

**BEFORE THE SOUTHLAND REGIONAL COUNCIL**

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

**AND**

**IN THE MATTER** of applications for resource consents for the  
Lake Te Anau to Manapouri multi use trail

**BY** **THE FIORDLAND TRAILS TRUST**  
Applicant

---

**BRIEF OF EVIDENCE OF SIMON HERBERT BEALE**

**4 September 2019**

---

---

FLETCHER VAUTIER MOORE  
LAWYERS  
PO BOX 3029  
RICHMOND 7050

Telephone: (03) 543 8301  
Facsimile: (03) 543 8302  
Email: cthomsen@fvm.co.nz  
Solicitor: CP Thomsen

**1. QUALIFICATIONS AND EXPERIENCE**

1.1 My full name is Simon Herbert Beale. I am a Director of Beale Consultants Limited, an independent ecology and planning consultancy.

1.2 I hold a Bachelor of Science in Zoology from the University of Otago and a Bachelor of Forestry Science from the University of Canterbury. I am a Member of the New Zealand Ecological Society the Environment Institute of Australia and New Zealand and the New Zealand Planning Institute. I am a Certified Environmental Practitioner.

1.3 I was previously employed by MWH New Zealand Limited for 22 years and more recently with WSP Opus as a terrestrial ecologist and environmental planner. Much of my recent experience has been dedicated to undertaking ecological assessments for infrastructure projects and tourism related developments.

1.4 I am familiar with the ecology of the affected wetland and its setting having conducted a site visit in the company of David Boniface on 11 October 2018.

1.5 I have prepared a report dated November 2018 which describes the terrestrial ecology of the wetland, its ecological significance and the ecological effects of trail construction. I have corresponded with Dr Lloyd on matters arising from that report.

**2. CODE OF CONDUCT**

2.1 I have read and am familiar with the Code of Conduct for Expert Witnesses, in the current Environment Court Practice Note (2014), have complied with it, and will follow the Code when presenting evidence to the Council. I also confirm that the matters addressed in this statement of evidence are within my area of expertise, except when relying on the opinion or evidence of other witnesses. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

---

### **3. SCOPE OF EVIDENCE**

3.1 My evidence will cover the following matters:

- wetland description
- ecological significance of wetland
- ecological effects
- agreed remedial and compensatory measures
- the staff report
- conclusions

3.2 In preparing this evidence I have read the following documents:

- The resource consent application for wetland modification prepared by WSP-Opus including appendices lodged with Environment Southland on 18 February 2019;
- The WSP-Opus response to the further information request from Environment Southland dated 7 March 2019;
- Peer review assessments prepared in letter form by Dr Kelvin Lloyd to Environment Southland dated 26 February, 8 April and 11 April 2019;
- The staff report prepared by Mrs Sonya Nicol; and
- A report prepared by Mr David Hamilton dated 2 September 2019 which forms Attachment 1 to my evidence.

3.3 I corresponded with Dr Lloyd by email and phone on 12 March 2019 in regard to the initial peer review he conducted at the request of Environment Southland.

### **4. WETLAND DESCRIPTION**

4.1 The wetland as described in my report is classified as a marsh. It is influenced by a spring fed stream that splits into two branches that define the wetland extent at the trail crossing. The wetland is subject to moderate to high water fluctuations as evidenced by areas of mud and silt that exist on the upstream side of the trail.

- 4.2 The wetland vegetation contains sedgeland dominated by purei (*Carex secta*) that lines both streams and mixed shrubland with a sedgeland ground cover that grows on the muddy-silty ground between the streams. The shrubland consists of stands of manuka (*Leptospermum scoparium* var. *scoparium*), shrubs of mingimingi (*Coproma propinqua*) and weeping mapou (*Myrsine divaricata*). The sedge rautahi (*Carex coriacea*) is dominant across the ground beneath an open shrubland canopy near the trail.

