

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of a suite of applications for resource consent by the Ashburton Community Water Trust

FOR resource consent to construct, operate and maintain an intake, settling pond, fish bypass, canals, tailraces and associated infrastructure to enable the take, divert, use and discharge of up to 42 cubic metres of water per second from the Rakaia River via the Ashburton Community Water Trust intake at Happy Valley, and to use it for hydro-electricity generation and associated purposes.

Resource Consent Application No's:

Ashburton District Council: - LUC07/0030

Environment Canterbury: - CRC072637,
CRC072636, CRC073863, CRC072638,
CRC072639, CRC072640, CRC072641,
CRC072642, CRC073862, CRC073864,
CRC072643, CRC072644, CRC072645,
CRC072646, CRC072647, CRC072648,
CRC072649

STATEMENT OF EVIDENCE OF Dr. KATRINA HALE
PREPARED FOR THE ASHBURTON COMMUNITY WATER TRUST

1. QUALIFICATIONS AND EXPERIENCE

1.1 My name is Dr Katrina Hale. I am employed as a consultant with Jolly Consulting Ltd, and have been engaged by the applicant to provide an expert opinion of the effects of the proposed Ashburton Community Water Trust (ACWT) scheme on the birdlife of the Rakaia River. I hold a 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 approximately seven years professional experience working with birds 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..

1.2 The evidence I will present today is within my area of expertise, except where I state that I am relying on information provided by another party. I have not knowingly omitted facts or information that might alter or detract from the opinions I express. I have read and understood the Environment Court's Code of Conduct for Expert Witnesses, and have complied with it in the preparation of my evidence.

2. SCOPE OF EVIDENCE

2.1 My evidence is presented on behalf of the Ashburton Community Water Trust (ACWT) in their application to Environment Canterbury (ECan) and the Ashburton District Council (ADC) to construct, operate and maintain a run-of-the-river hydro-electricity generation scheme using water from the Rakaia River.

2.2 My evidence will review the values of the existing environment, consider the actual and potential effects of the scheme on those values, and suggest some mitigation measures that would be appropriate. I will also comment on the relevant conditions of consent attached to the Planning evidence of Mr Dunning.

2.3 In presenting my evidence, I will:

- Consider the wider avifauna values of the Rakaia River and surrounds, and the methods used to assess the potential effects on birdlife within the scheme footprint;
- Describe the interaction of the scheme with the riverbed and the related bird habitat;
- Assess the overall effects of the scheme on the bird habitat values of the area, in the context of construction effects and operational effects; and

- Comment on submissions received by ECan and the ADC following public notification.

2.4 The opinions I express in my evidence stem from a site visit carried out in June 2008, and my understanding of the birdlife known to inhabit the type of environment within which the scheme is proposed. The site visit consisted of a one-day validation of the ornithological environment within the scheme alignment and in the Rakaia Riverbed and margins in proximity to the scheme. While the site visit was undertaken outside the bird nesting season, I was able to infer from my observations and my understanding of the environment the type of habitats and therefore the species most likely to be affected by the scheme.

2.5 These observations led to a desk top and anecdotal study to provide an accurately identify the bird life known to reside in the general area. Best practice directs that a full bird survey would be undertaken to identify the species in residence, observe bird nesting and feeding behaviour between September and January, and measure river flows in channels that would be affected by the scheme. While ideally my conclusions would be based on best practice over a longer period of field observations, I am confident that my understanding of the nature of the environment, the type and nature of species present, and the degree to which they would be affected can be accurately inferred from my observations. My conclusions are based on my own experience of braided river environments, existing literature on the Rakaia River, and previous surveys and research on the river.

3. SUMMARY OF THE PROPOSAL

3.1 The details of the proposal have been provided in the application documents, the Council Officer's reports, and in additional evidence presented to the Commissioners. Accordingly, I will not go into further detail in describing the scheme, but will focus on the key points where the scheme interfaces with the riverbed and margins, and other locations where bird life may be adversely affected.

