites where there are at least 50 interacting breeding pairs.
- 3.5 Outcomes of the consenting of the TPS in 2004 have included new minimum flows on the Mangatepopo and Whanganui Rivers, maintaining existing minimum flows on the Whakapapa and Whanganui River at Te Maire, an extensive monitoring programme and the establishment of the Central North Island Blue Duck Charitable Trust (“**BDT**”). These outcomes have contributed to the almost doubling of the resident blue duck population since 1998 – from 30 to 56 breeding pairs on the monitored river main stems downstream of the intake structures. There are also further breeding pairs upstream of the intakes and on major, unmonitored tributaries. Moreover, this population was able to produce at least 128 chicks during the 2007/08 breeding season (Oates, 2008)<sup>1</sup>.
- 3.6 Although the minimum flows have created some additional habitat for blue duck, it is important to note that other initiatives, such as predator control, have been equally important to the success of this programme. Without the establishment of the BDT, it is arguable whether the results seen to date would have been able to be achieved given that the predator control programme would have taken longer to become established and would not have been anywhere near as comprehensive.
- 3.7 I have used this example to illustrate that if “avoidance” was the only option available, sure there may have been more water flowing down these streams

---

<sup>1</sup> Oates, K. E. 2008 Blue Duck Monitoring Western Diversion Streams, Tongariro Power Scheme. Independent Study Report # 10325. Enviro Research Ltd, Ohakune.

creating more habitat for blue duck, however, it is highly probable that numbers would have remained low as the ducks were being actively predated upon. Hence there would not have been anywhere near the net gain for blue duck, or biodiversity values in general, which have occurred through the “mitigation” programmes implemented as part of the TPS consenting process.

#### **4. PROVISION FOR THE POSITIVE EFFECTS OF DEVELOPMENT**

4.1 Wetlands and lakes are a corollary of most hydro generation systems – lakes result from water impoundment and, generally, there are associated wetlands at their margins. The TPS is no different.

4.2 Three lake/wetland systems have been ‘created’ (at least in terms of their current size) within the Horizons Region as part of the TPS: Lake Moawhango on the Eastern Diversion and Lakes Te Whaiiau and Otamangakau on the Western Diversion. I note that these man-made habitats are identified as ‘rare and threatened’ in the One Plan.

4.3 Levels in the lakes formed as part of the TPS fluctuate as part of the normal operation of the scheme and flexibility is needed to operate in a manner that maximises the TPS’s value to the national electricity grid. The operating regimes on these lakes were reaffirmed through the re-consenting process as described by Mr Bowler

##### **Lakes Te Whaiiau and Otamangakau**

4.4 Lakes Te Whaiiau and Otamangakau were formed by the damming of the Te Whaiiau and Otamangakau Streams, respectively, in the mid to late 1960’s. The two lakes linked by a short canal. The lakes are used to convey water diverted by the Western Diversion across into Lake Rotoaira and provide short term storage, which enables water to be stored for hours or days to allow generation patterns that better match electricity demand. Lake Te Whaiiau also acts as a sediment trap for water entering Lake Otamangakau and is routinely dredged to maintain its operating capacity.

- 4.5 The development of the lake and wetland habitats associated with lakes Te Whaiiau and Otamangakau have added significantly – in excess of 500 hectares - to the size and quality of this habitat in the Rotoaira basin. These lakes are home to a wide variety of habitat types and associated wildlife and host an outstanding trophy trout fishery.
- 4.6 Genesis Energy currently operates these systems in a way that not only utilises their resource value for renewable energy generation but also helps provide for the biodiversity values present. Examples include:
- water level manipulation to maximise fisheries and angling values;
  - water flow regimes that optimise water quality (oxygen and temperature);
  - water level manipulation for aquatic weed control;
  - water level manipulation to maximise waterfowl and duck shooting values;
  - Screen mechanisms to avoid transfer of aquatic life, particularly eels and brown trout, to other aquatic habitats where these species do not currently exist; and
  - the development of Standard Operating Procedures, within the Company's Environmental Management System, to reduce the risks of aquatic weed transfer of species such as Hornwort, *Lagarosiphon* and Didymo.