## **5. ECOLOGICAL SIGNIFICANCE OF WETLAND**

- 5.1 The wetland has been determined to be ecologically significant in terms of Section 6(c) of the RMA when assessed against the assessment criteria listed in Appendix 3 of the Southland Regional Policy Statement. My assessment is set out in my report that accompanied the AEE.
- 5.2 The wetland reflects the high degree of representativeness, exhibiting natural diversity characteristic of wetlands in the Upukerora Ecological District. The significance of the wetland is further reflected by its location in a land environment where the indigenous vegetation has been reduced to less than 20% nationally and the role it plays in maintaining important biological and hydrological functions, including the stability of the riparian margins.
- 5.3 I agree with Dr Lloyd that marsh wetlands are one of the wetland classes, along with swamps, that have been reduced to the greatest extent in the country since pre-human times and therefore triggers the rarity/distinctiveness criterion.

## **6. ECOLOGICAL EFFECTS**

### Effects on wetland hydrology and function

- 6.1 In his peer review Dr Lloyd states that the adverse effects of trail construction on the wetland is more than minor due largely to hydrological effects. In particular he states the trail is likely to cause local drying of the wetland adjacent to the constructed water table while the trail itself is likely to reduce water flow to the large part of the wetland downstream of the trail. He adds that the adverse hydrological effects are likely to change the composition of the wetland vegetation over time. Dr Lloyd notes however that remediation, mitigation, or compensation actions could potentially address the adverse effects.

- 6.2 In response to Dr Lloyd's assessment, the Trust commissioned hydrologist Mr David Hamilton to undertake a desktop assessment of potential hydrological effects and to recommend appropriate remedial work. In his report Mr Hamilton concludes that trail construction has reduced natural surface and sub-surface flow from upstream to downstream of the trail. This reduced flow has occurred within the zone stripped of topsoil along the trail route. A plan attached to his report (Attachment 1) defines the extent of the wetland potentially affected by the trail being an area immediately adjacent to the water table and a wedge shaped area downstream of the trail.
- 6.3 Mr Hamilton supports the infilling of the water table and considers the groundwater levels upstream and downstream of the existing culverts have been retained. He recommends the placement of an additional 300 or 400 mm diameter culvert between the northern and southern culverts in order to return water to an area of higher ground downstream of the trail to ensure this area does not dry out.
- 6.4 During an exchange of emails Dr Lloyd and I agree that infilling of the water table using the same peat/silt material that was excavated is the best means of minimising any localised drying of the wetland. This would need to be undertaken in autumn or winter to avoid burying the sedge rautahi which will naturally recolonise the infilled water table.
- 6.5 Dr Lloyd and I agree that the infilled water table needs to be monitored to address any settlement that occurs to ensure the original ground level is maintained. This would be undertaken immediately after the remedial works have been implemented and then on two further occasions to assess whether there has been any settling that requires any refilling before any active growth or colonisation of the infilled water table by rautahi.
- 6.6 Retention of the existing culverts and placement of the additional culvert as recommended by Mr Hamilton, along with infilling of the water table, will in my opinion avoid any adverse effects on the hydrology of the wetland. This will, therefore, maintain wetland function by ensuring that potential localised changes in the wetland vegetation will be avoided.
- 6.7 Dr Lloyd in his assessment drew attention to the existence of a grove of exotic trees upstream of the wetland on private property which are likely in his opinion to be crack willows. However, recent correspondence with the landowner confirms that these trees are Japanese fodder willow (*Salix schwerinii*

“Kinuyanagi”) which I understand are non-invasive and not a threat to wetlands. While I have been onsite, I have not assessed these trees.