3.2 The key areas of interest are:

- The river intake structure and associated upstream riverbed:

I understand the intake structure would be recessed into the riverbank where the existing river channel has been historically stable. In-stream works would largely be limited to temporary construction works, and intermittent maintenance works. Upstream works would be infrequent, and primarily consist of gravel bund construction to direct flows toward the intake as required, and maintenance following flood events. I note that such works are already consented in relation to the EA/BCI proposal, and that other than the size of the intake, are substantially similar to works proposed under the ACWT.

- The settling pond sediment disposal area on the river flat:

I understand that approximately once per year, sediment excavated from the settling pond may be placed on the designated area of the river flat for disposal during flood events. I also understand that the applicant may seek consent to dispose of the sediment using a sluicing system such as that consented to EA/BCI under CRC990089.
- The interface of the scheme and river at the Highbank formed tailrace discharge:

The existing relationship of the Highbank tailrace and tailwater would change under the proposed scheme.
- The area affected by the construction and footprint of the Terrace canal:

The canal would be formed primarily from an embankment extending from the southeast end of the Highbank formed tailrace, crossing the river flat and climbing the primary terrace to the Canterbury Plains on the terrace top, shortly before terminating at the Barrhill Power Station head pond.
- The Barrhill Power Station and tailrace:

The Terrace Canal would provide water for hydro-generation to the Barrhill Power Station at the base of the primary terrace in an area currently dominated by scrubland, and of low habitat value to birds in comparison to the open river flats. The tailrace would be formed across a low river terrace to an active braid of the river, crossing some areas of low scrub and open river flats of some habitat value.
- The area of the proposed Barrhill Power Station that would be affected by the construction, maintenance and operation of the station, and the discharge of scheme water to the river.

4. OVERVIEW OF BIRD AND HABITAT VALUES

- 4.1 The Rakaia River is rated as a Significant Site of Wildlife Interest (SSWI) with ‘outstanding’ habitat for characteristic braided river bird species. The wide braided riverbeds of the Rakaia River provide important breeding habitat for many bird species in particular four threatened species, the wrybill, black-fronted tern, banded dotterel and black-billed gull. The black-fronted tern and wrybill in particular rely on these braided river beds for breeding and have been previously observed to occur in relatively high numbers on the Rakaia River.
- 4.2 While much of the scheme lies within land under agricultural use, the river bank habitat within the footprint of the proposed scheme is largely inundated with exotic plant species such as gorse, broom and Russell lupin. The river bed itself also has extensive portions where it is covered in broom, except at the proposed intake and sediment disposal area where there are large areas free of vegetation.

4.3 Typical birds that occupy the environment subject to the proposed scheme are described as those occurring on the riverbed itself, the wetted margins and the river bank above the wetted margins. These are listed in Appendix A. This list is intended as a guide to which species are most likely to occur on the river and its surrounds and have been observed and counted in previous surveys. Other species that are not on this list are not necessarily ruled out, and may be seasonally present on the Rakaia.

5. POTENTIAL EFFECTS OF THE SCHEME ON AVIFAUNA

Construction Effects

5.1 There are four threatened bird species that rely on the gravel expanses of braided rivers and are known to breed on the Rakaia between (but not limited to) the period of August to January inclusive. The black fronted tern, wrybill, banded dotterel and black-billed gull rely on un-vegetated flat gravel expanses to breed on and associated stable side channels and seeps in which to feed (Woolmore & Sanders, 2005). The potential issues in relation to the abstraction of water include the loss of channels or reduction of channel flow which would therefore reduce the feeding habitat. The reduction in channel flow can also facilitate predator access and disrupt stream invertebrate dynamics. Issues may arise due to the reduction in quality of habitat of food species by, for example siltation, so care would need to be exercised to avoid this. Most importantly however is the potential for riverbed works to disturb birds during nesting.

5.2 In general I do not anticipate any significant adverse effects from construction activities on birdlife on the river bed or margins. This is largely because, as I understand it, the majority of activities would be off-river, mostly minor and temporary and the proposed canal alignment would not cross active riverbed substrates which wrybill and black-fronted terns are known to rely on for nesting.

