

**BEFORE THE COMMISSIONERS ON BEHALF OF
THE OTAGO REGIONAL COUNCIL**

Consent No. RM20.005

BETWEEN

Wakefield Estates Ltd, Rockburn
Wines Ltd, Pisa Holdings Ltd, Mark II
Ltd, Stuart Douglas & Phillipa Mary
Hawker, Albany Heights Limited,
Chard Farm Trustees Ltd.

Applicant

AND

OTAGO REGIONAL COUNCIL

Consent Authority

EVIDENCE OF CIARAN SEWELL MERRICK CAMPBELL

Introduction

1. My full name is Ciaran Sewell Merrick Campbell.
2. I am a Freshwater Ecologist at Otago Regional Council. I hold the following tertiary qualifications; a Bachelor of Science (Ecology and Zoology double major) from Massey University and a Postgrad Diploma in Wildlife Management with Distinction from the University of Otago.
3. I specialise in freshwater ecological research and management of native freshwater fish. I was a freshwater fisheries specialist for the Department of Conservation from 2011 to 2019.
4. I am currently working my way towards a Master of Science (Zoology) through University of Otago, my project focusing on using genomic data to inform phylogenetics, and ultimately formal species descriptions, of threatened non-migratory galaxias fishes in Otago.
5. During the last ten years I have undertaken freshwater fish surveys throughout Otago catchments, and extending into the Waitaki catchment. I have considerable and contemporary understanding on the freshwater ecosystems and fish species of Otago from my employment and tertiary studies.
6. I confirm that I have read and agree to comply with the Environment Court Code of Conduct for Expert Witnesses (Consolidated Practice Note 2014). This evidence is within my area of expertise, except where I state that I am relying on the evidence or information provided by another parties. I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

Scope of Evidence

7. My evidence addresses:
 - An assessment of the nature and ecology of Amisfield Burn
 - Considerations for residual flows at point-of-take
 - Residual flow concerns raised in a submission by Aukaha Ltd.
8. To inform my assessment, I have used
 - freshwater fisheries data provided by the New Zealand Freshwater Fish Database (Crow 2017) - henceforth referred to as NZFFD.
 - Consent Application RM20.005.01
 - An ecological assessment report (Allibone 2019),

- Hydrological evidence prepared by Xiaofeng Lu – ORC Hydrologist.
- Information from my colleagues.
- Observations I made during a site visit, 7 February 2020.

Amisfield Burn

9. Amisfield Burn sources from the upper Pisa Range and flows in an easterly direction towards Lake Dunstan. The creek descends rapidly and flattens out as it hits the valley floor.
10. Otago Regional Council installed a flow recorder (“Amisfield Burn at Top Take u/s”) in the Amisfield Burn in November 2013. Note that the flow recorder is located immediately upstream of the proposed water take and is not impacted by any water abstraction or augmentation (Fig. 1), therefore the recorded flows can be considered natural. Based on the flow data recorded, the following flow statistics have been generated:
 - 69L/s 7dMALF across all seasons – the average of the lowest seven-day flow for each year of record.
 - 42L/s Average lowest monthly flow which occurs from January – April.
11. Based on the data provided in the application, there is an estimated natural loss of surface water to ground of 210L/s (Landpro 2019, Allibone 2019). This supports previous and recent observations that the Amisfield Burn is naturally ephemeral in reaches on the valley floor.

Ecological values

12. To consider the ecological values of the site, NZFFD records were combined with a recent survey report provided in the consent application, and observations by my colleagues.
13. The NZFFD provides presence/absence data for fish species at 13 sites in the Amisfield Burn catchment, three records are in Breakneck Gully, a tributary of Amisfield Burn. Records exist for fish surveys from 1996, 2001, and 2018 (Fig. 2, Table 1). There are three fish species recorded in Amisfield Burn and Breakneck Creek since 1996: brown trout (*Salmo trutta*), upland bully (*Gobiomorphus breviceps*) and kōaro (*Galaxias brevipinnis*).
14. Since 2018, a survey was completed in the Amisfield Burn and neighbouring catchments by Dr Richard Allibone of Waterways Consultants Ltd. Brown trout were detected at two sites in Breakneck Creek and no species were detected at one site in Amisfield Burn (Table 2).