#### Effects on natural character

- 6.8 Dr Lloyd in his assessments states that problem weeds such as Scotch broom that occurs in patches in the wetland are very likely to be having an adverse effect on the natural character of the wetland. Dr Lloyd adds that control of Scotch broom could mitigate these adverse effects on natural character.
- 6.9 The natural character values of wetlands, including stream margins, encompass natural elements such as indigenous wetland vegetation and its spatial distribution, natural drainage patterns (both surface and sub-surface) and the quality and diversity of habitat for indigenous flora and fauna.
- 6.10 I agree with the Reporting Officer that there are adverse effects from the trail on natural character through the removal of indigenous vegetation.
- 6.11 I support the proposed condition of consent requiring the consent holder to undertake an active weed management programme over an area of approximately 2,000 m<sup>2</sup> upstream of the trail beyond the active weed control corridor that is currently in place. Weed control in this area should target Scotch broom, gorse, Darwin’s barberry and other problem weed species and should involve targeted spraying on at least a twice-yearly basis. The programme would be ongoing in tandem with the current trail corridor control programme.
- 6.12 In particular weed control over this area will reduce competition for indigenous wetland plants and allow them to exert structural dominance over this part of the wetland enhancing its natural character and protecting and restoring areas of indigenous vegetation.

#### Cumulative loss of wetland

- 6.13 Dr Lloyd in his assessment refers to adverse effects arising from the cumulative or direct loss of wetland extent due to trail construction. He notes that while the extent of wetland loss is relatively small the adverse effects are more than minor. In my opinion the small area of wetland lost will not diminish the range and diversity of the indigenous vegetation and habitats in the wetland by a more than a minor extent.

6.14 Dr Lloyd proffers options that will have positive effects on the wetland. These involve the control of problem weeds such as Scotch broom as previously mentioned. Dr Lloyd adds that if these actions, which I consider are compensatory, are undertaken with sufficient care and diligence, the ecological effects of trail construction on the wetland function and natural character should be no more than minor. I agree with Dr Lloyd.

6.15 In summary the adverse effects arising from the direct loss of wetland can be will be no more than minor when assessed against the positive effects that will be derived from the implementation of proposed remedial and compensatory measures as discussed above. These measures will ensure wetland function and habitat quality is maintained.

## **7. SUMMARY OF REMEDIAL AND COMPENSATORY MEASURES**

7.1 In summary the remedial and compensatory measures I recommend are:

- Infilling of the water table in accordance with the methodology agreed to between the two ecologists;
- Installing a 400 mm diameter culvert about halfway between the northern and southern culverts to reinstate surface and shallow sub-surface flows to the wetland downstream of the trail;
- Retain the existing northern and southern culverts;
- Undertaking programmed control of weed species occurring in an area of approximately 2,000 m<sup>2</sup> upstream of the trail.

7.2 I note that the infilling of the water table and undertaking control of problem weeds are remedial and compensatory measures supported by ecologist's Dr Alan Mark and Mr Chris Stowe who provided submissions in support of the application.

## **8. STAFF REPORT**

8.1 In Section 2.3 of her report Mrs Nicol states the hydrological effects of the trail on the wetland and the effects arising from direct loss of wetland vegetation are more than minor. However, she qualifies these statements with the bracketed words "prior to any remediation proposed". I assume the inclusion of this qualifier

reflects her recognition of the positive effects of the measures recommended by Dr Lloyd in reducing adverse effects of the trail on the wetland.