I consider the specific scheme components as follows:

- Happy Valley Intake structure and Settling Pond

5.3 The Happy Valley intake structure would be constructed on the edge of the river. Some in-river works in the approach channel are likely to be required to isolate the construction area from the river.

5.4 The habitat around the intake largely consists of pines, exotic grasses, blackberry and various weed species. I consider this vegetation to be of low habitat value to the indigenous birdlife in the area.

The narrow band of vegetation forms a border along extensive farmland. Fantails were noted within the area at the time of the site visit. Threatened river specialist bird species are most likely to breed on active portions of the river near the construction area since it is largely free of exotic vegetation. Noise from construction activities and vehicles, and also vehicle movement in the area would be expected to disturb bird-life if construction is carried out during the breeding season (primarily August to January inclusive) and within close proximity to breeding colonies/individuals (<100 metres).

- Canals

5.5 The Highbank and Terrace canals together extend approximately 14km downstream to convey the water diverted from the Rakaia River to the top of the terrace. In my opinion, the formation of the canals are unlikely to disrupt the activities or behaviour of threatened bird species given much of the canal will cross agricultural land and it is understood no part of the canal will be directly on the riverbed itself.

- Head Pond

5.6 The proposed head pond would be positioned on short rotation crop paddocks approximately 3.2 km northwest of Barrhill. In my assessment, bird species likely to be present are introduced birds such as black bird and song thrush and widespread abundant native/endemic passerines such as grey warbler and silvereye. I consider that the construction of the head pond would be unlikely to significantly disrupt any indigenous bird activity or behaviour since most of the land in this area is agricultural with very little vegetation that would present significant habitat for indigenous bird life.

- Barrhill Power House and Plunge Pond

5.7 The Barrhill Power Station site and associated plunge pond would be located on low-use farmland at the toe of the river terrace. The land in this area is heavily vegetated by exotic weed species, particularly gorse and broom. I noted several small seeps present within this area on the day of the site visit, though did not observe any birds in the area. In my opinion, excavating the area could potentially disturb breeding passerine birds such as the grey warbler, a widespread and abundant endemic species and silvereye an abundant native species, both of which are known to nest in gorse.

- Barrhill Tailrace

5.8 A secondary channel runs along the edge of the river bank in the vicinity of the tailrace channel, which I understand would eliminate the need to extend the tailrace across active riverbed. This avoids, in my opinion, disturbing the river flat area, which is valuable breeding habitat for river specialist bird species. Considering the dynamic nature of braided rivers and the high possibility that the channel could move, I consider there to be potential to disturb birdlife on the river in the

event that the tailrace needed to be extended onto the active riverbed. Disturbance would have the most significant adverse effect if works were carried out during the breeding season.

Operational Effects

- Intake and Sediment Disposal

- 5.9 The Rakaia hydro intake is designed to take a maximum of 40m³/s. I understand that any water taken from the river would be abstracted in accordance with the provisions of the National Water Conservation Order (Rakaia) 1988 (NWCO). The proposal would remove water from a main channel of the Rakaia River.
- 5.10 I note that a reduction in channel flow and level could facilitate predator access to bird colonies on islands on the river. Predators such as cats, rats and stoats pose a significant threat to endangered bird species breeding on the riverbed. Furthermore reduced flows can affect aquatic invertebrate life and thus impact upon the food source of birdlife on the river, in particular wrybill and black-fronted terns.
- 5.11 In my opinion however, assuming the main channel does not move significantly, and taking account of the relatively small size of the take in comparison with the mean flow m³/s in the Rakaia River I expect that any adverse effects of the take on the birdlife of the river would be minor. A large portion of the riverbed affected by the scheme is already connected to the riverbank during low flows, and accordingly I do not consider that reduced flows would exacerbate predation of nesting riverbed birds in these areas. However, while a reduction of flow within the river may facilitate predation, I understand that the ACWT scheme would cease to take water well before the minimum flows identified in the National Water Conservation Order were reached.
- 5.12 I understand that the proposed settling pond would need to be cleaned out annually, using mechanical means, with the applicant proposing to deposit the sediment on an area of dry river bed for gradual disposal through flood events. The applicant estimates that on average 91,700 tonnes of sediment per year would be placed on the open river bed adjacent to the intake storage pond, covering an area of approximately 20 hectares. In my opinion, this disposal site is a potential breeding and feeding ground for wrybill, black-fronted terns, banded dotterels and possibly black-billed gulls, due to the large size and open gravels of the area, a lack of exotic plants, and its vicinity to major channels which are known to be important feeding grounds for black fronted terns, wrybill, banded dotterels, white-fronted terns, and black-billed gulls. I am of the view that depositing sediment on this area could have a significant adverse effect on the naturalness and intactness of the river in relation to bird habitat, and a significant effect on the birds which would otherwise use the area.