15. Recent additional sampling has been completed and not recorded on the NZFFD, which only found brown trout and upland bullies (Jason Augspurger, pers. comm.).
16. Sampling across Amisfield Burn and its tributary Breakneck Creek is not extensive, however in my opinion, there is sufficient data to determine fish values.
17. Brown trout are an introduced sports fish that appear to have formed a self-supporting, stunted population in the Amisfield Burn catchment (Allibone 2019, Jason Augspurger, pers. comm.), which is highly unlikely to be acting as a nursery to the downstream Lake Dunstan fishery due to the creeks ephemeral nature.
18. Upland bullies prefer lower velocity areas and typically have life histories that do not include migration. There are scattered populations of upland bullies in the Lake Dunstan catchment. Upland bullies are classified as Not Threatened (Dunn et al. 2018). The limited distribution of upland bullies in Amisfield Burn, coupled with their preference for low water velocity reduces the need for residual flow considerations at the point of take.
19. Kōaro are classified as At Risk and Declining with a qualifier of partial decline (Dunn et al. 2018). This indicates that the threat classification panel consider kōaro are in decline only in some regions of New Zealand. There are conservation concerns associated with the expansion of kōaro upstream of inland lakes in Otago, particularly on their negative interactions with threatened non-migratory species such as Clutha flathead galaxias (*Galaxias* “species D”) – which is classified as Threatened – Nationally Critical (Dunn et al. 2018).
20. Although there is no evidence that suggests *Clutha flathead galaxias* are in Amisfield Burn, it makes little sense to provide residual flow considerations for kōaro given the limited records of kōaro in the Amisfield Burn, and their negative associations with threatened species in nearby catchments.
21. Regionally Significant Wetlands are listed in Schedule 9 of the Regional Plan: Water for Otago. There are no Regionally Significant Wetlands that will be affected, adversely or otherwise, by the proposed water take in the Amisfield Burn.

22. In my original assessment (Objective Id A1327635), I recommended that a residual flow should be suggested by the applicant to look after natural character of the Amisfield Burn below the point of take. The applicant suggested that the open channel diversion allows for roughly 50% of the flow to pass the intake, even during low flows (Objective Id A1357760). This equates to a 50:50 flow sharing regime. My response was agreeable to this (Objective Id A1357761). This agreement is consistent with the submission made by Aukaha Ltd. (Objective Id A1352983) which states: "*Kāi Tahu would not oppose an amended application or, any consent that would be subject to the following conditions: (...)*"

- *Retain the requirement for at least 50% of the natural flow in the waterway.*"

23. In my opinion, residual flows should maintain flow connectivity through the point of take to allow invertebrates to drift downstream and move upstream.

24. The hydrological nature and connectivity of natural and manmade waterways in the area are complex and highly variable. To prevent unnecessary mortality, freshwater fishes should be able to move freely between natural waterways, water races, and storage ponds within the systems affected by this application. To further prevent unnecessary mortality, fish screens should be installed on outlet from storage ponds. A drum-shaped screen with 3mm mesh is recommended (Jamieson et al. 2007).

Recommendations

25. My recommendation is that further work is required to establish an agreed water take structure/design that provides the agreed 50:50 flow sharing regime. Monitoring of this residual flow should be in the form of photographs on regular fortnightly basis, photo point needs to be set up. These photographs then should be forwarded on the Consenting Authority.

26. Fish screens established on outlets from storage ponds.

Summary

27. Amisfield Burn is a small, ephemeral creek situated in the Pisa Range, Lake Dunstan catchment.

28. Amisfield Burn has a small, self-sustaining population of brown trout and is unlikely to be acting as a nursery for downstream fishery.