- 8.2 With respect to the commentary on Objective 14 of the proposed Southland Water and Land Plan (pSWLP) I disagree with Mrs Nicol that the proposal will not maintain the natural wetland. The small area of wetland lost due to the trail construction has not in my opinion diminished the range and diversity of the indigenous vegetation and habitats in the wetland. Furthermore, the volunteered remediation and enhancement measures, in particular the measures aimed at restoring hydrological functioning, will maintain the life supporting capacity of the wetland through reinstatement of surface and sub-surface water flows downstream of the trail. This will prevent any drying out of the affected area of wetland and in turn avoid changes that may occur in the composition of the indigenous wetland vegetation communities arising from an alteration of the wetland hydrology.
- 8.3 Reinstatement of the wetland hydrology in combination with weed control is consistent with Objective 14 as it will restore and maintain the range and diversity of the indigenous plant communities and habitats within the wetland. As such, the quality of the wetland will not be reduced by the presence of the trail and there will be positive effects from the measures proposed.
- 8.4 In terms of Objective 17 of the pSWLP I agree with Mrs Nicol that the natural character value of the wetland has been diminished by trail construction on the basis that there has been removal of indigenous wetland vegetation within the trail corridor. However the control of problem weeds in the wetland over a 2,000 m<sup>2</sup> area as volunteered by the Trust will in my opinion compensate for these localised effects on the natural character of the wetland by increasing the overall extent of indigenous wetland vegetation in the vicinity of the trail, including the riparian margins.
- 8.5 Under Policy 32 of the pSWLP it is my contention that the construction of the trail is not contrary to this policy on the basis that while a small area of the wetland has been lost, its protection is assured through remedial hydrological measures and through control of problem weeds such as Scotch broom and gorse. In the absence of control measures these weeds would increase in density and area within the wetland contribute to a decline in wetland function and habitat quality.
- 8.6 The remedial hydrological and weed control measures are focussed on protecting the indigenous vegetation and habitats of the wetland which are assessed as



ecologically significant under Section 6(c) of the Act. These measures will also maintain wetland function. These positive effects additionally align with the intent of Policy 32 of the pSWLP as well as Policy 34 of the pSWLP. This integrated approach to remedying the adverse effects of the trail on the wetland is also consistent with Policy 38 of the Operative Regional Water Plan.

- 8.7 In terms of Policy 33 of the pSWLP it is clear that the trail has reduced the wetland area by a small amount. However, the remedial and compensatory measures recommended by Dr Lloyd and Mr Hamilton which I endorse will in my opinion maintain the function and quality of the wetland. Put another way these measures will compensate for the minor loss in wetland area.
- 8.8 In summary the remediation of wetland through the proposed hydrological and weed control measures will maintain wetland function and in turn protect the indigenous vegetation and habitats of indigenous fauna that are assessed to be significant under section 6(c) of the Act.

## **9. CONCLUSIONS**

- 9.1 Both ecologists are in agreement that the marsh wetland is ecologically significant.
- 9.2 Both ecologists agree that the remedial measures involving the infilling of the table is appropriate and will effectively address the localised hydrological adverse effects on the wetland.
- 9.3 The proposed culvert installation as recommended by Mr Hamilton is an appropriate remedial measure in addressing adverse hydrological effects on the wetland downstream of the trail through reinstatement of surface and shallow sub-surface flows.
- 9.4 The combination of remedial measures will ensure the hydrological function of the wetland is maintained while avoiding any potential changes in the indigenous wetland vegetation cover within the affected areas.
- 9.5 The implementation of programmed weed control within the wetland as agreed to by the Trust is an appropriate compensatory action in response to wetland loss caused by trial construction. This will mitigate the effects of trail construction on the natural character of the wetland by providing suitable conditions for indigenous wetland vegetation in the vicinity of the wetland to increase in extent to the benefit of the wetland's natural character.

9.6 I agree with Dr Lloyd that the ecological effects of trail construction on the wetland should be minor if the recommended remedial and compensatory measures are undertaken with sufficient care and diligence.

A handwritten signature in blue ink that reads "S Beale". The signature is written in a cursive style with a large initial 'S' and 'B'.

Simon Beale  
Senior Ecologist

4 September 2019

Attachment 1 – Hydrology Review Fiordland Trails Trust Lake 2 Lake Leg 6

Fiordland Trails Trust

Attention: David Boniface [dajeck@xtra.co.nz]

**Hydrology Review Fiordland Trails Trust Lake 2 Lake Leg 6**

Resource Consent Application Reference: APP-20191150

Dear David,

In accordance with our Agreement dated 22 August 2019 we have undertaken a desktop review of existing information relating to the application for a retrospective consent for wetland modification on a section of Leg 6 of the Lake 2 Lake Trail near Manapouri. This report reviews the hydrological aspects of the trail and recommends remediation work.