### **Lake Moawhango**

- 4.7 The TPS is largely a run-of-the-river scheme, that is water is used when it is available to generate electricity, and there is limited ability to store water for significant periods throughout most of the scheme. The one exception is Lake Moawhango, which has a 15.2 metre operating range, Lake Moawhango is used to store water on a seasonal and annual basis, and is of national significance from an electricity generation perspective. This water is used to generate electricity when other sources are at a minimum, usually during the summer months.
- 4.8 The construction of the Moawhango Dam has affected biodiversity values, to a lesser degree in the area impounded by the lake, and to a much greater

degree the Moawhango River downstream of the dam. The downstream effects have primarily been the result of reduced flows and flow variability increasing periphyton growth and the accumulation of fine sediments on the bed of the river, thereby changing the invertebrate communities from stone dwelling species such as stonefly, mayfly and caddisfly to mat dwelling species such as chironomids, beetles and worms, with downstream impacts on those species that rely on these types of invertebrates as a food source.

4.9 The new flow regimes established by the consenting of the TPS in 2004 have included new minimum flows and summer flushing flows and/or natural fresh augmentation. These regimes have dramatically improved in-stream conditions within the Moawhango River downstream of the dam with flow on effects to biodiversity values (Kelly, 2006<sup>2</sup>; Arscott, 2008<sup>3</sup>).

4.10 Lake Moawhango is not high quality habitat, largely due to the operation of the lake for its primary purpose as water storage reservoir. The large fluctuations of lake level on an annual basis are not conducive to producing high quality aquatic habitat, although aquatic flora and fauna are present within the lake. The lake operating range and the flexibility to operate within this range is paramount for the effective and efficient operation of the TPS to be able to supply water when it is most needed to meet electricity demand.

### **Summary of TPS Development in terms of Lakes**

4.11 It is important to recognise through the One Plan that the creation of lakes and wetlands can have significant benefits for biodiversity. It is also equally important that the reason for developing these assets should not become compromised by managing assets to meet biodiversity requirements, rather that any biodiversity enhancements should be recognised as a positive effect of the development.

---

<sup>2</sup> Kelly, D., Jordan, M., Crocker, B., 2006 Tongariro integrated monitoring programme: Summary of Results for 2005-06 Prepared for Genesis Energy Ltd. NIWA Client Report: CHC2006-108, July 2006, NIWA Project: GPL06501

<sup>3</sup> Arscott, D.B. 2008. Tongariro Power Scheme River Monitoring Programme: Summary of Results (2007-08). Prepared for Genesis Energy Ltd. NIWA Client Report: CHC2008, June 2008, NIWA Project: GPL07501.



## **5. CONCLUSION**

- 5.1 Horizons has proposed rules within the One Plan seeking to protect the biodiversity values associated with rare and threatened habitats, including lakes and wetlands, as well as rare and threatened species, which are part of or occur within the TPS.
- 5.2 The operation of the TPS by Genesis Energy has an effect on biodiversity values. These effects have been both positive in terms of creating increased wetland and lake habitat, and potentially negative in terms of in-stream structures and water diversion from rivers and streams.
- 5.3 Through a range of careful planning; infrastructure placement and design; minimum flow and flushing flow conditions required by operational resource consents; and through third party agreements and/or dialogue with stakeholders; Genesis Energy has been able to significantly enhance or at least maintain most biodiversity values for both the lakes and wetlands, and rare and threatened species that occur within the catchments of the TPS.
- 5.4 Genesis Energy, through these processes, has managed, in my view, to carefully balance the use of a sustainable energy resource with important biodiversity values, within a valued New Zealand landscape.
- 5.5 I consider that it is, therefore, extremely important that the One Plan process does not compromise the substantial efforts already made to achieve this careful balance, in Council's efforts to protect biodiversity values within the Horizons Region.
- 5.6 Mr Matthews will detail specific biodiversity planning issues relating to, and changes sought in respect of, the Proposed One Plan.