29. I recommend a monitored 50:50 flow sharing regime as a residual flow.

30. I recommend fish screens to be established on outlets from storage ponds.

Ciaran Campbell

28 July 2020

DRAFT

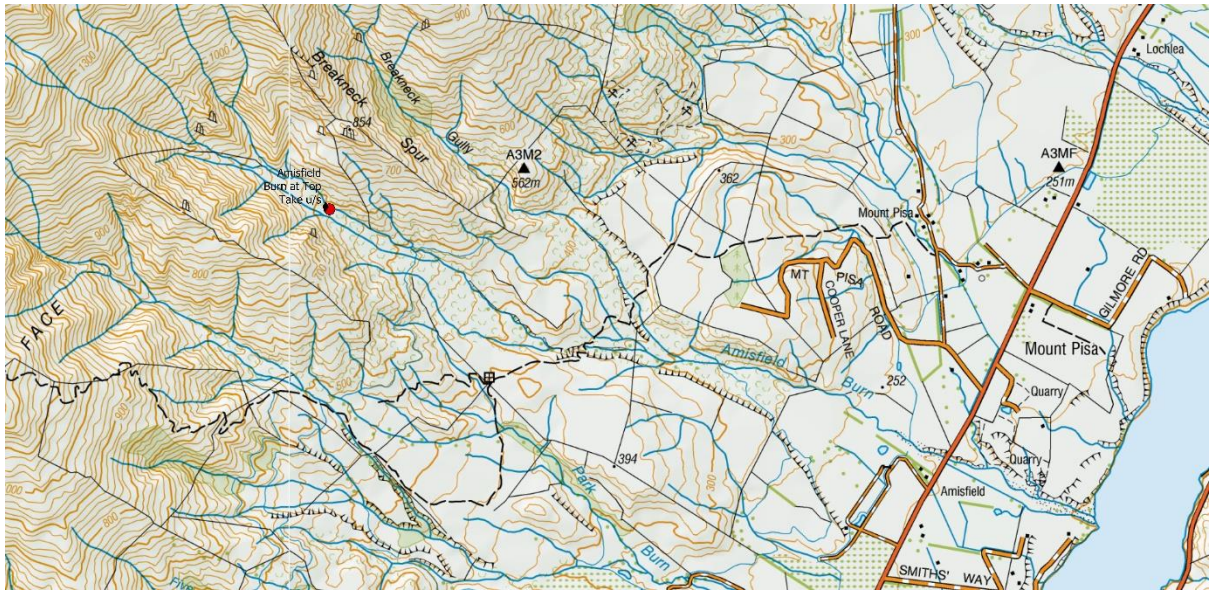


Figure 1. Amisfield Burn catchment, location of proposed water take (Red) – Rm20.005.01, and location of ORC water flow meter (Black diamond – “Amisfield Burn at Top Take u/s”).