5.13 The alternative disposal method of sluicing proposed by the applicant, and which is already consented under the EA/BCI consents would avoid the need for sediment disposal directly onto the riverbed. In my opinion, any reduction of traffic or movement of mechanical plant on the river bed that could disturb or damage nesting sites, and any measures to avoid sediment deposits on the riverbed would be preferable to depositing sediment on the riverbed. However, this aside, the key to undertaking any works in the riverbed area is its timing. All works in the riverbed should be avoided to the greatest extent possible during the nesting season, which as a minimum would generally extend from August to the end of January each year. By using the sluice method of sediment disposal, sediment could be returned to the river under consented flow conditions where the river turbidity is already naturally high. The sluice method could be used during the sensitive nesting period, which would avoid the need for vehicles to access the riverbed. The applicant could therefore continue to return sediment to the river during the crucial nesting period without intruding onto the riverbed.

- Maintenance Activities

5.14 Maintenance involving earthworks would be likely from time to time to reinstate flow diversion berms upstream of the intake, and undertake riverbank, scheme and discharge channel maintenance. Such maintenance would be particularly necessary after major flood events, and would be required throughout the life of the project. I understand such works would primarily be undertaken using bulldozers and/or diggers, and would involve short term intrusion into the riverbed and margins.

5.15 In my opinion, any earthworks or machinery on the riverbed or margins could potentially result in significant disruption to birdlife if it is carried out when birds are within the footprint of the maintenance area. I have suggested specific mitigation in Section 8 of my evidence to address this issue. If appropriately timed to avoid breeding seasons and assuming any works are preceded by a qualified assessment of the riverbed to identify and locate any nesting birds, I consider that significant effects on birds and bird habitat could be avoided. This is particularly important in this instance as uncontrolled recreational vehicle traffic may already be adversely affecting nesting birds, so any reduced risk to riverbed birdlife would be preferable.

- Discharges

5.16 Water containing minor amounts of sediment would be discharged into the river via the proposed fish bypass channel at an average flow rate of 2m³/s. As this would be a reasonably constant discharge using an old river channel, I consider that any adverse effects on birds would be minor.

5.17 The scheme design includes an emergency overflow spillway on the Highbank Canal to discharge water back to the Rakaia River in the event of an unintended scheme shutdown or gate failure. A

discharge up to a rate of 40m³/s would cross the vegetated river flat to the river, spread over approximately 100m of canal. This has the potential to affect birds if they are nesting in flow path of the discharge, as there is potential for nests to be washed away by sudden rises in water, and flooding of the river flat and margins. However, I understand that emergency discharges are extremely unlikely to occur, and in the event that they did, would be very brief in duration. Consequently, I do not consider this discharge to be significant in terms of the effect it could have on birds in the area because of the extremely low probability of it ever occurring.

- 5.18 The operational discharges from the existing Highbank Power Station formed tailrace would be reduced in most circumstances under this proposal. Discharges from this point have been part of the environment for some decades. The change in discharge regime from this location is unlikely to result in significant adverse effects on bird life or habitat.
- 5.19 The final discharge point on the scheme would be from the Barrhill Power Station tailrace. This tailrace would be located across vegetated river flat which historically appears reasonably stable, and is of currently limited value as habitat for river specialist bird species. The tailrace would terminate in a fish barrier connecting with an old river braid that would be reactivated, and when the station was discharging would flow as a natural river braid. Consequently, the proposal would not require extensive engineering works or structures in the riverbed thus this largely avoids disturbance to bird species nesting on the river flats.