*Material Reviewed*

The Opus resource consent application and the Environmental Report by Beale Consultants November 2018 have been reviewed. The effects of the trail on the upper part of the wetland have been identified in Wildland Consultants report dated 26 February 2019 Effects Assessment that states:

- The trail cuts across the flow of water in the upper part of the wetland, and diverts previously inflowing water into an adjacent stream. This is likely to cause local drying of the wetland adjacent to the water table, and reduce water flow to the larger downstream part of the wetland. These effects are likely to cause local changes in wetland vegetation over time, allowing facultative wetland species such as mānuka to increase in abundance at the expense of obligate wetland species such as purei.

In addition the Environment Southland request for further information dated 7 March 2019 and the Opus reply dated 27 March 2019 has been reviewed.

*Aerial Imagery and Photos*

The site has not been visited. Aerial photos with 0.75m and 0.4m definition for the area taken in 2008 and 2017 respectively have been used for site familiarisation. GoogleEarth images from 2007, 2013, 2014 and 2019 have also been viewed. Drone images supplied by David Boniface and ground photos from Simon Beale and David Boniface have been viewed.

*Culvert installation*

Two 800mm diameter plastic pipe culverts have been installed and details of depth of invert provided (David Boniface L2L Trail Leg 6, Culvert Analysis, Supply Bay Road to Twidle Property, August 2018). The channels upstream and downstream of the culverts do not appear to have been altered so groundwater levels should be similar to before construction.

*Track Construction and Watertable*

The track construction included stripping of vegetation and most topsoil. The placement of fill for the trail would have reduced natural flows at that level. Flows in the gravels underneath the stripped zone would still pass through the site.

DUNEDIN  
CROMWELL  
QUEENSTOWN  
WANAKA

Dunedin Office:  
Level 1, 70 Macandrew Road, South Dunedin  
PO Box 2427, South Dunedin 9044  
[dunedin@geosolve.co.nz](mailto:dunedin@geosolve.co.nz)



Photos of the watertable that drains towards the southern culvert on the upstream side of the track indicate that this is up to 400mm deep, although generally more like 300mm. This watertable picks up a small channel that would have continued on to ground between the two culverts downstream of the track.

*Area potentially affected by reduced groundwater levels*

The areas potentially affected by the track construction on upstream and downstream sides of the track are shown on the attached Figure 1.

*Proposed Solution*

The proposed remediation by way of filling in the upstream watertable is supported as a part solution. A small diameter pipe, nominal size 300mm to 400mm diameter, to pass the higher elevation water between the 800mm culverts would return water to the area of higher ground below the track, and ensure this area does not dry out. This should be placed approximately halfway between the two larger culverts., with the actual location to be confirmed on site. It is considered that a culvert with the ability to pass 20 l/s should be sufficient. This could be provided by a 200mm diameter culvert. Smaller culverts can have a tendency to get root bound and cleaning out is easier with a culvert in the 300 to 400mm diameter size and should be used. See Figure 1 attached for details.

*Discussion and Conclusion*

It is concluded that the construction of the trail between the northern and southern culverts has reduced the interflow from upstream to downstream of the trail through the higher ground between the two 800mm culverts. A small area adjacent to the watertable that feeds to the southern culvert would also have been affected.

It is recommended that remediation be undertaken:

- (a) through filling in of the watertable as previously proposed by Opus in letter 27 March 2019, and
- (b) placing a 300-400mm diameter culvert through the high ground approximately halfway between the two larger culverts. The actual location should be confirmed on site.

Yours faithfully,



David Hamilton  
Senior Water Resources Engineer



**Figure 1: Drone image of section of trail showing proposed remediation work**