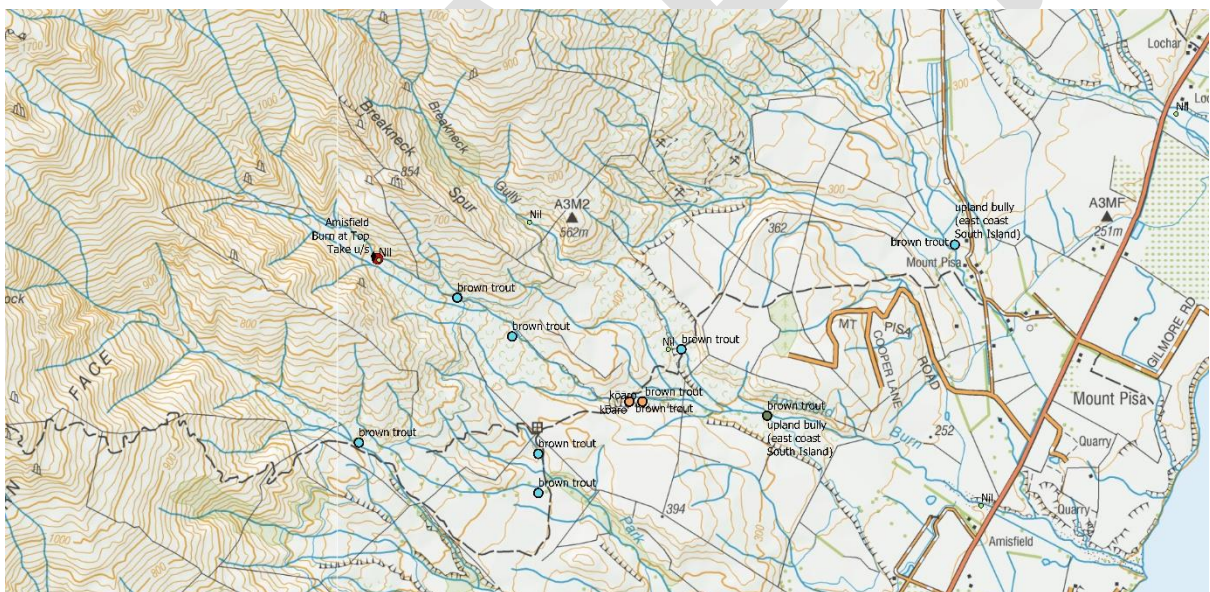


Figure 2. NZFFD records from the Amisfield Burn catchment.

Table 1. NZFFD data from Amisfield Burn and Breakneck Creek

card	m	y	location	org	east	north	fishmeth	species	abundance or number
15505	1	1996	Breakneck	doco	2212600	5580000	efp	brown trout	12
15506	1	1996	Amisfield	doco	2212300	5579600	efp	brown trout	a
15506	1	1996	Amisfield	doco	2212300	5579600	efp	kōaro	1
15509	1	1996	Amisfield	doco	2211300	5580100	efp	brown trout	a
25145	1	2001	Amisfield	doco	2214900	5578800	obs	nospec	
25259	5	2001	Breakneck	doco	2212500	5580000	efp	nospec	
25260	5	2001	Amisfield	doco	2212200	5579600	efp	brown trout	14
25260	5	2001	Amisfield	doco	2212200	5579600	efp	kōaro	1
114078	4	2018	Breakneck	rdcl	2211434	5580975	efp	nospec	
114080	4	2018	Amisfield	rdcl	2213258	5579491	efp	brown trout	18
114080	4	2018	Amisfield	rdcl	2213258	5579491	efp	upland bully	11
114083	4	2018	Amisfield	rdcl	2210278	5580687	efp	nospec	
114163	4	2018	Amisfield	rdcl	2210879	5580397	efp	brown trout	33

Table 2. Water Ways Consulting Ltd Data from Amisfield Burn and Breakneck Creek

Site	Area fished (m ²)	Species and size
Breakneck Ck 1	80	brown trout (length 76-194mm)
Breakneck Ck 2	80	brown trout (length 63-209mm)
Amisfield Burn 1	100	No species

References

Allibone, R.A. (2019). Park Burn and Amisfield Burn Ecological Considerations for Residual Flows. Water Ways Consulting Ltd, report 78-2019 for Landpro Ltd.

Crow, S. (2017). New Zealand Freshwater Fish Database. Version 1.2. The National Institute of Water and Atmospheric Research (NIWA). Occurrence Dataset <https://doi.org/10.15468/ms5iqu>.

Dunn, N. R., Allibone, R.M., Closs, G.P., Crow, S.K., David, D.O., Goodman, J.M., Griffiths, M., Jack, D.C., Ling, N., Waters, J.M., Rolfe, J.R. (2018). Conservation status of New Zealand freshwater fish. New Zealand threat classification series 24. Wellington, Department of Conservation.

Jamieson, D., Bonnett, M., Jellyman, D., and Unwin, M. (2007). Fish Screening: good practice guidelines for Canterbury. NIWA Client Report CHC2007.092. NIWA, Christchurch.

Landpro (2019). Hydrological assessment prepared for water users of the Amisfield Burn: Small Burn Limited, Pisa Holdings Limited, and Lowburn Land Holdings Limited. Technical comment.