6. SUBMISSIONS

- 6.1 Several submitters raised concerns regarding the effects of the proposal on the natural values of the Rakaia River, and the birdlife in particular. Most of the relevant submissions refer in general terms to the potential for the degradation of wildlife values of the river, and to the potential for adverse effects on birds with "cryptic nesting habits" that nest on the exposed gravel river bed areas.
- 6.2 In my assessment, the matters raised in submissions can be largely addressed through minimising works in the riverbed in general, and avoiding them during the nesting season altogether. In doing so, the adverse effects of construction works on birds and habitat would be mitigated during the construction phase, and would be minimal during the operation of the scheme. In observing suitable mitigation measures and adhering to the recommended conditions of consent, I consider that the bird life values of the riverbed and margins would be safeguarded and maintained, and the effect would be minor.

7. OFFICER REPORTS

- 7.1 The report of the Officers' of the Ashburton District Council does not raise any significant issues of adverse effects of the ACWT Scheme on avifauna in general or on riverbed birds in particular.
- 7.2 In the Officer's report of the Canterbury Regional Council concern is expressed for the effect of sediment release from the sediment pond on riverbed birds. However, the report acknowledges that the applicant intends to release sediment in the winter months outside the bird nesting season. During the nesting season the report advocates a survey of birds prior to any in-river works. In paragraph 166 the report recommends such a survey would be required before any works from September 1 to May 31. In my opinion this mitigation would be more appropriate during the nesting season from August to January. September 1 to February 1 is the period proposed for this mitigation in the Recommended Conditions of the Officer's report and concurs with that proposed by the applicant (with an extension to include August).

8. MITIGATION MEASURES / CONDITIONS OF CONSENT

- 8.1 In general, most mitigation measures centre on the need to avoid contact with or disturbance of nesting or feeding birds, disruption to their food supply, or exposure to increased predation. By minimising the need in construction, operation or maintenance of the scheme to enter the river margins or river bed, this can be readily achieved. In particular favour of this scheme is that fact that the amount of contact with the river bed and margins is minimal (largely constrained to the interface points noted previously), and since much of the scheme crosses agricultural land. However, the following suggested mitigation measures would go some way to ensuring that the effect on bird life and habitat is limited.
- 8.2 The following mitigation measures are suggested as a minimum:
- Avoid direct sediment disposal to the riverbed where possible, or reduce or replace it by other methods such as sluicing sediment directly to the river at times of high flow, or disposal to alternative sites away from the riverbed and margins;
 - Avoid where possible all major construction and maintenance works in the river bed and margins between 1 August and 1 February each year;
 - Engage a qualified and suitably experienced ornithologist to survey the riverbed for the presence of the bird species identified in Appendix A within or in proximity to any areas of in-river or river margin works prior to the commencement of any works in the period from August 1 to February 1;

- Limit excavation, stockpiling and any construction related works to a defined area within close proximity to the canal alignment to limit “creep” of the area impacted by the works. This could be achieved for instance by physically defining the extent of the works area at each stage of development.

8.3 I have also attached in Appendix B a list of conditions of consent that may assist in achieving the above mitigation measures. I have based these on similar conditions to those imposed on the recently granted construction consents for the EA/BCI scheme that would form the first part (intake through to Highbank discharge) of the ACWT scheme.

9. CONCLUSION

9.1 There is potential with any works within braided riverbeds such as the Rakaia River to result in significant adverse effects on the integrity and habitat values of birds that inhabit gravel riverbeds and margins. In particular, the birds of conservation concern listed in Appendix A are particularly vulnerable to environmental degradation, encroachment and disruption such as would be likely in any development involving braided riverbeds and margins.

9.2 The proposed scheme however largely avoids such adverse effects by placing infrastructure outside the river on adjacent land of limited value to the species of conservation concern listed in Appendix A. Where the scheme interacts with the river adverse effects could result, but in my opinion the degree of effect can be adequately managed and mitigated to an acceptable degree such that the effect on the listed species would be minor. Most important in avoiding any adverse effect on birds and bird habitat is to avoid or limit as far as possible works in the riverbed during the breeding season.

9.3 On the basis of my understanding of the proposed scheme, and my observations and review of the physical environment and existing literature of the site, I consider that subject to the implementation of appropriate mitigation measures and the application of consent conditions, the scheme could be carried out in a manner that would limit adverse effects on the listed species. Accordingly in my opinion, the adverse effects of the proposal on birds and habitat in the vicinity of the scheme would be no more than minor.

Dated: 15 September 2008

Dr Katrina Hale

Ornithologist

Appendix A: Bird Species

Table 1: Native/endemic bird species and their respective conservation status that are expected or have been previously recorded to be present on the Rakaia River or its banks. The bird survey did not include the diversion reach of the Scheme and should be interpreted only as an indication of the abundance of the species in the mid-section of the Lower Rakaia River.

Common name	Scientific name	New Zealand Conservation Status 2007 (Hitchmough <i>et al.</i> 2007)	Survey Counts Barrhill to SH1 Bridge (DOC 2006)
Black-fronted tern	<i>Sterna albostrata</i>	Nationally endangered	119
Wrybill	<i>Anarhynchus frontalis</i>	Nationally vulnerable	30
Banded dotterel	<i>Charadrius bicinctus bicinctus</i>	Gradual decline	82
Black-billed gull	<i>Larus bulleri</i>	Serious decline	63
South Island pied oystercatcher	<i>Haematopus ostralegus finschi</i>		48
Black-backed gull	<i>L. dominicanus</i>		3683
Pied stilt	<i>Himantopus himantopus leucocephalus</i>		32
Australasian harrier	<i>Circus approximans</i>		0
Black-fronted dotterel	<i>Charadrius melanops</i>		0
Black swan	<i>Cygnus atratus</i>		0
Grey duck	<i>Anas superciliosa</i>	Nationally endangered	–
White-fronted tern	<i>S. striata</i>	Gradual decline	2
Caspian tern	<i>S. caspis</i>	Nationally vulnerable	6
New Zealand pipit	<i>Anthus novaeseelandiae</i>		0
Welcome swallow	<i>Hirundo tahitica</i>		0
New Zealand kingfisher	<i>Halcyon sancta</i>		0
Spur-winged plover	<i>Vanellus miles</i>		227
Black shag	<i>Phalacrocorax carbo</i>	Sparse	3
Little shag	<i>P. melanoleucos</i>		0
White-faced heron	<i>Ardea navaehollandiae</i>		10
Paradise shelduck	<i>Tadorna variegata</i>		25
Canada goose	<i>Branta Canadensis</i>		4
Grey warbler	<i>Gerygone igata</i>		–
Silvereye	<i>Zosterops lateralis</i>		–

Fantail	<i>Rhipidura fuliginosa</i>		-
Shining cuckoo	<i>Chrysococcyx lucidus</i>		-
Duck species	<i>Anas spp</i>		52

Appendix B:

Proposed Conditions of Consent

- 1) Prior to any mechanical works being carried out in the period 1 August to 1 February, the consent holder shall ensure that:
 - (a) A suitably qualified and independent person inspects the proposed area of works, no earlier than eight working days prior to any works being carried out, and locates any bird breeding sites of riverbed nesting species listed in Appendix A; and
 - (b) The person carrying out the inspection prepares a written report that identifies all the located bird breeding or nesting sites and provides copies of that report to the consent holder and the Canterbury Regional Council; and
 - (c) The name and qualifications of the person carrying out the inspection are provided to the Canterbury Regional Council with the report; and
 - (d) Any person carrying out works authorised by this consent are informed of any bird breeding or nesting sites located.
- 2) Excavation shall not occur within 100 metres of birds, which are nesting or rearing their young in the bed of the river.
- 3) All practicable measures shall be undertaken to minimise adverse effects on property, amenity values, wildlife, vegetation and ecological values.